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PLUS

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Publisher's Note

Maulik Jasubhai

We set out in 1998 on a journey to redefine what you could expect from a computing magazine in India. Four years later and many miles further on, on that road we are still committed to ensure that Digit continues to be a magazine that sets new standards in technology content in this country.

The last year has been a time of change both within and outside our worlds. Changes so enormous, that it was tempting for most outsiders to write us off.

We proved them wrong.

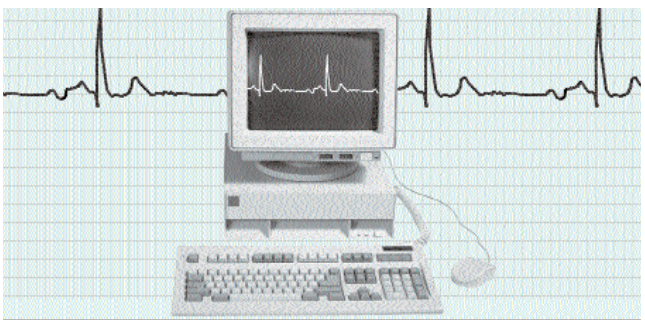
We've moved on from being your best guide to computing to your very own technology navigator. Our greatest strength in all this time has been our people. And here I will take the liberty to include you the reader as 'our people'. Although we strive to create and deliver a magazine of the highest quality, it would not have been possible without your constant support and encouragement.

Karan Manral, over the past year has done some wonderful work and has been the torch bearer for Digit. With this issue I would like to introduce to you another person who is going to take Digit forward into the next stage of its evolution—Vinit Aggarwal, who is familiar to many of you as the former editor of our publication Computer Gaming World. Vinit brings with him extensive experience in various editorial capacities as well as an undying passion for all things technological.

I believe that we'll continue this journey together into the future of technology. We are committed to go all the way, with your support.

Best Wishes
Maulik Jasubhai
Executive Director, Jasubhai Digital Media

APRIL 2002



INSIDE

REGULARS

Reviewed this month

MONITORS 44

15-inch CRT Monitors
Benq V551-M
BPL J5
Compaq MV5400
Krypton 500LR
LG Studioworks 563N
Microtek Flatvision 38F1
Philips 105E
Proview PA-566
Samsung Syncmaster 551s
Samtel SV-410
Viewsonic E53

17-inch CRT Monitors
Benq V771
Benq G773
Compaq MV740
Krypton V798
LG Flatron 700S
LG Studioworks 700S
Microtek 43F1
NEC Multisync 75
Philips 107T
Philips 107S
Proview 787N
Samsung Syncmaster 753s
Samsung Syncmaster 753 DFX
Samsung Syncmaster 765MB
Samtel 17 Futurist
Viewsonic E-70
Viewsonic E771
Viewsonic G73t

19-inch CRT Monitors
Benq 99SL
Compaq MV940
NEC Accusync95F
NEC Multisync 95
Philips 109S
Samsung 955DF
Sony CPD 420
Viewsonic E90

20-21-inch CRT Monitors
Benq P211
LG Studioworks N2200P
Philips 201B
Samsung Syncmaster 1100p Plus
Sony Multiscan G 520
Viewsonic G810
Viewsonic P220 F

LCD Monitors
LG Flatron 568LM
Philips 150MT
Samsung Syncmaster 151MP
Sharp LL-T15S1
Sharp LL-T15V1
Convergent Easel CT-170
LG Flatron 782 LE
Samsung Syncmaster 171MP
Viewsonic VE 170MB
Viewsonic VP181
Sony SDM-N80
LG Flatron 295LM

Inside the CDs

Software

OpenOffice 641c

If you're looking for a free office suite, then OpenOffice 641c should fit the bill. This open

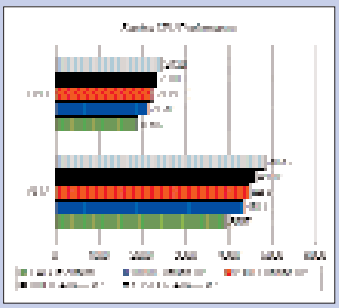
source software features a Word compatible word processor, allows you to save to PDF files, and also offers enhanced printing capabilities

PLUS

Stones WebWriter 3.5.2e
Opera (Java) 6.01, CacheMan 5.1, HTML Compress 4.10

Stress Testing Utilities

Give your PC a much needed boost and test its performance with these stress test and benchmarking utilities: HDTach, Nokia Monitor Test, Quake III:Arena and more



Test Drive

If you're looking for the best in monitors then you won't want to miss these tests and reviews

Newsletters

Round-the-clock help for Linux newbies

Bookmarks

Bring out the Houdini in you with these Bookmarks on magic sites

Tips & Tricks

Choice tips on Win XP

Arena: Top Gun

Medal of Honor:Allied Assault

Play the most exciting of missions from the full game in this action packed demo. Lead your troop of soldiers on a mission to destroy a six-barrelled rocket projector and save lives

Extras

Diablo II Lord of Destruction patch and more

Music

Unwind to the tunes of DJ Smoke, Global Peace Grooves, Sparrowhawk and catch the latest trailers

Gallery

A whole new look for the PC with these wallpapers, Winamp skins, screensavers and themes

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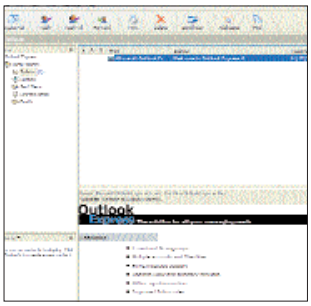
Web Special

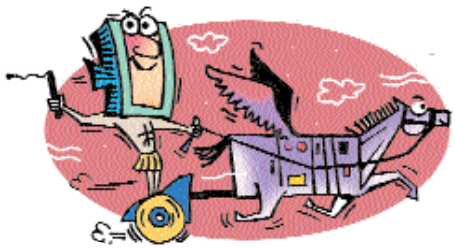


Mastering Outlook

There's a lot more you can do with your Outlook Express. Use these tips to manage your mail better

Tips & Tricks

Get help from the experts on various aspects of computing. Our Tips and Tricks section should help you get things done in a jiffy.



Technology Next

What's up in the tech world?

Up and coming technology—that's what you'll find here. Get an in-depth look at the new technologies that are creating waves and feed your own thirsty grey cells!

Web Special

What it takes to upgrade

If the trusty old desktop has been faltering of late, think twice before you chuck it out the window and buy a new one. These leads on upgrades will help you renew your PC's vigour

VOLUME 2, ISSUE 4

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news feed

DIGIT APRIL 2002

hypethesis

SOUNDBUG

■ What is it?

Tagged as the 'sexiest gadget of the year at CeBit', the Soundbug is a device as small as a computer mouse and can turn any flat surface into a soundboard.

■ How does it work?

The Soundbug can be connected to the headphone socket of an MP3 player, Walkman, etc, and then fixed by suction to a flat surface, thereby turning a wall or a window into a speaker. Sound is transmitted to the flat surface via a small piece of Terfenol, a combination of rare earth materials and iron. Terfenol is placed in an aluminium casing, which in turn is wrapped in a coil. Electricity passed through the coil causes the Terfenol to expand, resulting in a force of 400 pounds which causes the surface to vibrate and broadcast the sound.

■ When will it be released?

Soundbug will go on sale sometime in April 2002. It will be priced approximately $40 (Rs 1,600).

snapshot

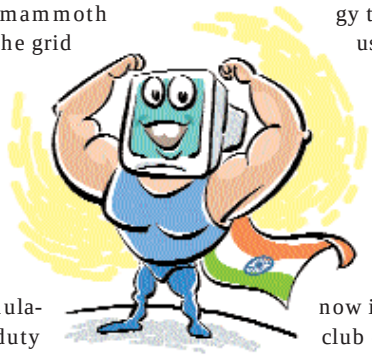
2.2%

of the world's population is online

Source: *www.ucsi.cc*

India to build Supercomputing grid

India's state-run agency for advanced computing, C-DAC, plans to build a nationwide grid of supercomputers for mammoth applications. The grid would be used to aid environmental modelling, fast analysis of satellite images, advanced chip design and simulation of heavy-duty equipment such as turbines.



C-DAC has faced more than a decade of technology export restrictions from the US, particularly relating to the Cray supercomputer on the grounds that India might put the technology to military use. Despite sanctions, C-DAC has built four versions of its Param series of machines and India is now in the elite club of supercomputing nations such as the US, Japan, Israel and China. The latest Param crunches numbers at a speed of 100 gigaflops, or 100 billion floating point operations per second, placing it among the world's top performers, although the US has developed machines that are 10 times faster.

C-DAC's computers, built on a sophisticated clustering of microprocessors, would resemble the popular Napster peer-to-peer file-sharing system, but its scale is humongous and its design intricate, R.K. Arora, Executive Director of C-DAC said. C-DAC plans to link the seven Indian Institutes of Technology (IITs), the Bangalore-based Indian Institute of Science and other academic institutions to the I-Grid.

DivX gets a facelift

DivX Networks released the latest version of its digital video technology, DivX 5.0.

It includes improvements to image quality and compatibility with the MPEG-4 format. DivX 5.0 uses 'psychovisual modelling', which selects image data in the encoding process based on how people perceive motion, light and colour, and places that data where the eye is most sensitive to it.

DivX Networks have been struggling to establish a means of making money out of its popularity among video-traders on free peer-to-peer trading networks.

It clocked more than 1 million downloads within 48 hours of its latest release. DivX is trying to go legitimate now, and includes digital rights management, or DRM technology, which would protect movies from being bootlegged.

Foul Play at CeBit?

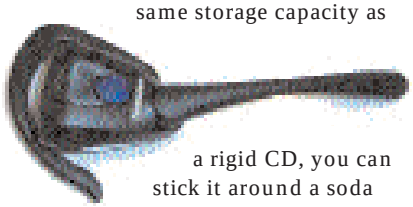
Reflecting bad gaming spirit, Microsoft played spoilsport and reported on Sony to Hannover Messe AG, the organisers of CeBit. The point of contention was that Sony was breaching show rules by letting people have a go at the Sony PlayStation 2 (PS2) consoles. Technically, Microsoft was right, and Sony had to pack up its 27 PS2s. Sony has shown PlayStation consoles for the past three years without any problem. Microsoft also demonstrated its game machine at the show this year.

➜

■ Palm launches new HTML browsers ■ Israel based Check Point Software releases firewall for PDA ■ Microsoft to launch new file system for Windows

Showstoppers at CeBIT 2002

CeBIT 2002 saw a lot of hot new products and technologies. Take for example the flexCD, which is the first physically flexible CD on the planet. With the same storage capacity as



a rigid CD, you can stick it around a soda can like a sticker, or even wrap it around pencils.

Plantronics announced the future of speech communications by releasing M1500, its first Bluetooth headset for a wide range of mobile phones.

Toshiba unveiled its new European GPRS i-mode phone, the TS21i, which features a large, colour screen and high-speed data access using GPRS.

Roxio previewed a technology code-named 'Hitchcock', which has been developed to combine CD and DVD recording into one integrated, easy-to-use application.

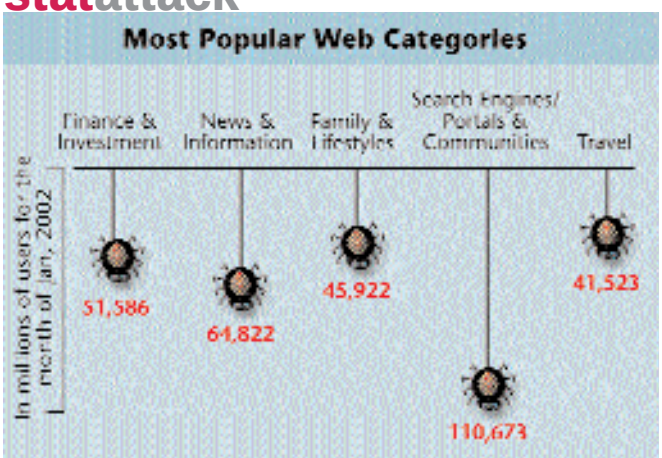
Other high-profile launches included Transmeta's Midori Linux for mobile devices. And for all car lovers, IBM sponsored the Smart car while Fujistsu Siemens featured the Mini.

You've got MTNL

MTNL Internet and phone subscribers can now be notified via phone every time they receive a new mail. The system works on a text to voice scheme. You can check your mail on the phone, hear the subject of the message, the name of the sender and even the content of the e-mail, if you so wish.

The MTNL e-mail-to-phone system, based on unified messaging service capabilities, can handle 2.1 lakh subscribers simultaneously. The service can be made available to both fixed line as well as cellular subscribers of MTNL, and is scheduled to become operational in the first half of the year 2002.

statattack



Source: *www.nielsen-netratings.com*

Slash the ads

Slashdot.org will put up larger ads and place a premium on ad-free pages. A note on the site from co-founder CmdrTaco said, "We don't have an option; these are what advertisers want, and if we don't provide them, we won't be around much longer. But we want to give you an option to see Slashdot without these ads." The site will also offer subscribers an inventive way to avoid ads—pay $5 for every 1,000 ad-free pages.

PC games: Not dead as yet

Microsoft revealed its PC game plans through next year with the release of the Xbox. Upcoming titles include *Rise of Nations*, an empire-building game similar to the popular *Civilization* series, and *Age of Mythology* a strategy game based on the *Age of Empires* series. Other AAA titles expected this year are *Combat Flight Simulator III*, *Asheron's Call II*, *Zoo Tycoon: Dinosaur Digs* and *Links 2003*.

redalert

Klez resurfaces

Klez, the worm, which was spreading via e-mail, has now become a menace. Documents, spreadsheets and other graphic images are vulnerable to attack. The worm gets activated on the 6th of every odd-numbered month. It can cause extensive damage that can wipe your hard disk clean. The virus reaches your mailbox with a subject and body that comprise a lengthy string of random text within which the virus incubates. When activated, the virus copies a file that bears the name Wink followed by some random characters and ends with a .exe extension. As a protective measure, you can carry out a search for this file and delete it from your computer. Also run a thorough virus check after updating your virus database. The virus spreads through a security hole in Outlook. Get the Patch at ***www.microsoft.com***.

Sharpei hits .NET

A new virus, Sharpei, based on C# is on the prowl. It targets .exe files on the .NET platform and spreads via e-mail. This is more or less similar to the earlier 'Donut' virus genre. It is one of those slippery viruses that e-mail themselves as a 'Windows update'. The subject line is quite convincing—it states that the sender has tried and tested the attachment. Once opened, the virus mails itself to all contacts in your Outlook and even removes traces of itself from the sent folder and the inbox.

All major anti-virus manufacturers have issued patches for Sharpei detection and control.

➜

■ AMD unveils 1.73 GHz Athlon XP 2100+ processor ■ Siemens releases M50 Java enabled MMS phones ■ Intel gives the green signal to HP-Compaq

ISPs embrace Internet telephony

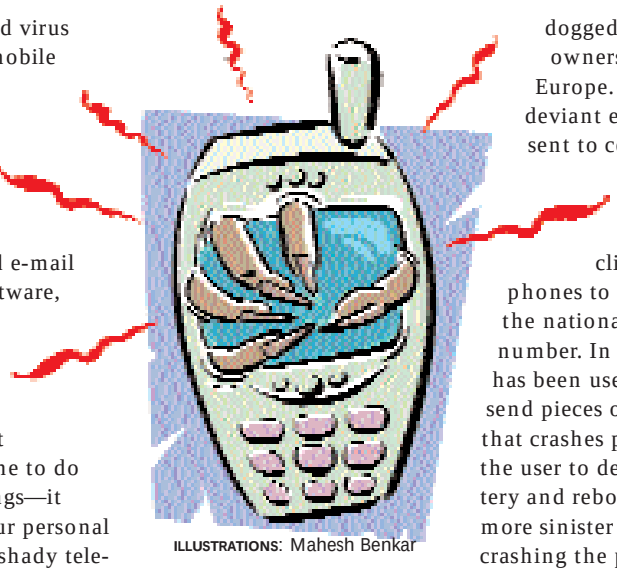
Following the unshackling of Internet telephony in April 2002 by the Telecom Regulatory Authority of India (TRAI), leading ISPs are all geared up to offer this service to subscribers. Sify, NOW, and HCL Infinet, along with most Category A ISPs have made modifications to their infrastructure to build on this recent development.

The voice market in India is estimated to be around Rs 33,000 crore, of which Internet telephony might grab a share of 2 to 3 per cent. Currently, a call to the US from India costs around Rs 55 per minute but with the introduction of Internet telephony, this cost is sure to come down drastically to Rs 33 per hour (Rs 25 to the basic telephone operator and Rs 8 for Internet access).

As per the TRAI recommendations, the scope of this service will include only PC to PC (both within the country as well as abroad), PC to Phone (PC in India, phone abroad) and IP-based terminals in India to similar terminals both in India and abroad.

Hackers target mobiles

For hackers and virus writers, the mobile phone is the next frontier. As cellular phones morph into 'smartphones' that can surf the Web, send e-mail and download software, they're prone to the same dangers that have plagued PCs. A phone virus might instruct your phone to do extraordinary things—it might forward your personal address book to a shady telemarketing firm. Or it could simply eat into the phone's operating software, shutting it down and erasing your personal information.



ILLUSTRATIONS: Mahesh Benkar

SMS bombers are available on the Net on hacking sites that allow you to flood ANY cell phone. Just send 10,000 SMS instantly to crash a cell phone.

Such attacks have already dogged cell phone owners in Japan and Europe. In Japan, deviant e-mail messages sent to cell phones contained an Internet link that, when clicked, caused phones to repeatedly dial the national emergency number. In Europe, SMS has been used to randomly send pieces of binary code that crashes phones, forcing the user to detach the battery and reboot. A new, more sinister version keeps crashing the phone until the SMS message is deleted from the carrier's server. At least three software companies have released personal security software for emerging smart phones.

64-bit computing and you

Yamhill Technology is Intel's secret weapon against upcoming chips from rival AMD. It's also a safeguard against the possible failure of Intel's Itanium chips for

computer servers, which have so far had a disappointing reception. Apparently Yamhill is Intel's 64-bit plan B. Itanium faces performance comparisons not just from AMD's Hammer, but also from Sun and IBM who also are investing heavily in their 64-bit processors. And of course, with AMD bringing in a 64-bit, backward-compatible x86 chip to the market, there's a fair chance we'll see affordable 64-bit computing for the x86 platform sooner than anyone anticipated.

snapshot

Popular activities on the Internet include
e-mail 90%
banking 37%
job searches 31%

Source: www.ucsi.cc

heroes

Xbox

Voice recognition for the Xbox will allow to you interact verbally with the game environment.

MS Visual J#

Newly released Visual J# .NET will allow programmers to code for the .NET platform using Java.

zeroes

XP Phantom Menace

WinXP integrated with speech recognition capabilities runs amok and disturbs users.

Yahoo!

Cuts down POP3 access and imposes fee on the same.

merger ■ FBound computer virus wiggles its way to Asia ■ Morpheus to launch legitimate music service ■ Nigerian e-mail hoax trails on under WTC facade

Will cheap PCs end Microsoft monopoly?

Microsoft's software monopoly is running out of time, says open-source guru Eric Raymond, and he's got a precise figure for when the company's position will no longer be sustainable—$350. "When the price of a PC falls below $350, Microsoft will no longer be viable. The reason is that if you sell something below that price, you can't afford to pay royalties to Microsoft and still make money." Prices are falling in the PC market, and it isn't difficult to imagine buying a computer for about the same price as a DVD player before long, he said. Ultimately, the commoditisation of PCs and the shift to the Internet will make Microsoft's relatively expensive software obsolete, Raymond argues.

Not just a Flash in the pan

For most surfers, Flash is what decorates Web sites and makes them worth visiting. With Flash MX, Macromedia wants to provide a one-stop resource for designing Web pages. The upgrade expands the role of Flash's initial function as animation software. The ubiquity of the Flash player on PCs has made it hard for would-be competitors to gain any ground, and Macromedia plans expanded tools for delivering Web applications.

It is in the midst of a far-reaching campaign to include the Flash player in all manner of Internet-connected devices.

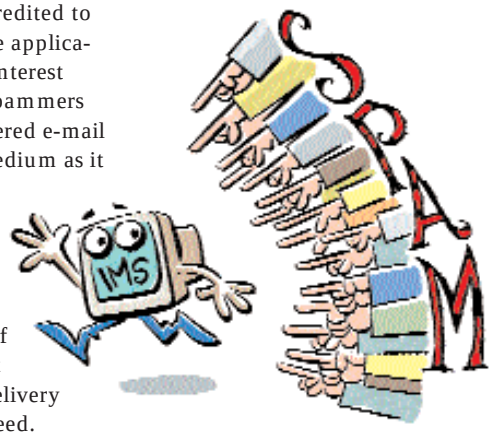
The promised results include business Web sites that will be substantially easier for customers to navigate and cheaper for businesses to maintain.

The shift of Flash from eye candy to an application platform comes in the wake of losses in the last few quarters.

Spam scares IM users

Spam attacks on instant messengers (IMs) are raising questions about the future of one of the fastest-growing applications on the Internet. Although still uncommon, it is becoming prevalent—some IM users are inundated with a seemingly unstoppable marketing deluge.

New applications such as Massmess and ICQ Interest Search have caused a surge in technologically sophisticated junk instant messages. MassMess claims to have unleashed more than 10 million unsolicited commercial messages on Yahoo! Messenger users. A steady barrage of spam on ICQ is credited to the $99 shareware application, called ICQ Interest Search (ICQIS). Spammers have long considered e-mail their preferred medium as it costs little or nothing to produce. Its processes are automated, and despite an array of defences aimed at shutting it out, delivery is almost guaranteed.



IMs may be just as susceptible—they offer sufficient convenience and vulnerability to raise the spectre of a major new front in the spam war. A fair witness of this deluge has been the decrease in users of ICQ. According to Jupiter Media Metrix, it fell to 8.4 million users from 9 million users, over a period of 12 months.

Creative re-enters graphics market

Creative Technology has had a change of mind and is all set to re-enter the graphics market. Creative aims to do this by taking over California-based 3Dlabs, of which it already owns 28 per cent, in a $103.7 million bid.

This decision comes two years after the PC peripheral manufacturer announced that it would be reverting to its flagship audio business and stepping out of the graphics market.

According to Creative CEO Sim Won Hoo, the reason for this move was to develop graphics cards for the mid-to-high-end gaming market. 3Dlab's Oxygen and Wildcat graphics cards are widely sold to workstation manufacturers such as Sun Microsystems, IBM, Compaq and Hewlett Packard. New graphics cards carrying 3Dlabs chips are expected to be released toward the year-end.

According to Woo, "3Dlabs' chips have a highly scalable architecture, which allows for the creation of a family of graphics cards to target new markets. The technology can be scaled down to meet the requirements of game console makers." He cited Nintendo, Sony and Microsoft as potential partners.

→

■ Compaq plans a large life-sciences supercomputing facility ■ Intel develops world's densest SRAM chips with 330 million transistors

Be Indian

Net on the move

Mobile phone subscribers who do not own WAP enabled handsets can now access the Web, provided they are using the services of Bharti Telecom. This service provider plans to introduce SIM (subscriber identification module) cards with a Net browser installed in them. Installing the software called the Wireless Internet Browser (WIB) that lets you browse the Net would mean that a mobile phone subscriber could have access to the Internet even if s/he does not have a WAP-enabled phone. This development will give users of Bharti's mobile service the ability to surf the Net while on the move. The SIM toolkit comes from SmartTrust of Finland.

ATi to launch 5 chipsets

ATi Technologies, one of the world's leading graphics chip companies, is looking to recharge itself with a leap into the risky market of the PC chipsets. By the middle of 2002, ATi will have five Radeon IGP integrated chipsets with a graphics core based on ATI's standalone Radeon graphics processor.

Chipsets connect a PC's processor with other system-level components such as memory and input/output controllers. PC manufacturers have increasingly looked at integrated chipsets, which combine a chipset with a graphics and sound processor, to cut costs for low-end PCs.

ATi's foray comes after the entry of rival nVidia into the arena of stand-alone graphics processors. So far, integrated graphics processors have made it into the 810 and 830 chipsets, and nVidia released its nForce integrated chipset. Motherboards with integrated chipsets will not only make graphics cheaper, but help set an acceptable graphics standard.

Price is a major driving factor in the integrated chipset market, which might account for about half of all PC graphics chips in the foreseeable future. ATi forecasts that 60 to 70 per cent of graphics processors will go into integrated chipsets by the year 2006.

The new chipsets will work only with DDR (double-data rate) memory, another sign that the PC market is standardising on DDR rather than the low-end SDRAM and the high-end Rambus memory.

quoteworthy

"This is hard to believe, It has grown all by itself"
– DivX creator Jerome Rota

"It's a bit like being a bank robber caught on videotape..."
– Larry Ellison, Oracle CEO, on the US Department of Justice's proposed settlement of antitrust case against Microsoft

"If you legally acquire music, you need to have the right to manage it on all other devices that you own."
– Steve Jobs, accepting the Grammy awarded to Apple for Outstanding Technical Contribution to the music industry and recording field

snapshot

2.5
billion hours were wasted last year as people waited for pages to download

Source: *www.internetstats.com*

tomorrow'stechnology

Blu-ray: New-age storage

Nine companies, namely, Hitachi, LG, Matsushita, Pioneer, Philips, Samsung, Sharp, Sony, and Thomson have developed a 30 GB single sided single layer disc called Blu-ray. The technology incorporates a short wavelength 405 nm blue-violet laser to record, rewrite and playback data from the disc. This high fidelity disc can store up to two hours of digital high-definition video or 13 hours of TV quality video. The video is recorded in the MPEG2 format and the audio can be recorded in AC3, MPEG1 layer-2, or in any other format of your choice. A simple optical disk cartridge protects the optical disc's recording surface from dust and fingerprints.

Toshiba, in fact, has gone ahead and unveiled a next-generation storage disc of 110 GB capacity based on the Blu-ray disc technology. The new twin sided DVDs incorporate double layer construction that enables more data packaging onto the discs.

The companies are planning to create large storage discs by making use of multiple layers and both sides of the disc. The creators of Blu-ray are also planning to manufacture devices that can make full use of the storage capacity of these discs.

■ Real Networks to release RealOne media player for Microsoft PocketPC ■ A UK-based company makes $1 million by selling bogus .usa domain names

Missing the Penguin?

Hello guys,
Can I please see some Linux software on the Digit CDs? I want StarOffice and I can't download it from the Net. Can you bundle it with the next issue? It would also be nice if you could include one of the Linux distributions which are freely available on the Internet.

ABHINAV VIJ
Via e-mail

digit

Dear Abhinav,
We would love to include the latest Linux distributions on the CDs, but their huge size (Red Hat requires 2 CDs) prevents us from doing so without compromising on our regular content. However, watch out for a special section on Linux software in one of our upcoming issues.

Music Mis-match

Dear Digit,
In the story on '10 Free Downloads for every PC user' (Digit, February 2002), MusicMatch Jukebox 7.0 is listed as freeware, but on CD you mention it as shareware. Is there any free, fully functional version of MusicMatch Jukebox?

DEBASIS SARKAR
Via e-mail

digit

Dear Debasis,
You are right. We inaccurately listed MusicMatch Jukebox 7.0 as shareware on the CD, but the software we carried is the 'free' scaled-down version of the application. And though it lacks advanced features like multi-session CD burning that are available in its commercial counterpart, it performs functions like playback, ripping and burning of MP3s quite efficiently, and is not time-locked like most shareware programs.

Bite that Apple!

Hi Karan,
The feature article, '10 reasons why you should buy a Mac', was lacking in credibility. The five reasons why you shouldn't buy a Macintosh and the accompanying cartoon strip were far removed from reality.

There is a large community of Mac-savvy engineers and ASPs (Authorised Service Providers) across India. You do not have to send Macs for repairs to Bangalore.

The writer should have relied on firsthand research, instead of featuring hearsay and myths about the Mac.

JOGESH J. SHELAT
Via e-mail

digit

Dear Jogesh,
The cartoon strip was based on the firsthand experiences of an Apple PowerBook owner. Many other users echo dissatisfaction with Apple's service. While you mention the presence of qualified ASPs all over India, this 'Mac lover' who does not live in a metro had to spend the best part of six months seeking a solution to his problem. He has finally switched over to Windows. We stand by what we said in the article. The support for Macs in India today doesn't match up to what is available for the PC.
PS: The writer, Anil Patrick, and most of our design team are great fans of the Macintosh platform and believe that the 10 pros in favour of the Mac outweigh the 5 cons.

CD Blues

Since the last two months, the CDs supplied with Digit have not been working. Please improve the quality otherwise the trust that we have in the magazine will fade. Is there any scheme for replacement of bad/corrupt CDs?

AMIT
Via e-mail

digit

Dear Amit,
Our CDs are replicated at one of the largest manufacturing plants in India with a stringent quality control process. In case a cover CD does not work, contact our customer care at *help@jasubhai,com* and we'll send you a free replacement. Please return the damaged CD so that we can analyse it for possible manufacturing defects that could be avoided in the future.

Bookmark this!

Can you carry a monthly feature on Web sites broken down by topics such as Thesaurus/Dictionary, Jokes, E-cards, Quotation, Utility sites, etc? Maybe you could also ask readers to share their favourite Web sites.

ANINDITA GUHA
Calcutta

digit

Dear Anindita,
We already have something on the lines you are suggesting. Look out for the Bookmarks section on our Mindware CD. Every month this section features reviews of Web sites on a single topic.

News-worthy

Hi,
Please beef up the Pulse section. Surely there's much more than just a couple of pages of international technology news that must be worth mentioning.

KARTIK KAMATH
Via e-mail

digit

Dear Kartik,
While it's simple for us to add more content to our News Feed section, we don't really see ourselves as a news magazine. Most of our readers prefer that we devote more space to relevant articles like feature stories, comparison tests and technology workshops.

Eye-candy

Dear Karan,
I used to spend hours looking at those beautiful pictures of computers, printers and other wonderful peripherals you used to feature in the Hardware comparison test. But now we only get two-three dismal pictures scattered around the article with a feature table in the end. I think Digit is a wonderful magazine, but there is definitely scope for improvement.

SACHIN JAUHARI
Via e-mail

digit

Dear Sachin,
You're right that our tests now contain less product photos. But, how many similar looking monitor photos do you really want to see? This is why we've opted to include photographs of only the best products while providing more space to relevant elements like feature tables and benchmarks. These provide greater details, which are needed to make the right decisions about which products to buy.

However, if you still need some drool-worthy pictures, how about salivating over our drool-maal section on the Playware CD? I'm sure that will suffice your photo-lust. Enjoy!

Space Wars

Agent 001 stories tend to be a big waste of space. The agent goes on and on about the location of the shop, what kind of a shop it is and how the dealer feels, which in my opinion is totally irrelevant to a person who knows what to buy. You've already educated the readers on the best products in the comparison tests, so the above is just another way to fill up more space so that you can justify the increase in advertisements.

Hoping to see THE Digit it once was back again.

BALACHANDAR
Via e-mail

digit

Dear Balachandar,
Agent 001 is one of our most hard-working correspondents who brings us the ground realities from the marketplace. Sure the comparison tests list our recommendations, but the actual buying process can still be troublesome at best!

I'm really surprised that you feel the number of ads have increased so dramatically that we're compromising on editorial content to make room for them. Let me assure you that this would never happen at Digit.

Hot Plate

After reading the Processor comparison test in your January issue (Processor Power), I decided to buy an AMD Athlon XP processor. But none of the vendors in my city (Aligarh) were ready to assemble an AMD-based PC. Everyone went about praising the Pentium 4 and said that the Athlon was not performing well. They also said that AMD processors overheat, are less reliable and that their motherboards are more costly. I even went to Nehru Place in Delhi and found only a couple of vendors who seemed satisfied with the performance of AMD processors.

Is it true that AMD processors generate a lot of heat and thus need an air-conditioned environment? It looks that even after outperforming the P4, AMD has not gained the trust of Indian computer vendors.

NITIN
Via e-mail

digit

Dear Nitin
AMD processors do dissipate more heat and run a little hotter than their Intel counterparts. But this has been blown out of proportion—an AMD-recommended heatsink/fan combo solves most overheating issues. Moreover, it's always wise to provide better ventilation for your PC with an additional case fan, which can significantly increase the life of your computer, regardless of your choice of processor.

Short Bytes

Grey Area

Dear Karan,
Your March editorial 'Upholding Customs' was very interesting. I can sympathise with the companies that are trying to sell imported products in India, but until prices come down to a reasonable level, I will experience no guilt in purchasing goods from the 'grey' market.

RAVI THOMAS
Via e-mail

Yipee!

Hi Digit Team!
Thanks for fulfilling my request for the Intel 810 chipset drivers and the GLSetup program. Other content on the February CD was excellent too.

CHETAN
Via e-mail

My Technology Navigator

Dear Karan,
I'm only 14. My day starts and ends with Digit. A couple of years ago, computers seemed like Latin to me. But now thanks to Digit, I'm well informed about computers and the Internet. Thanks to you and your whole team.

ARKOPAL BHATTACHARYA
Via e-mail

Goof Ups

■ We would like to point out errors that occurred in the laptop comparison test in the March issue of Digit. On page 67 we have inaccurately listed Compaq Presario 1722 as a winner of the Best Performance Award. The award actually belongs to Presario 1725.

Also on page 71, the logo of the Best Value Award has accidentally been printed on the photograph of the Sharp Muramasa PC UM10. The award actually belongs exclusively to the Zenith One Up-21.

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

In the Big League

Sujoy Roy kicked his high profile job as an investment banker with JP Morgan to turn a professional gamer and... is still making as much money!

"Gamers in India play in a closed environment and have not learned from their European and American counterparts"

Advent of deathmatching and multi-player games has turned gaming into a competitive arena where 'cyberathletes' turn passion into a profession. Professional gamers (pro-gamers) are making money out of death matching and see it getting better. Sujoy Roy, MA, MSc, who was working at JP Morgan in New York, quit his job as a high flying investment banker and became a pro-gamer.

A veteran Quaker from UK, the plunge into full-time professional gaming has clicked well for him. Though he didn't achieve the kind of success or notoriety that Fatality or Makaveli would have, his business skills have gone a long way in making him the 'Anandtech' of pro-gaming. His site, ***xsreality.com*** is an E-Sports community site that garners a huge following among pro-gamers. The site posts news, strategies and recorded demos of pro-gaming tourneys. We had a few words with him.

How would you introduce yourself? Sujoy Roy, PhD - Professional Gaming?
I'm no longer a pro-gamer officially. My main business is with a new company called Virtual Gaming Alliance (VGA) which promotes E-Sports through offline gaming centres around the UK. My official title there is: Sujoy Roy, MA, MSc Cantab - Marketing Director. But who uses the official title anyway?

And how many hours do you play each day?
Work with VGA generally takes up my whole day. However, I spend an hour or two in the evening playing games online.

Which games are hot right now, and where do you see professional gaming in the next few years?
Counter-Strike is hot. It's unfortunate that no other game has been able to break the *Counter-Strike* dominance in online gaming. We're due for something new and exciting that will change the face of E-Sports, but I'm not sure what it will be. Maybe *Quake IV*, *DOOM III*, *Unreal Tournament II*... we'll have to wait and see.

Will pro-gaming gain mass acceptance and become as big as Soccer or Basketball?
Someday, yes. But not today or within the next few years. Pro-gaming has a long way to go still in developing the structure of a real sport. Right now I'm building a league in the UK based on regional locations at registered gaming centres so that the teams represent a real town and a real community of people. When leagues like this gain acceptance we can begin to start taking on real sports.

Your comments on the LAN party culture.
I'm more interested in actual gaming centres than LAN parties. I see a gaming centre as a social club for gamers, which they can visit daily.

Cheating has become a huge issue and is strangling the integrity of online games. Is there a one-stop solution for this?
There is no easy solution to cheating. But the most obvious one is for more games to take place in controlled setups such as live tournaments and gaming centres.

What do you think about the deathmatch demo between (TUA) Wile and (DS) Peter? (TUA is India's number 1 gaming clan.)
I guess that the players in India have been playing in a somewhat closed environment and have not learned from the European and American players yet. I'm afraid the only way to describe the play—and I'm really trying not to sound conceited here—is that it's very bad.

Tips for budding Indian pro-gamers.
The important skills to master as a pro-gamer are not physical ones like accuracy and reaction times. Understand your opponent so that you can be one step ahead in your strategy.

Based on an e-mail interview conducted by Sriram Sharma

FILM IS DEAD

The age of digital video is dawning and everyone, from independent filmmakers to handycam enthusiasts, are taking note

Two decades ago, the word-processor transformed the world of the writer. No more typos, no more piles of crumpled papers. You could write an entire story, and if you didn't like the protagonist's name, a find and replace string could change it all. You could shuffle those words around, grab a paragraph from down there and move it up here.

Word processors, spreadsheets, image editing software, and the Net have bought about radical changes in the way we work.

Now, the amateur moviemaker gets the big break. Just like shuffling words, he's juggling video clips. No negative cutting, no off-site sound mixing. No elaborate special effects done at huge costs.

Inexpensive broadcast quality equipment has democratised both production and distribution; the mediums of film and television are being redefined on the Internet by a new generation of technologically savvy media artists. The results they achieve are difficult to quantify, but what is clear is that visual media is undergoing a dramatic and fundamental transformation.

Introducing digital video

Endorsed by 55 electronics manufacturers, the new digital video (DV) standard specifies a level of picture quality that is significantly better than what's available today on television. Needless to say, the DV standard is far superior to other common standards with lower quality, such as the familiar VHS standard.

Until the development of the Digital Video format (and its attendant hardware), you had to add expensive video digitising cards to your computer if you wanted to edit video. After editing, the same hardware used to write the edited footage back onto tape.

With DV, video footage is digitised and transferred to your computer, where scenes can be inserted, deleted, or rearranged in any order. A DV camera digitises video, compresses it, and writes a digital file to its on-board storage—while shooting the video. All you have to do is copy that digital file from the camera's tape onto your computer. When you make copies of your work in the digital language, you don't lose picture quality like we used to with 'analog'.

But the DV format is more than just a digital version of ordinary analog video. In overall image quality, resolution, colour reproduction and sharpness, DV far outperforms older consumer and industrial formats. In fact, DV delivers image quality that rivals high-end broadcast formats such as Betacam SP.

To DV or not to DV

Price is a big clincher when opting for a DV setup. A professional setup with non-linear editing software and hardware, a Betaplayer and camera would cost you Rs 20-30 lakh. The DV route, inclusive of a competent PC setup, a camcorder, and software would cost you considerably less. Even if you add another Rs 50,000 for professional video editing software and decide to go for a Mac setup, a DV setup would cost you about Rs 3 to 5 lakh.

Enter FireWire

You can make the grooviest video-editing hardware and software in the world, but it's not going to do anything until the raw material is in the machine. So how do you get it there?

Answer: FireWire, a high-speed interface for connecting peripherals to computers. Currently running at 400 MBps, it supports up to 63 devices, is hot pluggable and requires no configuration. The next generation is expected to reach 800 MBps. FireWire was developed by Apple, but has been adopted as an industry standard, IEEE 1394. The name 'FireWire' is a trademark of Apple, however, so other companies give the technology different names, such as Sony's iLink.

DV has a data rate of 25 megabits per second (Mbps), meaning that each second of video requires 25 megabits (roughly 3.1 megabytes) data per second. The standard FireWire interface built into many computers these days can transfer about 12.5 megabytes per second, which allows it to handle the DV format easily. ➜

PHASE OFF!

The three digital advantages—robust transmission, identical-to-the-original copies and vastly improved editing—put the tape-based analog technology at a severe disadvantage.

Pre DV: ANALOG	Post DV: DIGITAL
An Analog signal is vulnerable to interference that can significantly degrade picture quality. Timing errors can make straight vertical lines wavy in playback.	Digital signals are more forgiving when it comes to fluctuations in signal strength, and can incorporate checking of algorithms to ensure that a signal has been received as it was sent.
Quality degrades during copying. There is a significant loss of information associated with each transfer from one tape to another, so quality worsens with each generation.	Digital video suffers virtually no degradation in quality, no matter how many copies are made.
Every scene in a video project is shot several times. If you—re a director trying to choose between take one and take six, you can—t simply switch back and forth between them. You have to roll through takes two, three, four and five every time. Even with high-speed tape decks, this adds up to an enormous waste of time	In contrast, non-linear DV editing allows instant location and playback of any take of any scene. Non-linear editing has another advantage. Once you—ve picked the best take from each scene, you can assemble a —rough cut— in a few minutes just by deleting the scenes you rejected.

Video editing on a PC

This Typically requires a slightly beefed up home computer with a capture card, running software such as Avid's Media Composer, Apple's Final Cut Pro and iMovie, Adobe Premiere, or perhaps Broadcast 2000 if you're working on Linux.

Simple video editing software, like Studio, lets you organise clips in the same manner as photos in a photo album and assemble them in any order, by dragging and dropping. When you play the whole movie, the computer plays each clip, one after another.

More professional software, like Adobe Premiere, lets you arrange the clips on a more complex looking timeline and apply special effects like bluescreen transparency—an effect where a person appears against a fake background such as a solar system or a still photograph. With this you can create transitions, such as dissolving from one clip to another. Adding soundtracks is also possible.

The bare minimum ingredients for a competent DV-capable setup includes: 700 MHz computer, 128 MB of RAM, a 30 GB hard drive, a FireWire card, a video editing program, and a FireWire equipped DV camcorder.

The images, by being digitised into the machine, can now be cut-pasted, warped, rendered, 'Photoshopped', and twisted around until they tell a tangible tale. Digital video editing is used for television shows, TV commercials, music videos, and promotional movies.

Film effects can be achieved, to a certain degree, with Adobe Premiere. Another program, called Cinelook, can reproduce a wide array of film-looks—8, 16, and 35 mm film-stocks. It can give movies that gritty 'film-damage' look as well.

Online movies

Over the last year, independent filmmakers have been putting their work online for the first time, with Internet start-ups such as Atom Films and Ifilm.com giving would-be filmmakers a place to showcase their newest works. Ifilm uses a democratic review process where the viewers determine which films move up the charts based on the number of times the movies are viewed.

DV and the Internet have created a new life for short films, which have never found viable outlets for mainstream audiences. Likewise, new distribution methods are allowing niche filmmakers to reach the audiences that might be interested in their peculiar tastes. Internet as a medium for movies has become an attractive alternative to the traditional distribution route.

The future is virtual

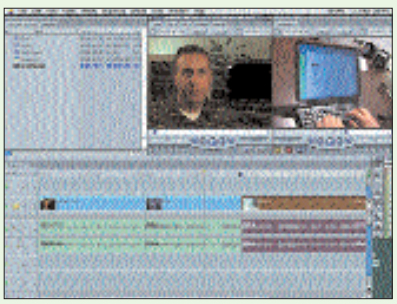
All the pieces are in place to make DV products a huge market success, particularly when it comes to image capture and editing. To begin with, all the supporting technologies already exist. DV camcorders outsell conventional analog units in Japan.

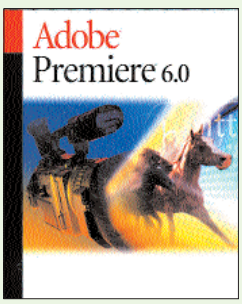
The DV standard is backwards compatible—content creators can begin working with DV products now, without having to worry about the market penetration of a new platform for their work.

The DV market will almost certainly follow the pattern of numerous other technology-based products where the ini-

The Killer Apps

Final Cut Pro is a suite of editing programs rolled into one super-shiny package that just reeks of awesomeness with cutting, juggling, and every other type of special effect to keep a movie junkie happy. While Final Cut Pro doesn—t have all the power of a standalone, professional sound editing program, it is quiter adequate. Also, there—s an additional track for any music you might want to import off CDs or any other source.





Adobe Premiere 6.0 can handle all the cut or transition edits, apply rolling titles and credits, and add soundtracks. The resulting production can then be exported to tape or a variety of computer files such as AVI, MPEG, QuickTime, and RealMedia. Premiere 6.0 can also work directly over FireWire with a DV machine for importing and exporting video. Very handy indeed!

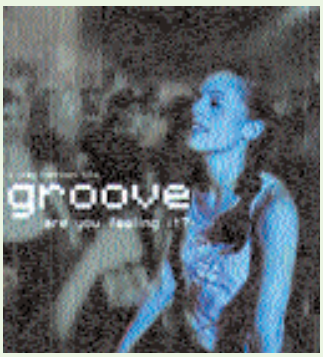
Not-to-miss DV Flicks

After the successful debut of *The Blair Witch Project*, the established film industry is starting to warm up to DV projects. These

movies eschew special lighting, optical effects, props, and attain higher truths yielded by characters. Digital video was a surprising success at this year—s Cannes Film Festival. *The Celebration* was an award-winning DV at last year—s Sundance.

Groove: This much talked-about flick gives you an up and close perspective into the rave subculture. The movie takes place in a warehouse and follows several ravers throughout the night as they navigate a sensory-overloaded world filled with sex, drugs, and DJ wizardry.

The Celebration: Shot on a one-chip video camera the size of a paperback book, it was also transferred to 35 mm and shared the



Jury Prize at Cannes.

The Idiots: This weird faux-documentary explores spoiled adults pretending to be retarded in order to find their —Inner Idiots—. You might find your —Outer Idiot— trying to understand the point of this sometimes funny, sometimes disturbing experiment that doesn—t provide any answers to its questions. Few people who saw it had any idea that it had been shot on a Sony VX1000 mini-DV camera, and later transferred to 35 mm film.

tial applications targeted at professionals soon migrate to consumers. The first such 'hot' application may target the broadcast news industry.

As things stand today, news crews shooting on location must uplink raw footage for editing prior to broadcast. And even with the highest quality (and most expensive) equipment available, there is still some fall-off in picture quality. With DV equipment, news crews can shoot footage, transfer it to a high-powered laptop, edit, insert further commentary from an on-scene reporter, and then uplink a ready-to-broadcast sequence. It's easy to see how these features will appeal to consumers.

For example, videos shot while on vacation could be edited on the spot—with commentary if desired—and stored in an Internet-ready format for transmission to friends and family. No one knows exactly how long it will take for DV products to become a hit in the consumer marketplace, but there's no doubt that the day will come and soon.

SRIRAM SHARMA

10 Myths abou PROGRAMMERS

Programmers are...

1 **Myth:** Big on caffeine and nicotine
Reality: Blame the movies for this stereotype—those celluloid nerds that you see aren't us! We don't need gallons of coffee or chain smoking to keep all that code flowing. That comes from the great repository in our brains, which doesn't need to be chemically 'inspired'. So stop spoiling our scope for marriage, will you?

2 **Myth:** Fast food junkies
Reality: Let's clear that image straight off. We enjoy the occasional binge of parathas and dosas as much as you do! Being true blue Indians, we are just as picky about what we put in our mouths. Get rid of that pizza swallowing, cola guzzling image of a programmer. After all, our *dil maange* more as well!

3 **Myth:** All about code—stupid is as stupid does!
Reality: Nah! Most of us are talented and knowledgeable people in more areas than just programming. We are ordinary people like you except that we came with a built-in taste for programming! We have our opinions on everything under the sun just like you do. Sit down to a tête-à-tête with a programmer and he/she will probably talk circles around you!

4 **Myth:** Male chauvinists
Reality: That couldn't be farther from the truth! There are more of the fair sex among us than you know. We believe in equality of the sexes, buddy (and it makes the work place that much more visually appealing!). But seriously, girls are much better programmers than guys at times. The only scenario wherein we might oppose women programmers in the vicinity is if you insist on surrounding us with pictures of babies and stuffed animals!

5 **Myth:** The ones with the most stable jobs
Reality: Off target again. Our chances of having a stable job are just about the same as yours. Survival of the fittest is the name of the game. The IT slowdown had created a scenario where people were being laid off in thousands. But those are days of yore. Now a programming job is a stable and lucrative option.

6 **Myth:** Loaded with the green stuff
Reality: Money never did grow on trees. There were times when even HTML coders used to rake in hefty paychecks. Not any more. Our salaries are comparable to any other job now. They aren't as sky high as you would like to believe.

7 **Myth:** The ones with fancy techie degrees under their belt
Reality: Let's clear this myth spread by B.Techs and MCAs. Well, it does help in getting a better pay packet if you have these, but it's not a must-have. Programming is something that comes from within. Almost like those army recruitment ads, "Do you have it in you"?

8 **Myth:** The know-alls in programming
Reality: Although we would like it to be so, programmers aren't always the Yoda of coding. Each of us is a specialist in the kind of programming we do. Of course, this depends on the project that we are working on. We learn new skills if the project calls for them. The only thing we consider stable are our programming fundamentals, which remain the same whatever programming language or tools we use.

9 **Myth:** Great at handling entire projects single-handed
Reality: Even if it were so, we prefer parallel processing. It's much better when many heads work on a complex problem than a single one, isnt it? That's our modus operandi as well. Projects are split into parts and different teams of programmers work on them. Besides, this is also the reason that we don't run into too many late nights at the office!

1 **Myth:** Not interested in women
Reality: Well...would love to talk about that at length but got to rush. Have a date with Julie and then dinner with Priya. Shucks, social life's more hectic than coding!

ANIL PATRICK R.

DIGITAL TEMPTATIONS

DVD cameras, palm-size printers, multi-functional MP3 players—stuff that dreams are made of

Essential Reality P5-E
Serious about Gaming

The P5-E from Essential Reality is a glove which offers six axes unlike keyboards and game pads which offer two. P5-E's docking station can be attached to a PC, Mac or any game console that supports a USB interface. The glove has integrated infrared sensors that gather and transfer movement to the docking station, which can be kept at a maximum distance of 4 feet.

Web site: www.essentialreality.com

Sharp AQUOS LC-20B2U
TV for your Wall

Sharp AQUOS is one of the thinnest televisions on this planet. It is just 2.5 inches deep and weighs 17.2 pounds. It can be placed on the floor or hung on a wall. This LCD television has high brightness and a 160-degree viewing angle. It comes with a 181-channel cable tuner so you can catch all the channels your cable operator offers.

Web site: www.sharp.com

Motorola V70
Talk in Style

The V70 will make a snug fit in a child's palm, however the features are advanced enough to make even the grown ups drool. The phone is GPRS-ready and has a a micro-browser that allows you to surf the Net. Two outstanding features are its fully rotational, flip design cover and black back-lit display. It also has voice activation dialling and a translucent Motogo keypad for hassle-free dialling in pitch darkness.

Web site: www.motorola.com

Canon Pro 90IS
Shooting Star

A 10x zoom, image stabiliser and 2.6 mega pixel CCD sensors make the Canon Pro 90IS am amazing camera. With a shutter speed of 1/1000, it claims to give you clear shot of a jet plane flying by. You can also record a 30 second movie clip at 15 frames per second, to be played back on its on-board LCD screen. The resolution of 1856x1392 pixels allows you to print high quality photographs on 8-inch x 10-inch paper.

Web site: www.canon.com

Hitachi DZMV100A
DVD CAM with a Difference

The Hitachi DZVM100A writes data directly on dual-sided DVD-RAM media to be played back on a DVD player or DVD-ROM. The camera is fitted with a 1.1-mega-pixels CCD sensor and can store 1,998 images, taken at a whopping resolution of 1280x960 pixels. It can also record and playback 60 minutes of movie using the MPEG-2 format at 704x480 pixel resolution. The 12x zoom lets you take distant photographs with ease, thereby making it ideal for professionals.

Web site: www.hitachi.com

MagicEyes MkiVki
Mini Theatre

Taking functionality to another level, this MP3 player can play videos, capture still images and movie clips at 10 fps and also edit clips. Sing along with your favourite song as it plays, thanks to the built-in text processor. MagicEyes doubles as a PDA and can even play 2D games! The device has a built-in microphone, camera, USB/serial/IrDA interface and works on Li-Ion battery.

Web site: www.mkivki.com

Sony DPP-MP1
Palm Printer

This portable printer not only runs on a battery but also fits in your palm. The DPP-MP1 dye-sub printer can print a card-sized photograph in approximately 2 minutes. The ink in its ribbon cartridge is thermally transferred to the printer. The printer has a USB interface—you can plug it to a computer or directly print from the Memory Stick via the Memory Stick slot.

Web site: www.sony.com

Around the world in 1 Click

Are travel portals good for more than just reading up on destinations? Let's find out

Going on a trip involves more than just packing your bags and hopping onto a plane or a train. Whether it's a couple of days in Khandala or a foreign jaunt, planning for your trip can be trying, especially if you're not a seasoned traveller. Information isn't always easy to come by—you have to make calls to travel agents, hotels and airlines to fix the itinerary and procure the tickets.

Travel Web sites and sites of airlines and travel agents help a modern day traveller by providing select information about destinations. But at the same time, they can also overwhelm—and sometimes confuse—travellers with unnecessary, irrelevant data. You can reserve airline seats, choose a hotel in any city, book a tour package online as well as get a cab to the airport. But can you find a good deal online?

Research

The key to travelling smart involves research about the destination. Turn to the Web for help and all the groundwork for your trip can be easily configured. For example, the tour itinerary, weather conditions, special places of interest, amount of money needed—you can find out all of this on the Web. And that too in just a couple of hours.

If, for instance, you can't decide whether to go trekking through the Amazon rain forest or spend a romantic getaway at the Pyramids, visit ***www.lonelyplanet.com***, which is an excellent place to start. Though its World Guide is not as comprehensive as other guides, Lonely Planet has some really unique information on a lot of worldwide destinations. Browsing through maps of continents and cities will help you zero in on a destination that catches your fancy. Apart from some fairly exciting slideshows and first-hand accounts from travellers, this site features well-written reviews about different countries which focus on problems such as political insurgencies,

IMAGING: Ram

outbreak of diseases, ethnic violence, while also mentioning the history, demographics and places worth seeing.

Expedia.com and ***Travelocity.com*** are the behemoths of online travel planning, but they cater mainly to non-Indian travellers. Check them out if you're looking for information on overseas destinations, hotels and eating joints. However, for working out the cost in Indian rupees and for practical travel tips on how to get visas, passports and insurance, stick to Indian travel portals like ***Traveljini, Makemytrip*** and ***Travnova.com.***

Travnova and ***Traveljini*** talk about popular international travel destinations but are particularly good when it comes to Indian destinations—quick facts, sightseeing, getting there, shopping, eating out, weather, hotels, you name it—these sites have listed it all. You can browse through destinations by country, state or by interest. For example, honeymoon destinations, beaches, heritage resorts and golf holidays.

If you need more detailed information, drop in a mail to the 'Jinis' assigned to the specifc region. Or you could try the 'Travelwizzy' at ***Makemytrip*** to plan your itinerary to perfection. Some State Tourism Web sites like ***www.keralatourism.org, www.mptourism.com*** and ***www.himachaltourist.com*** are also a good source of information.

There's more to planning a vacation than getting information on destinations and packages. Travel is about experiences and adventure too. Use the Web to connect with travellers around the world for their views on a particular destination.

Travellers Checks

Payment for online travel services differs according to the type of service you've booked. If it's travel within India, most portals will accept a wide range of options such as international and domestic credit cards, cheques, demand drafts, Net banking, and even cash. The choice, eventually, is yours. For international hotels, car rentals or tour packages, you may have to pay by only an international credit card or in dollars out of your BTQ (basic travel quota). Look carefully for the fine print on additional service charges and extras apart from the published fare on the site.

Feature Comparison for Travel Sites

I need……	Makemytrip	Traveljini	Travnova	Primetravels	Outlooktraveler	Thomascook
Air tickets	✔	✔	✔	✔	✔	✔
Hotels	✔	✔	✔	✔	✔	✔
Car rental	✔	✔	✔	✔	✔	✔
International hotels and car rentals	✖	✔	✔	✔	✔	✔
Destination info.	✔	✔	✔	✔	✔	✔
Group tours	✔	✔	✔	✖	✔	✔
Visa services	✖	✔	✖	✖	✖	✔
Travel insurance	✔	✔	✖	✖	✖	✔
Travel finance	✔	✖	✖	✖	✖	✖
Foreign exchange	✖	✔	✖	✖	✖	✔

www.virtualtourist.com is an online community of travellers which isn't just about places—it's about the experiences of people who've been there, done that, and who remember it. Each member has a page which they fill up with experiences about the places that they've either been to or are keen to visit. It's possible to record travel preferences, post messages in the forums, and touch base with other travellers using the site's e-mail messaging service. This site has a rating system where you can rank members based on the information they provide.

Munish Aggarwal
BUSINESSMAN,
MUMBAI

"We got amazing discounts but there was an unexpected glitch with Traveljini: it gave us vouchers, which some hotels didn't accept, but accommodated us later, after we phoned the portal and confirmed the booking"

And there's always Google!

More adventurous travellers who seek offbeat destinations find travel portals very limiting. For in-depth information about places not on the tourist trail, there's no better help than ***Google***. This search engine will give you all the information you'd ever need on any destination on earth.

Also, chuck that paper and pencil if you want to make a travel itinerary. Most sites have travel planning tools like itinerary planners where you can save your travel schedule, favourite packages, and keep a record of all online transactions and bookings. You can also use tools such as currency converters to plan your budget and look up the weather to figure out the best time to visit a particular destination.

Maps are handy travel tools, we all agree with that. So go to ***www.mapsofindia.com*** to find clickable maps, road maps, rail maps, road maps, as well as tourist maps of Indian cities and states. For maps of the US and other countries, try ***www.mapquest.com***.

The next step: Getting it done

After browsing, surfing, reading, and researching on your destination, it's time to get down to the basic nitty-gritty of travelling—transportation. A couple of years ago, travel portals were good for just information and there was no way you could book a ticket online. This has changed. Portals like ***Traveljini*** and ***Travnova*** can get you good deals on air tickets and hotels, so much so that they can even give your friendly neighbourhood travel agent a run for his money.

Gone with the wind

Air tickets are probably the easiest to book online, provided you own a credit card. Most flight search options are powered by central reservation systems (CRS) like Amadeus or Galileo, which formerly only travel agents or airlines had access to.

Online Flight Search options allow

Travel Portals vs Travel Agencies

	Traveljini	Travnova	OutlookTraveller	Travel Agencies
International flight tickets	Rs 28,100 Mumbai-London-Mumbai (Gulf Air)	Does not offer discounted fares on air tickets	Rs 30,000 Mumbai-London-Mumbai (Emirates)	Rs 22,000 Mumbai-London-Mumbai
Hotel packages	Majorda Beach Resort Goa 3N/4D Rs 6,500 (per person)	Majorda Beach Resort Goa 3N/4D Rs 6,175 (per person)	Majorda Beach Resort Goa 3N/4D Rs 12,999 (per couple)	Majorda Beach Resort Goa 3N/4D Rs 9,333 (per couple)
Group tours (Domestic)	Kerala (luxury tour) 7N/8D Rs 17,835	Kerala tour 9N/10D Rs 29,850	No escorted tours	Kerala (luxury tour) 9N/10D Rs 25,575 (Kesari Tours)
Intenational group tours (hot deals)	Singapore Temptations Rs 25,999	South Africa Unveiled 7N/6D Rs 59,460	Vibrant Malaysia 6N/7D Rs 27,770	Singapore and Thailand Rs 21,990 + $299 (Kesari Tours)

* Note: The prices for flight tickets are on a per person basis
**This table is only an indicative comparison of online travel rates. Do not forget to get online and check with the portal/travel agency for the full dope!

you to look up flight combinations and routes, both domestic and international, to any destination in the world in the airline of your choice. You'll get fares in Indian rupees for the route of your choice sorted by the class of travel. You can check ***Makemytrip*** for a quick flight search. However, not all sites will let you book a seat online. At ***Traveljini,*** you can look up seat availability for a flight but you'll have to e-mail in a booking request to block the seats. You pay for your ticket and can have it delivered to your doorstep. ***Travnova,*** on the other hand, lets you log on to Amadeus and block seats yourself, but only after divulging your credit card details.

Also look up the special offers and privileges which airlines offer. If you're flying British Airways (***www.britishairways.com***) or Singapore Airlines (***www.singaporeair.com***), you can now check-in online. Lufthansa has special offers if you book online directly with them, and lots of other airlines let you trace your baggage online.

In India, Jet Airways has a service called JetMobile which enables you to find out flight schedules, status and alerts through SMS. This service is available through cellular operators like Orange (Mumbai), Essar (Delhi), Spice/UMTL (Kolkata), Fascel (Gujarat), Tata Cellular (Andhra Pradesh) and Spice (Karnataka). Cathay Pacific and Singapore Airlines are other international airlines that offer this service in India.

Chugging along

The ubiquitous Indian Railways. Who can travel within India without them? The best place to find out all about rail travel in India is, thankfully, the official Web site of the Indian railways itself at ***www.indrail.gov.in***. This is a comprehensive site where you get almost all information you need about train travel—rail availability and options, train routes, seating availability, ticket status, and time of departure and arrival. You can't book or block seats online yet, but then, living in India, you'd know how to book a ticket offline. The Indian Railways has a wonderful 'Circular Trip' option wherein travellers can chart their own routes and get a connecting ticket from every station they stop at.

You can also buy international train passes when travelling outside India. For example, Eurail online passes are available on sites like ***Traveljini***.

Taking the high road

If you're looking to rent a car for a road trip, you'll find plenty of models to choose from, and that too at decent rates. There are lots of sites online, and choosing a car is easy. Just pick the city, the car model and the rental period, and with an instant confirmation, you're on the road again.

In fact, most portals have an arrangement with local car rental agencies or travel agents in different cities; rates will differ according to the agency in the city concerned. ***Traveljini*** had different rates quoted by different travel agents in one city for the same car model! The important thing is that you can pick and choose the car you want—all from one place.

The rates aren't too bad and are comparable with what regular travel agents ➜

Offers that Deserve a Closer Look

A good vacation can also cost you a bomb. But not if you're smart and have planned ahead. There are plenty of online deals that can save you a pretty penny—the idea is that you have to watch out for them. The thing with deals is that they keep changing depending on the season and the place.

Go to the 'deals' section of travel portals and airline Web sites regularly. Also, sign up for newsletters to keep up with the travelling world. Compare rates right down to the smallest detail, for example, service charges, before you clinch a deal. ***Traveljini***'s newsletter 'Deal-a-jini' brings deals right into your inbox.

If you don't mind waiting for the cheapest deal, try your luck at bidding for holiday packages in auction sites like ***Baazee.com*** and ***Indiatimes.com***, which have packages from ***Traveljini*** and other agents. Place you bid and if you get lucky, you could end up winning a free holiday or air tickets at rock-bottom prices.

There's one more way: simply pick a destination and state the price that you're willing to pay for a decent vacation. Then sit back and relax as various hotels come up and fight to deal with you. That's what reverse auctions can do. Check them out at ***Traveljini***.

Over the Seven Seas

International travel involves clearing a lot of formalities and getting a lot of paperwork done (passports, visas, insurance, and so on). The good news is that you can do most of this online. Not entirely, of course, as you will still have to fill out forms, sign many times, and be physically present for visas of some countries. But you can look up visa requirements for all countries, download passport forms, check the passport status online, look up foreign exchange rates, and consider insurance options. Once you've booked with a site, they'll send someone over with the various forms and take care of all the formalities. You save your breath and time. You can download forms and check passport status online at ***Passport.nic.in*** and get information on travel insurance at ***Hotclaim.com.***

offer. For example, at ***Traveljini***, renting an Esteem for about 8 hours in Mumbai will cost you about Rs 1,200 onwards (driver's allowance and extra kilometres are charged additionally), while renting the same model for half a day through ***Travnova*** will cost you Rs 1,700 onwards.

International car rentals are fairly straightforward and done through the same CRS as the flight reservation through local offices of international car rental agencies like Hertz or Avis. The prices are in US dollars and you rarely find deals.

A place to rest

Booking a hotel is a breeze online, what with the wide variety and range available right under our noses—ranging from five stars to budget hotels. Indiatimes (***www.travel.indiatimes.com***) has a database of hotels where you'll be able to find a hotel anywhere in India for under Rs 500 a night. If you're looking for a cheap hotel, you'll find it here.

You can also book budget hotels at ***www.indianbudgethotels.com***. ***Traveljini*** has a database of hotels with tariffs starting from Rs 1,500 which you can book online. ***Travnova*** is great for a wide range of hotel packages including premium hotels.

International hotel bookings are taken care of by ***www.worldres.com*** or ***www.amadeus.net***, where you can log on and book a room against your credit card. Watch the deals space in portals for special holidays or off-season hotel packages for Indian and international destinations.

Holiday packages

Prefer escorted tours? Take your pick from a wide range of escorted tours online. Research, compare Indian and international tours and get it all done online at ***www.thomascook.co.in*** or ***raj-travels.com***. You can take care of all formalities like air tickets and related paper work at these sites or just buy the tour and get your ticket done elsewhere. Most portals have inbound and outbound group tours.

The Web offers same or better rates as a travel agent and most reputed sites are as reliable as regular travel agents. However, print out your vouchers and maintain records of all your transactions and phone numbers. If you ever happen to be in a soup, get online, and call. Most portals are pretty prompt in attending if you have a genuine problem. The trick to landing a good deal is hard work—it involves constant comparison with different portals as well as 'offline' travel agents. But in the end it pays off when you have those extra bucks to spend on your holiday shopping spree!

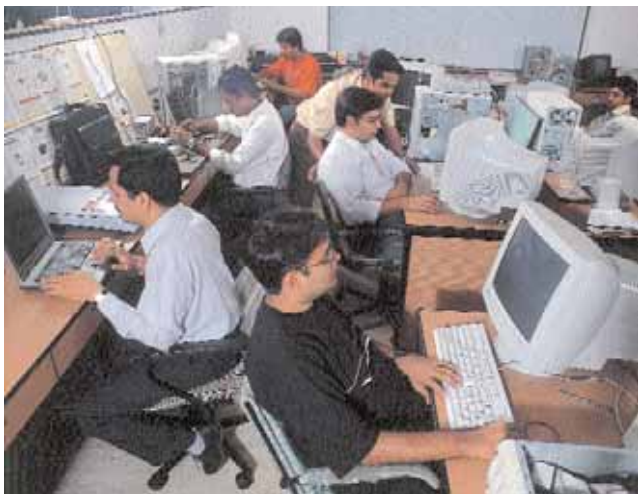
AVINA LOBO

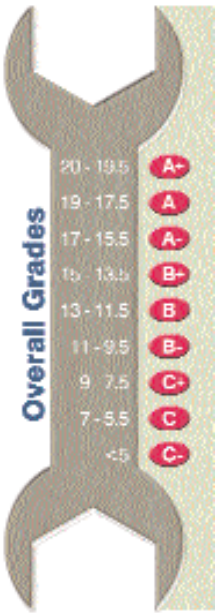
How we Test

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

Reviewers at the Digital Media Test & Research Centre (DMTRC) spend many manhours every month testing hardware and software to guide Digit readers to make an informed choice when faced with a buying decision. At the core of the tests is the usability and the relevence of the technology for the readers of Digit.

To ensure that the Indian readers do not have to compromise on qualiy, engineers at DMTRC evaluate and review the latest hardware, software and technology services in accordance with the most cutting-edge evaluation processes and methodologies used around the world.





Demystifying the ratings

The DMTRC conducts two kinds of tests/reviews in the Test Drive section of the magazine—standalone product reviews as well as comparison tests. The test process is elaborate. We test an assortment of hardware and software products from the Indian market, and the evaluation processes involve parameters such as sheer performance, build quality, value for money and the features of the product. A set of weightages are applied to these evaluation parameters to arrive at an overall score. The table given below is used in applying the overall grades to these products based upon the overall scores.

In the case of the comparison tests, the weightages are applied to the various test parameters according to their importance. This is explained in the magazine articles and in the Test Process section of the CD, where the benchmarking methodology is explained in detail.

The Awards

Digit rewards exceptional performance in each comparison test by picking a Best Performance winner. This award goes to the product that outshines the competition in our performance benchmarks. The Best Value award, on the other hand, is awarded to the product that we feel has the best combination of price and performance. Consider this your yardstick if you are looking for more value for your money.

RATINGS	
★★★★★	**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:** contains serious drawbacks and needs improvement before it can be used for the target application

In Test this Month

The hightlight of the month definitely is India's first-ever LCD monitor comparison test.

In the quest to find the perfect display solution we tested 56 monitors—44 CRT monitors and 12 LCD monitors. The test features some of the most unique monitors in the market including LG's 22-inch Flatron 295LM, which had the spirits of the entire team high. Another first was doing the comparison without a price barrier, that is, we tested monitors from as low as Rs 5,400 to a whopping Rs 2,80,000. The Sony G520 emerged a winner with its sheer size of 21 inches with support for resolutions up to 2048x1536.

Mindware

Look up the test process in the Test Drive section of the Mindware CD. All benchmarking software featured in the software test are also available for power users.

A Perfect Display

PHOTOGRAPH: Mexi Xavier

Open your eyes and see the clear picture as we test the best CRTs and LCDs in the market in search of that perfect display

The fastest processor that money can buy, plenty of hard disk space, and oodles of RAM—most people have these at the top of their shopping list when chalking up a dream machine for themselves. However, one important aspect of PC performance often gets completely overlooked, and that is the display.

This should ideally be one of the more important things for any computer user to consider. First, because the display, which depends both on the monitor and the graphics card, is one of the more expensive components that you will buy—it makes up about a quarter of the cost of your entire system. The monitor in particular is a long-term investment, a good monitor can give you trouble-free performance for years.

A second and equally important consideration is that newer software demands more and more from the display subsystem of computers. For example, there is no way that the 2 MB graphics card and 14-inch monitor that were the norm just three years ago, can do justice to the modern GUIs for operating systems such as Windows XP, Mac OS X, and Helix Gnome.

But sadly the monitor, is still taken for granted by most users. New PC buyers usually just take whatever their vendor offers them. At best, a little thought is given to the size of the monitor.

Today we have a wealth of choices available to us at reasobable cost. You can easily buy a 17-inch CRT monitor for less than Rs 10,000 and you will occasionally come across a gigantic 21-inch CRT unit for less than Rs 50,000.

The prices of LCD displays have also come down over the last year making them an attractive proposition. With their sleek looks, compact size and lower radiation levels, they will only rise in popularity as time goes by.

However, choosing a monitor suited to your needs is not simple. You need to strike a balance between picture quality and the amount of money you're willing to spend on buying a monitor. We help you make the right choice.

CRT MONITORS

The CRT monitor continues to remain the display of choice in India. We received 13 different brands of CRT monitors in this comparison test, making this a hotly contested territory. The influx of brands in the market place has led to a significant drop in prices over the last year.

One important trend that was reflected in the kind of monitors we received for testing was that the 15-inch monitors seem to have become less popular. While in previous years this category would see the largest number of contestants it has now been superseded by the 17-inch category in terms of popularity. This can be attributed to the fact that this category has seen a significant price drop.

At the same time there's been a remarkable price reduction in 15-inch monitors too. A year ago you would get a 15-inch monitor for around Rs 8,000, whereas now you can get one for Rs 5,400. Prices have fallen in the 19-inch category as well. Could you have ever imagined buying a 19-inch monitor for under Rs 20,000? Well you can now buy one for as low as Rs 17,000!

All this variety has made choosing the right monitor an even more challenging task. We had a close look at 44 different models to find you some of the best deals that are available today.

Geometry test

Most people who use their computer for general office applications will not notice minor irregularities in screen geometry. But if you need to work with CAD/CAM applications, engineering drawings or with professional 3D content, where accurate geometric shapes need to be generated, then it's crucial that your monitor's screen regulation be impeccable.

Another factor that's important is the ability of the monitor to generate consistent images when the intensity of light changes suddenly. If the images flicker or get distorted with sudden changes in brightness levels, for instance when watching a movie or a Flash presentation, it can lead to an eye strain.

The screen in Geometry test1

Viewsonic E53 (15-inch monitor)

All 11 of the 15-inch monitors showed a clear pattern, but the scores in the Geometry test were a trifle low because all the 15-inch monitors we received were 'non-flat' tubes—since CRTs are not perfectly spherical, the focus on the screen will not be uniform. However, the electronics in the monitor compensate for some of this variance.

A score of around 10 points should be

Digit Test Process

The CRT monitors were benchmarked on different parameters based on the tests carried out by DisplayMate, a dedicated video utility for setting up, tuning-up, calibrating, evaluating and testing video displays, monitors and even complete video systems.

It is the only utility devoted to monitors and video boards. The tests carried out by DisplayMate were:

1. Geometry test: It comprises six subtests. The pincushion and barrel distortion test shows the monitor's capacity to display straight lines; the screen regulation tests examine the extent to which an image expands in bright areas on the screen, and contracts in the areas which are dim.

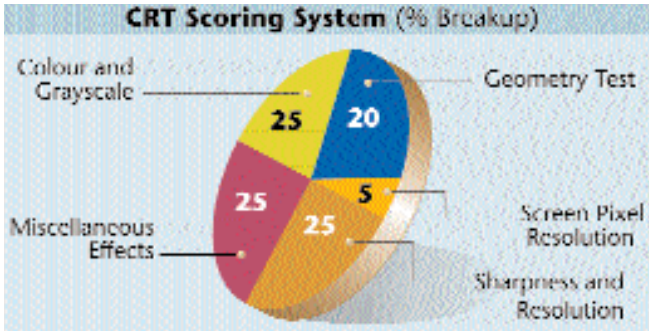
2. Sharpness and Resolution test: This includes seven subtests that examine the sharpness of horizontal as well as vertical resolutions of the images, variations from optimum focus over the screen, sharpness and resolution of the entire screen, the visible RGB component and moiré pattern.

3. Screen pixel resolution: A test named Scaled Diamond is used to check for any jaggedness on the screen while displaying straight as well as diagonal lines.

4. Colour and gray scale: This test comprises nine sub-tests that check for any kind of ghosting or streaking.

5. Miscellaneous effects: This is a set of five subtests that check the monitor for flickering and how uniformly the screen is visible while viewing full-screen images.

Before testing, the monitors were configured with the correct set of drivers provided by the vendor or the ones supported by default in Windows. Three reviewers tested all the monitors and three separate test scores were logged for each monitor. The scores were then averaged and compiled to generate an overall score. We switched on the monitors for approximately 10 minutes for warming them up so that each reviewer would get exactly the same results.



To keep the ambient light condition constant for each monitor, they were tested in a closed room with only one incandescent lamp (40 W) on at the back of the monitor. This was also done to reduce any glare on the monitor screen. The door to the room was kept closed and the see- through glass on the door was covered with a black sheet of paper on both sides to keep the room dark. The monitors were tested at the following constant resolutions:

15-inch/17-inch:
1024x768x75Hz
19-inch/21-inch/22-inch:
1280x1080x75Hz

The test bed comprised a P-III 700 MHz processor, 128 MB of RAM. The graphics card was GeForce2 Ultra 64 MB DDR.

Finally, the monitors were checked for other parameters like construction and build quality, ease of use of the OSD, user manual, integration of extras such as USB functionality, speakers, and so on.

considered acceptable. As you can see from the table in one of the following pages, Microtek's entry logged a very poor score of 4.6. On the other hand, the Compaq MV540 scored an amazing 16.6, mowing over the rest of the competition by a fair margin. It also carried with it a pretty hefty price tag. The closest that any monitor could come to it was the Benq V551-M, which would be a decent bargain considering its price. Another rather interesting fact was that only four of the 11 monitors in this category—namely BPL, Viewsonic, Proview and Samsung—provided OSDs; the rest came with analog controls.

Among the 17-inch monitors, the Viewsonic G73f came out on top in the Geometry tests. It had an impressive overall screen geometry score of 20.8 which was over 3 points ahead of its nearest rival, the Samsung SyncMaster 753s and way ahead of the average score for the 17-inch category (13 points). A large component of its good showing in the Geometry test was the impressive scores in the screen regulation test—we observed practically no changes in the size and shape of the image and no perceptible clipping of the screen when brightness levels were suddenly increased. Surprisingly however, the monitor gave only average results when generating parallel line patterns in the distortion test.

Another impressive performer was the Samsung SyncMaster 753s, which showed very little image distortion and came second only because it showed some variation in dimensions during the Screen Regulation test.

The LG Flatron 700s was a big disappointment and gave us way below average results in all four image regulation tests—the variation in the size and shape of the test images was drastic.

In the 19-inch category, Sony CPD-420 showed pretty impressive results. It logged an extremely high score of 24 points—the highest score in the entire comparison test, across all categories of CRT monitors. Close on its heels were the Compaq MV-940 and the Viewsonic E90 with scores of 23.6 and 23.3 points, respectively. The Sony CPD-420 was also the only monitor with an Aperture Grill tube, which uses the patented Trinitron technology. This test clearly indicates that the Sony CPD-420 is ideal for graphic and Web designers who have to deal with a lot of vector images and animations.

The 21- and 22-inch monitors are probably the most widely used for video editing, CAD/CAM applications, graphic designing and engineering drawings. Considering that these monitors incorporate high precision electronics, a score of over 20 in the screen geometry test should be considered a bare minimum.

There was stiff competition in the Geometry test in this category. The Viewsonic G810 showed outstanding results in the Pincushion/Barrel test. It logged an overall score of 23.5 in the Screen Geometry test, beating the supremely elegant Sony CPD-520, which scored 22.8 points.

In contrast, the Benq P211 logged a disappointing score of 14.4 points. The low overall score in this test can be attributed ➜

to its poor showing in the Local, Symmetric and Asymmetric Regulation tests. There was far too much distortion in images with sudden increase in brightness.

Sharpness and Resolution

If design is your forte then your monitor should also be able to reproduce sharp images at high resolutions. We tested the monitors for sharpness and resolution through a set of tests in which seven different images were generated on each monitor. The outcome of this test is a clear indicator for those who work with

This is the test screen for sharpness and resolution

page layout software, image editing software and other specialised design tools.

For 15-inch monitors, a score of 17 points and above in the Sharpness and Resolution test should be considered good. Here, Samtel SV-410 was clearly the best performer as it scored 20.6 points overall in this test. It did especially well in the Vertical Bar Resolution test in which the gaps between the bars could be clearly seen and there was very little moiré visible. Viewsonic E-53 came close behind in this test.

The Krypton 500LR performed poorly in this test. Even at full resolution it showed the bar as a solid block and the corners in the fine resolution matrix and diagonal matrix appeared very unclear—instead of showing a pure white line, the RGB component was clearly visible throughout. This clearly indicates that on this monitor one will not be able to view an object with great clarity.

As for 17-inch monitors, an overall score of 22 and above should be considered good. In this test, the monitor that came out trumps was again the Viewsonic G73f. It scored a handsome 27.1 points. Combined with its good showing in the Geometry test, this one makes a good choice for those who need to work with a lot of complicated 2D and 3D drawings at high resolutions. This model is a trifle expensive though.

Samsung SyncMaster 753DFX came out second best, scoring a neat 26. It performed exceptionally well in all the other subtests except for the Horizontal Bar Resolution test and the various resolution tests wherein its performance was just about acceptable.

The Samsung SyncMaster 753s performed brilliantly, scoring almost on par (25.8) with its more expensive cousin. Considering its price, the Samsung SyncMaster 753s strikes the right balance between price and performance.

Most of the other monitors scored pretty decently too, with a fair number of them crossing the 22 mark. A surprising exception was the LG Flatron 700s; it scored only 11.

Among the 19-inch monitors, the Sony CPD-G420 once again emerged as the winner, scoring maximum marks in all the tests except for the Horizontal Bar Resolution test where it took a slight beating. Viewsonic E90 came very close to Sony by achieving a score of 25.1. Considering that it is priced at only Rs 21,500, it surely deserves more than a second look.

Samsung SyncMaster 753s (17-inch)

The Philips 109s lost a lot of points due to its rather average performance in the Resolution tests, especially in the Horizontal Bar Resolution test.

In the premium category (21- and 22-inch), one should expect nothing less than 26 in the Sharpness and Resolution test. With high-quality tubes and electronics, there was little where these behemoths could go wrong. All of them performed brilliantly and the competition was intense. Benq P211 and Philips 201B topped with a high score of 27.8. Viewsonic G810 came second with a score of 27.6. Yet, it beats the top performers in this test if you consider the price—a good Rs 15,000 to Rs 20,000 cheaper. The flatter Viewsonic P220F surprisingly failed to live up to expectations here, scoring only 25.

Screen Pixel Resolution

Once again, this aspect is especially important in applications where geometric shapes need to be generated. Even the highest resolution systems available will show some limitations, which in turn would result in jagged lines, inability to discriminate between closely spaced lines and ➜

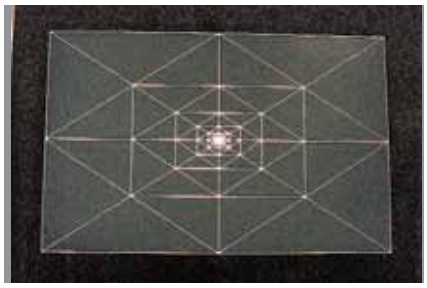
Go Easy on the Eyes

For anyone who spends more than a couple of hours a day in front of a computer, eyestrain is an important consideration. A good monitor not only generates more vibrant and 'real' looking images, but it is also much easier on the eyes. There are several factors that impact the eye-friendliness of a monitor.

Resolution: This refers to the sharpness and clarity of an image. For monitors, the screen resolution is expressed as number of dots (pixels) on the entire screen. This means that a 640x480 pixel (or VGA) screen is capable of displaying 640 distinct dots on each of the 480 lines, which translates to about 300,000 pixels. Make sure that you choose a resolution setting that you are comfortable with—a 1024x768 resolution on a 15-inch screen might not be very comfortable to view even if your monitor supports it.

Refresh rate: This is the rate at which each pixel is redrawn on a screen. If you view an image at lower refresh rates (say, 60 Hz), the images will flicker, causing eye-strain. The ideal setting for flicker-free viewing is about 85 Hz, but 75 Hz is comfortable too. Make sure that your monitor supports a refresh rate of at least 75 Hz. If you have a powerful graphics card that can generate images at high-resolutions and refresh rates, make sure that your monitor is able to support them.

Radiation: Long hours spent in front of a monitor can cause damage to one's eyes and in some cases even cause severe headaches. While modern CRT displays abide by the new (and stricter) emission standards, it would still be advisable to use an anti-glare screen to further eliminate electromagnetic radiation (EMR) from the display.



The screen for testing Screen Pixel Resolution

objects, and fusion or merging of pixels.

Among the 15-inch monitors, the Compaq MV540 displayed diagonal lines perfectly and the shape of the rectangle and the circle was also almost perfect. It scored a brilliant 4 points out of a maximum of 5. Krypton 500LR was its nearest rival with a score of 3.8; the only visible difference was that the lines were slightly more jagged as compared to the Compaq MV540. The rest of the 15-inch monitors scored close to 3 points, which is quite acceptable.

In the 17-inch category, LG StudioWorks 700s, Philips 107s, Philips 107T, Proview 787N and Viewsonic G73f vied for the top spot, each scoring an impeccable 4 points.

There was a tie between Compaq MV940, Sony CPD-G420, and Viewsonic E90 in the 19-inch category. Each scored 4.1 points.

In the 21- and 22-inch category also there was very close competition. Sony CPD-G520 won by a hair's breadth, scoring 4.1—just 0.1 points extra over the entries from Viewsonic and Philips.

Colour and Grayscale

This test, which had the highest weightage in the overall score, helps evaluate how well the monitor is able to reproduce colour. It also checks for any ghosting and streaking that might occur with different colour shades, brightness and contrast as well as overlapping of darker or lighter shades on other colours. The results of this test would prove quite interesting for photo and video professionals as well as those who work in the print industry and need to work specifically with colours. For home or office users, this test might not hold too much importance as general applications like Office suites will not be able to highlight the difference.

The Proview PA-566 came out on top here. It scored an excellent 33.6 points, edging out Viewsonic E53 by just about a

The screen in a Colour and Grayscale test

point. A decent score in this category would be over 30, and almost all 15-inch monitors made that cut, except for LG StudioWorks 563N—one could see a lot of colour and midrange streaking and its performance in white and black level shift was also below average.

In the 17-inch category, Samsung Syncmaster 753s was a clear winner with a score of 37.1. No monitor came even close to this score. It performed extremely well in all the tests, and one couldn't observe any sort of ghosting and streaking effect. Viewsonic E771 was the second best, scoring 35.1 points.

There was a neck and neck fight between Samsung SyncMaster 955DF and Compaq MV-940 in the 19-inch category; SyncMaster 955DF emerged as the winner. Compaq MV-940 lost out on account of the high amount of ghosting and streaking.

The NEC AccuSync 95F was the only monitor which did not perform well in this test. It performed poorly in the Streaking and Ghosting test and displayed an average performance in the colour purity test as well. It surely shouldn't be on your list if you are a designer or need to work for print publications.

In the 21- and 22-inch category, Philips 201B performed brilliantly. Viewsonic P220F too put up an extremely respectable performance, except in the Midrange Streaking test. LG StudioWorks N2200P's performance was not up to the mark at all and was especially bad in the Streaking and Ghosting test.

Miscellaneous Effects

This test is a combination of several small but important tests. It checks for screen uniformity which basically determines whether the image will be clear throughout without variation in colour, contrast and brightness. It also includes a flicker test, which checks for visible flicker at various resolutions. Defocus, Blooming and Halos tells us whether or not lines, bars or other objects will appear uniformly or not.

In the 15-inch category, Viewsonic E53 came out tops, with a score of 16.6 points. This was the only monitor to display a resolution of 1024x768 at 75 Hz. Proview PA-566 too performed well, scoring 16.1 points. The only place it lost out was in the Dark Screen test, which checks for reflection off the screen. Compaq MV-540 was a disappointment. Its poor performance was especially visible in the Flicker, Defocus, Blooming and Halos and Dark Screen test.

Among the 17-inch monitors, both Samsung SyncMaster 753 DFX and Viewsonic G73f emerged winners in this test, scoring 18 points each. Both performed exceptionally well in all the tests. For the second place also there was a tie between three models: Benq V771, Benq G773 and Samsung SyncMaster 753S, each scoring 17.6 points.

In the 19-inch category, Compaq MV 940 was the top performer, scoring 19.3

5 Steps to a Perfectly Calibrated Machine

How do you get your brand new monitor to display an image as close to perfection as possible? The answer is to calibrate and characterise the monitor. Calibration removes colour casts and sets a known white point on your monitor as a reference point for variations in brightness and contrast, whereas characterisation creates a monitor profile for use with a colour management system. The colour profile of the monitor must be as accurate as possible.

Specialised software are available for calibrating monitors. For PCs running Windows, the most commonly used program is Adobe Gamma, which comes bundled with most Adobe products.

To calibrate your monitor, go to ***Start > Run > Control Panel > Adobe Gamma***. Select the 'Step by Step' wizard. It will prompt you to give a unique profile name. Next, it will prompt you to adjust the brightness and contrast so that the centre box is as dark as possible. It will then display the phosphors that your monitor displays.

Adjust your gamma settings and then adjust the Hardware white point according to your preferences. Save your profile. The next time you boot your machine, the same profile will be applied.

points. It performed brilliantly in all the tests, except in the dark screen test. For the second place there was a tie between Benq 99SL and Sony CPD-G420 with a score of 18.5 points each.

Lastly, in the 21- and 22-inch category, Sony CPD-G520 showed an exceptionally brilliant performance in all tests. We could observe no flicker and the Dark Screen was perfect with no reflection of background objects. This indicates that

Sony CPD-G520 (21-inch)

one will experience less eyestrain while working with this monitor.

Viewsonic P220F came second. It lost out only because of its average performance in the Dark Screen test where we could see white objects even at a distance of 2 feet. Philips 201B's performance was below average and it performed particularly badly in the Flicker test and the Dark Screen test—the background objects were clearly visible.

Making a choice

This comparison test proved to be a close and well fought battle between top brands. One remarkable fact that we observed was that as we moved up the categories, there was a steady rise in the points scored. There was a definite improvement in sharpness and resolution along with better colour reproduction. This is a clear indicator of how things improve as you move to bigger monitors.

15-inch monitors: The monitor to get the highest overall score was the **Viewsonic E53** (61.8 per cent). We were impressed by this monitor's ability to give a flicker-free display at high resolution, while preserving image quality. This one undoubtedly deserves the Best Performance award.

Its nearest competitor was the **Proview PA-566** which scored 60.9 per cent. It takes our Best Value award for 15-inch monitors. Its performance was almost as good as that of the Viewsonic E53, and it came at an unbeatable cost of only Rs 5,600.

17-inch monitors: This category saw the maximum number of monitors—we received 18 monitors from 11 different brands.

As expected, the results were much better than what we saw in the 15-inch monitors—the overall score went as high as 75.5 per cent here. The winner of the Best Performance award in this category was the **Viewsonic G73f**—this flat monitor managed to just scrape ahead of the Samsung SyncMaster 753s. It delivers a crisp and crystal clear display but as always with the best performers, it demands a hefty premium. This monitor is available for Rs 18,750, which makes it the most expensive monitor in its category.

The **Samsung SyncMaster 753s** takes the Best Value crown without too much effort. Performance wise it was very close to the Viewsonic G73f, but the G73f simply cannot match its price. You can have this wonderful monitor for just Rs 10,000!

19-inch monitors: The count for this category stood at six and the highest overall score crept up to 79.3 per cent. **Sony CPD-G420** emerged the Best Performance winner, thrilling us with its amazing display abilities. It will truly delight any design or multimedia professional. It is simply the best when it comes to image quality, geometric precision or colour reproduction. But hold your breath—it will put you back by Rs 52,000, which is at least 30 per cent more expensive than other monitors in this category.

The Best Value award goes to **Compaq MV940**. Purely on performance it was just 1.23 per cent behind the Sony CPD-G420 scoring 78 per cent. But the price factor is what gives it the edge—just Rs 21,736.

Compaq MV940 (19-inch)

21- and 22-inch monitors: We received seven monitors representing six brands. Two of these were 22-inch monitors, which we clubbed with the 21-inchers as they had a viewable area of 20 inch as against 19.8 inch for most 21-inch monitors. We witnessed one of the toughest fights in this category—the Sony CPD-G520, Viewsonic G810 and the Viewsonic P220F were equally brilliant, each scoring an overall 81 per cent.

Hence, to select a best performance winner, we looked at the feature list of each monitor. The **Sony CPD-G520** was easily the winner. This monitor uses the Aperture Grille technology, has a dot pitch of 0.24 mm and can reach a maximum resolution of 2048x1536 at 60 Hz. Of course, it costs a bomb! It is available for Rs 83,200.

Selecting the **Viewsonic G810** as the Best Value winner was easy. It scored equal to the Sony CPD-G520, but didn't get the Best performance award on account of the tie.

But when one considers its price—just Rs 45,000—there can be no doubt about the value it offers. Price conscious buyers who wouldn't like to compromise on quality will find this their best companion for a long time to come.

Decision Maker

	Office Productivity	Home and Internet	Graphics and Design Professionals
You need	A display that generates crisp text and is easy on the eye	A display that is suitable for video and gaming and fits your budget	A large display with a high resolution support and accurate colour reproduction
Look for	A 15-inch monitor	A 15- or 17-inch monitor	A 19-, 21- or 22-inch monitor
The models	Krypton 500LR, Proview PA-566	Acer V551-M, Samsung SyncMaster 753s, or Viewsonic G73f	Sony CPD-G420, Compaq MV940, Samsung SyncMaster 1100p Plus, Sony CPD-G520, or Viewsonic G810
Price range	Up to Rs 8,000	Up to Rs 12,000	Rs 20,000 and above

SCORE BOARD Features and Specifications – 15-inch CRT Monitors

Brand	Benq	BPL	Compaq	Krypton	LG	Microtek	Philips	Proview	Samsung	Samtel	Viewsonic
Model	V551-M	J5	MV540	500LR	Studioworks 563N	Flatvision 38F1	105E	PA-566	SyncMaster 551s	SV-410	E53
Viewable (inch)	13.9	13.9	13.8	13.9	13.8	NA	14	13.7	13.8	13.8	14
F & FST ***	No	No	No	No	No	No	No	No	No	No	No
Dot Pitch (mm) (Diagonal)	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.24 (Horizontal)	0.28	0.27
Vertical Scan Rate (Hz)	50-120	55-120	50-120	50-120	50-120	50-120	50-120	50-120	50-120	50-120	50-120
Horizontal Scan Rate (KHz)	30-54	31-55	31.5-54	30-54	30-61	30-56	30-54	30-70	30-55	30-54	70
Maximum Resolution/ Refresh Rate	1024x768 @ 67 Hz	1024x768 @ 60 Hz	1024x768 @ 60 Hz	1024x768 @ 60 Hz	1024x768 @ 75 Hz	1024x768 @ 60 Hz	1024x768 @ 60 Hz	1024x768 @ 60 Hz	1024x768 @ 68 Hz	1024x768 @ 60 Hz	1280x1024 @ 60 Hz
Video Band-width (MHz)	65	85	65	65	78	65	65	110	65	65	110
CRT type	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM
W x H x D (mm)	361x388 x384	363x360 x384	371x396 x414	360x367 x377	371x356x395	470x470 x460	380x358 x379	359x366 x385	356x369.5 x380	460x390 x475	360x374 x390
Weight (kg)	12	12	13	12.5	11.7	12.5	11.5	12.5	11.5	12.5	12
Warranty (years)	3 yrs (on site)	3 yrs (on site)	1 yr carry in	2 yrs carry in	2 yrs on site	3 yrs on site	2 yrs on site	3 yrs on site	3 yrs *	3 yrs on site	2 yrs **
Price (Rs)	6,500	6,500	10,868	5,400	5,757	5,850	7,490	5,600	8,000	5,800	7,750
Performance											
Geometry test	14.1	8.16	16.6	13.5	6.3	4.6	9.1	10.6	12	8.1	11.1
Sharpness and Resolution	19.8	17.66	19.3	13.6	17.1	16.3	15	19.6	15.6	20.6	20.3
Screen Pixel Resolution	3.6	4	4	3.8	3	3.3	3.1	3.5	2.8	3.3	3.5
Colour and Grayscale	32.1	31.33	30.3	32	29.3	32.3	31.8	33.6	31.3	32	32.8
Miscellaneous Effect	12.6	12.16	10.8	13.1	12.5	13	12.8	16.1	13.5	11.5	16.6
Overall % (per-formance only)	59.7	52.72	58.8	55.34	49.1	49.6	51.7	60.9	54.5	53.9	61.8
Rating	B+	B	B	B	B+	B+	B	B+	B	B+	B+
Vendor Details											
Contact	Benq India	Sky Electronic	AVI	Priya Ltd	LG Electronics	Microtek Int Ltd	Philips India	Venktron	Samsung	Compuage Infocom	Roop Technolo-gies Pvt Ltd 022-6631921
Phone	022-5705230	022-5512721	022-6465522	022-2663611	0120-4560300	022-8362406	022-6912255	022-4375262	011-6322517/18	022-8305501	
E-mail	pankajpamani@benq.com	skyepl@bom8.vsnl.net.in	aviteam@vsnl.com	sales_bom@priyagroup.com	ddavar@lgindia.com	an.bom@mtk.sril.in	debasish.mitra@philips.com	venktron@bom3.vsnl.net.in	marketing@sam-sungindia.com	biju@com-puageindia.com	roop@vsnl.com
Web site	www.benq.com	www.bplworld.com	www.com-paq.com	www.priya-group.com	www.lgindia.com	www.microtekdirect.com	www.philips.com	www.proview-india.com	www.samsungin-dia.com	www.copuagein-dia.com	www.roopon-line.com

*****On site in Metroes/others carry in ******Pickup and drop charges to the nearest service centre will be borne by Viewsonic *******Full and Flat Square Tube SM= Shadow Mask

SCORE BOARD

Features and Specifications – 17-inch CRT Monitors

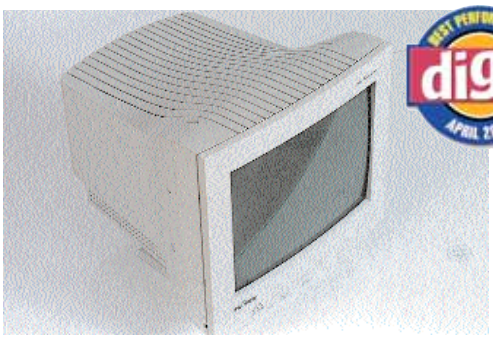
Brand	Benq	Benq	Compaq	Krypton	LG	LG	Microtek	NEC
Model	V771	G773	MV740	V798	Flatron 700S	StudioWorks 700S	43F1	Multisync 75
Viewable (inch)	16	16	15.9	16.1	16	16	16	16
F & FST* **	No	No	No	No	Yes	No	No	No
Dot Pitch (mm) (Diagonal)	0.27	0.25	0.28	0.28	0.25	0.27	0.28	0.27
Vertical Scan Rate (Hz)	50-120	50-120	20-120	50-120	50-160	50-160	50-120	55-120
Horizontal Scan Rate (KHz)	30-72	30-72	31.5-70	30-70	30-70	30-70	30-70	31-70
Maximum Resolution/Refresh Rate	1280x1024 @ 67 Hz	1280x1024 @ 67 Hz	1280x1024 @ 60 Hz	1280x1024 @ 60 Hz	1280x1024 @ 60 Hz	1280x1024 @ 60 Hz	1280x1024 @ 60 Hz	1280x1024 @ 66 Hz
Video Bandwidth (MHz)	110	150	108	110	110	110	110	NA
CRT type	Shadow Mask	Shadow Mask	Shadow Mask	Shadow Mask	Shadow Mask	Shadow Mask	Shadow Mask	Shadow Mask
W x H x D (mm)	406x422x412.5	406x423x412.5	451x449x416	404x431x429	400x395x424	400x395x420	420x430x420	403x420x418
Weight (kg)	15.4	16.4	17	16.8	16	14.4	15.5	15.4
Warranty (years)	3 yrs carry in	3 yrs carry in	1 yr carry in	2 yrs carry in	3 yrs on site	3 yrs on site	3 yrs on site	1 yr carry in
Price (Rs)	11,500	15,000	16,302	8,150	10,712	8,355	8,500	7,750
Performance								
Geometry test	11.3	9.3	16.5	14.6	5.6	7.5	6	11.3
Sharpness and Resolution	23.8	22.5	21.6	21.1	11	23.5	18	21.5
Screen Pixel Resolution	3.16	3	3.3	3.1	1.6	4	2.5	2.8
Colour and Grayscale	32.5	32.5	31.8	31.5	27.6	32.6	26.5	30.3
Miscellaneous Effect	17.6	17.6	13.1	17.1	13.3	17.1	16.6	15.3
Overall % (performance only)	64.9	62.2	62.8	64.6	42.7	62.1	51.5	59.4
Rating	B	B+	B	B+	B+	A-	B+	B
Vendor Details								
Contact:	Benq India		AVI	Priya Ltd.	LG Electronics India Ltd.		Microtek International Ltd.	Moon Computers
Phone	022-5705230		022-6465522	022-2663611	0120-4560900		022-8362406	022-2653390
E-mail	pankajpamani@benq.com		aviteam@vsnl.com	sales_bom@priyagroup.com	ddavar@lgindia.com		an.bom@mtk.sril.in	sales@moonindia.com
Web site	www.benq.com		NA-	www.priya-group.com	www.lgindia.com		www.microtekdirect.com	www.moonindia.com

*On site in Metros; others carry in **Pickup and drop charges to the nearest service centre will be borne by Viewsonic *** Full and Flat Square Tube

Proview PA-566

This 15-inch monitor was second only to the Viewsonic E53 in performance. At Rs 5,600, which is a good 25 per cent less than what the Viewsonic E53 costs, it was also one of the cheapest monitors in this shootout.

The Proview PA-566 gave good results in the Geometry test and was able to produce colours precisely. It showed good results in the screen uniformity test and there was no flicker.



The one place it suffered, however, was in the dark screen test where we could clearly see the reflection of the white object and also the black pen held at a distance of 2 feet. Given its price and performance, this monitor is a good buy for most home users.

Philips	Philips	Proview	Samsung	Samsung	Samsung	Samtel	Viewsonic	Viewsonic	Viewsonic
107T	107S	787N	SyncMaster 753s	SyncMaster 753 DFX	SyncMaster 765MB	17 Futurist	E-70	E771	G73f
16	16	16.07	16	16	16	16	16	16	16
No	Yes	Yes	Yes	No	Yes	No	No	No	Yes
0.25	0.27	0.25	0.24 (horizontal)	0.20 (Horizontal)	0.20 (Horizontal)	0.27	0.27	0.27	0.25
50-160	50-160	50-160	50-160	50-160	50-160	50-160	50-160	50-120	50-180
30-71	30-70	30-86	30-70	30-70	30-85	30-70	30-70	30-70	30-86
1280x1024 @ 60 Hz	1280x1024 @ 60 Hz	1600x1200 @ 60 Hz	1280x1024 @ 60 Hz	1280x1024 @ 65 Hz	1600 x1200 @ 68 Hz	1280 x 1024 @ 60 Hz	1280 x 1024 @ 66 Hz	1280 x 1024 @ 66 Hz	1600x1200 @ 68 Hz
108	110	160	110	110	185	110	110	100	110
Shadow Mask	Shadow Mask	Shadow Mask	Shadow Mask	Shadow Mask	Shadow Mask	Shadow Mask	Shadow Mask	Shadow Mask	Shadow Mask
399x410x419	399x410x419	550x550x465	398x412x400	412x420x415.5	398x412x400	18.9"x18.3"x22'	408x426x420	417x425x427	408x428420
15	15	17.5	15	16.4	15.9	15.5	14.9	16.5	16.2
2 yrs on site	2 yrs on site	3 yrs on site	3 yrs *	3 yrs *	3 yrs *	3 yrs on site	2 yrs **	2 yrs **	2 yrs **
13,990	10,990	9,200	10,000	12,000	13,500	8,000	9,550	9,250	18,750
7.16	7.16	14.6	17.1	14.8	10.5	11.3	6.6	6.5	20.8
21	21	19.8	25.8	26	25	20.5	23	24	27.1
4	4	4	3.8	3.1	3.1	2.8	2.8	3.6	4
31.1	31.6	34.3	37.1	33.5	27.5	31.8	34	35.1	31.5
16.6	16.6	17	17.6	18	15.8	15	14	17.3	18
58.7	58.71	65.9	74.3	70.2	60.5	59.2	57.4	62.8	75.5
B	B+	A-	A-	B+	B+	A-	B	B+	B+
Philips India Ltd.		Venktron Digital Systems	Samsung Electronics India Information & Telecommunications Ltd.			Compuage Infocom	Roop Technology Pvt Ltd		
022-6912255		022-4375262	011-6322517/18/19			022-8305501	022-6631921		
debasish.mitra@philips.com		venktron@bom3.vsnl.net.in	marketing@samsungindia.com			biju@com-puageindia.com	roop@vsnl.com		
www.philips.com			www.samsungindia.com			www.com-puageindia.com	www.rooponline.com		

Viewsonic G73f

This 17-inch flat monitor could reach a resolution of 1600x1200 at 68 Hz, thanks to its 110 MHz video bandwidth of the monitor—one would expect such high resolutions from a 19-inch or bigger monitor. It had a 16-inch viewable area and a dot pitch of 0.25 mm, whereas most 17-inch monitors have a dot pitch of 0.27 mm.

The Viewsonic G73f gave an impressive performance, especially in the Screen Geometry test, where it showed hardly any distortions in screen size when the screen turned bright. It was also perfect in drawing lines diagonally. Though a slight ghosting and streaking effect was visible, it wasn't very prominent and could be seen only when observed from up close. The Viewsonic G73f is available for Rs 18,750, which makes it a bit expensive for the home user, but professional graphic designers, 3D-animators and Web developers will find it suitable for their needs.

SCORE BOARD Features and Specifications – 19-inch CRT Monitor

Brand	Benq	Compaq	NEC	NEC	Philips	Samsung	Sony	Viewsonic
Model	99SL	MV940	Accusync 95F	Multisync 95	109S	955DF	CPD 420	E90
Viewable (inch)	18	18	18	18	18	18	18	18
F & FST* **	No	No	Yes	No	No	Yes	Yes	Yes
Dot Pitch (mm) (Diagonal)	0.26	0.26	0.25	0.26	0.27	0.25	0.24	0.27
Vertical Scan Rate (Hz)	50-160	50-120	55-160	55-160	51-60	50-160	48-170	50-180
Horizontal Scan Rate (KHz)	30-98	31-85	31-96	31-96	30-92	30-110	30-110	30-86
Maximum Resolution/Refresh Rate	1600x1200 @ 78 Hz	1600x1200 @ 60 Hz	1600x1200 @ 76 Hz	1600x1200 @ 76 Hz	1920x1440 @ 60 Hz	1600x1200 @ 87 Hz	1920x1440	1600x1200 @ 68 Hz
Video Bandwidth (MHz)	176	162	207	207	234	240	NA	150
CRT type	Shadow Mask	Shadow Mask	Shadow Mask	Shadow Mask	Shadow Mask	Shadow Mask	Aperture Grill	Shadow Mask
W x H x D (mm)	466x484x428	460x485x466	442x453x455	442x453x455	440x447x440	465x489x455	451x471x461	448x470x463
Weight (kg)	21	25	22	22	19.7	23.3	25.5	18.5
Warranty (years)	3 yrs carry in	1 yr carry in	1 yr carry in	1 yr carry in	2 yrs on site	2yrs*	1 yr carry in	2 yrs **
Price (Rs)	27,000	21,736	24,000	17,000	24,400	21,000	52,000	21,500
Performance								
Geometry test	21.5	23.6	9.3	7.6	16.5	12.16	24	23.3
Sharpness and Resolution	22	22.8	20.5	24.5	20	23.33	26	25.1
Screen Pixel Resolution	3.5	4.1	2.1	4	3.1	4	4.1	4.1
Colour and Gray Scale	32.3	34.8	30	30.66	33.3	35.33	34	33.5
Miscellaneous Effects	18.5	19.3	17.1	15.5	17.8	16.66	18.5	17.3
Overall % (performance only)	72.8	78.09	58.11	60.17	67	66.69	79.32	76.75
Rating	A-	B+	B	B+	B+	A-	B	A-
Vendor Details								
Contact	Benq India	AVI	Moon Computers		Philips India Ltd.	Samsung	Neoteric Informatique	Roop Technologies P Ltd
Phone	022-5705230	022-6465522	022-2653390		022-6912255	011-6322517	022-4172600	022-6631921
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Web site	www.benq.com	www.compaq.co.in	www.moonindia.com		www.philips.com	www.sam-sungindia.com	www.neoteric-info.com	www.roopon-line.com

*On site in Metroes/others carry in **Pickup and drop charges to the nearest service centre will be borne by Viewsonic ***Full and Flat Square Tube

Sony CPD G-420

This 19-inch flat monitor comes with Sony's proprietary Aperture Grille technology, which leads to crisper images. It has a very detailed OSD function, which is easy to use. The monitor can reach a maximum resolution of 1920x1440 (the recommended resolution is 1600x1200) and features one upstream and four downstream USB ports.

The CPD G-420 gave very good results in the Geometry test, with the lines showing perfectly parallel. There was no expansion in the screen size in the Screen Regulation tests and the red, green and blue colours were reproduced precisely. The monitor, however, was not up to the mark when tested for horizontal bar resolution—it showed the bars, which were drawn very close to each other, as a single block. The ghosting effect was also very prominent. Though at Rs 52,000, it is rather expensive, its performance makes it well worth the price.

Features and Specifications – 21- and 22-inch CRT Monitor

Brand	Benq	LG	Philips	Samsung	Sony	Viewsonic	Viewsonic
Model	P211	StudioWorks N2200P	201B	SyncMaster 1100p Plus	Multiscan G-520	G810	P220 F
Size (inch)	21	22	21	21	21	21	22
Viewable	20	406x304 mm	20	20	19.8	20	20
F & FST ***	No	No	No	No	Yes	Yes	Yes
Dot Pitch (mm) (Diagonal)	0.25	0.27	0.25	0.25	0.24	0.25	0.27
Vertical Scan Rate (Hz)	50-160	50-160	50-160	50-160	48-170	50-180	50-180
Horizontal Scan Rate (KHz)	30-115	30-125	30-107	30-110	30-130	30-97	30-97
Maximum Resolution/Refresh Rate	1920x1440 @ 76 Hz	2048x1536 @ 75 Hz	1920x1440 @ 60 Hz	1800x1440 @ 75 Hz	2048x1536	1600x1200 @ 77 Hz	1920x1440 @ 73 Hz
Video Bandwidth (MHz)	290	350	261	280	NA	200	225
CRT type	ShadowMask	Aperture Grill	ShadowMask	ShadowMask	Aperture Grill	ShadowMask	Aperture Grill
W x H x D (mm)	515x508x512	470x470x409	482x478x467	504x510x493	500x498x485	500x507x488	508x502x500
Weight (Kg)	29.8	26.8	24	26.1	30.3	23.5	28
Warranty	3 yrs carry in	3 yrs on site	2 yrs on site	2 yrs *	1 yr carry in	2 yrs **	2 yrs **
Price (Rs)	69,000	55,000	60,000	49,000	83,200	45,000	67,000
Performance							
Geometry test	14.5	20.8	17.5	20.6	22.8	23.5	22.5
Sharpness and Resolution	27.8	25.3	27.8	27.1	26.1	27.6	25
Screen Pixel Resolution	3.8	3.8	4	3.6	4.1	4	4
Colour and Gray Scale	33.5	28.5	37.6	34.3	35.5	34.1	35.5
Miscellaneous Effect	20.6	17.3	16	18.8	22.6	19.8	21.5
Overall % (performance only)	74.5	71.7	74.8	77.5	83.5	81.3	81.079
Rating	A-	A-	A-	A-	B+	A	A-
Vendor Details							
Contact	Benq India	LG Electronics India Ltd.	Philips India Ltd.	Samsung	Neoteric Informatique	Roop Technologies Pvt Ltd	
Phone	022-5705230	0120-4560900	022-6912255	011-6322517/18/19	022-4172600	022-6631921	
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Web site	www.benq.com	www.lgindia.com	www.philips.com	www.samsungindia.com	www.neoteric-info.com	www.rooponline.com	

*On site in Metroes/others carry in **Pickup and drop charges to the nearest service centre will be borne by Viewsonic ***Full and Flat Square Tube

Viewsonic G810

This 21-inch monitor was neck and neck with Sony CPD-G520 in performance but lost the Best Performance award to the latter only on account of features supported, such as higher resolution and smaller dot pitch. The results were very impressive when displaying RGB. There were no distortions, nor was there a change in the shape of the image when the screen turned bright. This makes it a good

choice if you love watching movies. The monitor even scored well in the Horizontal Bar Resolution test. Most monitors failed in this test or displayed discrepancies such as moiré pattern.

The Viewsonic G810 has a 20-inch viewable area with a video bandwidth of 200 MHz. It is available for Rs 45,000, which makes it one of the least expensive in this category.

LCDs provide for crisper images and emit less radiation than CRT monitors, but till recently, they came at an enormous cost. With improvements in manufacturing processes, prices have fallen and you can comfortably include a 15-inch LCD monitor in your PC budget. These now retail for as low as Rs 33,000.

But if you've got your eyes set on a bigger LCD monitor, then every extra inch will cost you a great deal more. A 17-inch LCD will cost you at least Rs 55,000. Move on to the premium segment and you can expect to pay Rs 1 lakh for an 18-inch LCD monitor.

So if crystal clarity is all you want and money is not an issue, then here's how you can buy the best LCD for your money.

Viewable Angle Test

One important consideration when buying an LCD monitor is the angle you can view it at. Most LCD panels display fine when the viewer is seated right in front, but if you are viewing it at an angle, the display quality undergoes a significant amount of change—there is a discernible drop in the brightness level and a yellow or blue tinge appears at more acute angles. So if you plan to use it for presentations or for more than one person to work on it simultaneously, then the viewing angle becomes a critical consideration. The higher the viewing angle supported by the LCD, the better. A presentation on an LCD which supports a viewing angle of less than 120 degrees (combined) will make the presentation look shoddy when viewed from the sides.

In this test Samsung SyncMaster 151 MP topped in the 15-inch category with a score of 9.33 points. In fact, it was the only monitor in this category which allowed us to read the document when sitting at an angle of 80 degrees to the monitor. The drop in brightness was just about tolerable and the document did not become too hazy. Sharp LL-T15V1 and LG Flatron 568 LM stood second with a score of 8 points, whereas Sharp LL-T15S1 performed below average.

In the 17-inch category, Samsung SyncMaster 171MP topped with a score of 14 points and second in line was Convergent with a score of 12.66. These two were the only LCDs that allowed us to read the document somewhat clearly from both the test angles, with no colour variation. Even at an angle of 80 degrees, there was only a slight change in brightness. In

CRT vs LCDs

CRTs are better than LCDs because

- They are less expensive
- They display a wider range of colours
- They have quicker response times which means that they can display moving images without smearing or artefacts
- You can view images from any angle

LCDs are better than CRTs because

- They are lighter and more compact
- They have a lower power consumption
- The image is crisper since each pixel is physically etched on the display
- Eyestrain and fatigue are lower because the images don't flicker
- LCDs generate less low-frequency electromagnetic emissions than CRTs
- The image geometry is always perfect
- The LCD panel reflects less light, which means less glare

Digit Test Process

The LCDs we received were categorised by size as 15-inch, 17-inch, 18-inch and above 18-inches. We tested them at the following test resolutions:

15/17-inch: Recommended resolution (OSD, Auto)

18-inch and above: Recommended resolution (OSD, Auto).

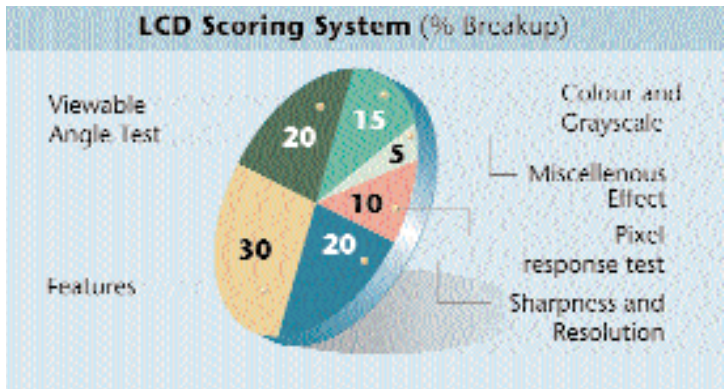
The test bed consisted of a Pentium III 700 MHz processor, 128 MB RAM, and a GeForce2 Ultra 64 MB DDR graphics card. When arriving at the overall score for each monitor, features were given a weightage of 30 per cent and performance, 70 per cent.

Among features, we looked for

Pixel size: The lower the pixel size, the better.

Viewing angle (horizontal and vertical): LCDs with a viewable angle of 160 degrees and above were given maximum points.

Power Consumption: LCD monitors with a power consumption of 50 watts and less were given maximum points.



The tests consisted of the following:

Viewable angle test: A text document and a tiff image were viewed from two different angles—85 degrees and 60 degrees. We looked for colour and clarity when viewed at these angles.

Pixel response: We played *Quake III* and watched a DVD movie (*The Matrix*) on the LCD and looked out for any blurring of the image.

Point shape and visibility: This is a DisplayMate test where an image is generated with a black background and a fine dot of one pixel size on it.

Here we checked to see if the shape of the dot was correct (square/round). We also looked for pixel bleeding and purity of colour.

Colour and grayscale: This test comprises nine subtests, including streaking and ghosting, bar streaking, mid-range streaking, colour streaking, white level shift, black level shift, and red, green and blue colour purity.

The Next Dimension

Emerging technologies that will change the way you see things on your display system:

3D TFT-LCD Monitor: Champagne served in a plastic cup somehow doesn't feel like Champagne at all. One could say the same for the kind of display you get when you combine the capacity of new-age graphics cards to render 3D objects in real time with plain Jane monitors.

3D TFT monitors will be here soon to complement today's advanced graphics cards. These monitors have a glass panel sandwiched between two LCD panels. Each LCD panel reflects half the light, creating a 3D sensation which takes realism to new heights.

OLED: Organic Light Emitting Diodes (OLED) are a new way to generate light, using organic materials rather than the complex crystalline structures found in traditional Light Emitting Diodes (LEDs). OLED technology produces self-luminous displays that do not require backlighting. As a result, you get thin, very compact displays.

OLED displays have many advantages over LCDs such as increased brightness, faster response time for full motion video, greater reliability and broader operating temperatures.

contrast, the performance of LG Flatron 782 LEs was quite mediocre—it could garner a score of just 8 points.

Viewsonic VP181 logged a top score of 16 in the 18-inch category. There was no visible colour tinge and no problem viewing the document at an angle. Surprisingly, Sony SDM-N80 showed a mediocre performance—the document could not even be seen clearly at an 80-degree angle and there was a noticeable yellow tinge.

Sharpness and Resolution

Here the test utility lights up only one pixel, which is made up of three subpixels representing red, green and blue. You can change the pixel as well as background colours at the press of a set of keys to see the impact of various colour combinations. If the pixels bleed into adjacent pixels, it indicates that the image generated will not be as perfect and sharp as it should be.

The 15-inch LCDs that did really well in this test were Philips 150 MT, Sharp LT-T15V1 and Sharp LT-15S1. Philips 150 MT scored over the two Sharp models with a hairline difference of just 0.67 points. There was no pixel bleeding in these three models and the display was crisp. An acceptable score here is 13 points.

In the 17-inch category, Samsung SyncMaster 171 MP and Viewsonic VE170 MB scored an impressive 16 points each. There was almost no noticeable bleeding in either model. By contrast, Easel CT-170 showed a lot of pixel bleeding and stood last with a score of just 4 points.

Sony SDM-N80 gave an outstanding performance in the 18-inch and above category, and scored 18 points, the highest across all categories. Viewsonic VP181 took a beating here, scoring only 8 points. The pixel dots were not perfect and a lot of pixel bleeding could be noticed.

The Viewsonic VP181 (18-inch LCD)

Colour and Grayscale

LCD monitors reproduce colour more accurately and the brightness and contrast level is also far better than in CRT monitors. Another difference between LCD and CRT monitors is that LCD panels are made up of pixels which are individually lit.

Here, we had three subtests (midrange streaking, white level shift and black level shift). In real world applications, this would help a user judge how much clarity he can get in terms of brightness and contrast and whether there will be any ghost effect on the images.

Among the 15-inch monitors, Sharp LL-15V1 and Sharp LL-15S1 scored 11.16 and 10.83 points, respectively. A decent score here is 10 points. Neither monitor showed any streaking and ghosting effect, but the LL-15S1 showed a slight white and black level shift. LG Flatron 568 LM was disappointing here too. A lot of ghosting and streaking was visible and its performance in the white and black level shift was also mediocre (it scored just 8.49 points).

In the 17-inch category, Viewsonic VE 170 MB scored 11 points, just 1 point ahead of its nearest rival, LG Flatron 782 LE. Both showed minimal streaking and ghosting effect and their performance in the White and Black Level Shift test was also up to the mark. Another model that did well here was the Easel CT-170, with a score of 9.16 points.

Glossary

Active Matrix: An LCD technology used in flat panel computer displays. It produces a brighter and sharper display with a broader viewing angle than passive matrix screens. Active matrix technology uses a thin film transistor at each pixel and is often designated as a 'TFT' screen.

Aspect Ratio: The relationship of width and height. When an image is displayed on different screens, the aspect ratio must be kept the same to avoid stretching in either the vertical or horizontal direction. For most current monitors, this ratio is 4:3. For HDTV, the ratio is 16:9 or 16:10.

Colour Temperature: This defines the whiteness of the white colour on the screen. Natural colours used in life-like images, such as people or landscapes, look more true to life when displayed at a colour temperature of 6500K. Black text on a white page is better represented by a colour temperature of 9300K.

Dot Pitch: A measurement of distance between the centres of two same-colour phosphor dots on the screen. The closer the dots, the smaller the dot pitch, and sharper the image.

Ghosting: A visual effect in which an area of 'on' pixels causes a shadow on 'off' pixels in the same rows and columns. As a result, one can see two images of the viewable object.

Pixel: In a raster grid, the pixel is the smallest unit that can be addressed and given a colour or intensity. The pixel is represented by some number of bits (usually 8, 16 or 24) in the frame buffer, and is illuminated by a collection of phosphor dots in the CRT that are struck by the beams of the electron gun.

Enhanced Dot Pitch: This term refers to the Hitachi's tube technology in which the phosphor triads are spaced closer together horizontally than they are vertically.

Sony SDM-N80 was the top scorer in the 18-inch category with an impressive 11.33 points. It showed practically no ghosting effect and its performance in the White and Black Level Shift test was excellent. On the other hand, Viewsonic VP 181 was not quite up to the mark. It scored just 8.66 points and we could see a lot of ghosting and streaking as well as a good deal of white and black level shift.

Screen uniformity

In the 15-inch category, Sharp LL-T15V1 showed a uniform screen throughout and it scored the highest (4 points). Philips 150 MT came close with a score of 3.67. Once again, LG Flatron 568 LM gave a poor showing with a meagre 1.87 points—the screen was not uniform and there was also some amount of flickering.

Viewsonic VE 170 MB performed well in the 17-inch category (3.5 points). Easel CT-170 and Samsung Syncmaster 171MP also gave an acceptable performance, scoring 2.33 and 3 points, respectively.

As for the 18-inch LCD monitors, the top scorers were Sony SDM-N80 (3.33 points) followed by Viewsonic VP181 (2.33 points).

Pixel Response Time

One of the few areas where LCDs really take a back seat is in the area of movies and games. But with faster pixel response times now becoming the norm, watching movies and playing games on LCDs is very much possible. Nevertheless, you can still observe a distinct blur in games and it can get a little strenuous on the eyes. We tested by playing a short clip from *The Matrix* where the scene changed frequently with lots of lights flashing. We also played the *Quake III* demo to gauge the performance of the LCD monitor when there were a lot of moving objects.

In the 15-inch category we found Sharp LL-T15V1 to be the best LCD with no ghost effect visible—it scored an impressive 6 points; compare that with the acceptable score which stands at 4.3 points. However, during the *Quake III* demo, we observed that while firing, the gun left behind a ghost image for a split second. However only a trained eye will catch this and most people will not notice any discrepancies.

We had a surprise winner in the 17-inch category—the Convergent monitor managed to score 6 points. This LCD monitor was accurate in displaying images on the screen both while playing the movie and running the *Quake III* demo. There was no shadow left behind by fast moving objects even at high frame rates. Samsung SyncMaster 171MP was a close second in the race but there were some shadows left behind for split seconds in the *Quake III*.

Of the two LCDs in the 18-inch category, Viewsonic VP181 overtook Sony SDM-N80 by a good margin. The LCD from Sony was all right while playing the movie but in the game demo, the shadow was clearly visible.

The Features

In the 15-inch category, Philips 150MT was the most feature rich. Its power consumption was only 48 watts and it also provided the facility of adding a VCD, DVD and VCR player. It included a PiP (picture in picture) feature, enabling you to watch your favourite TV channel on your machine.

The stunning Samsung SyncMaster 151MP with its silver finish, would add grace to any desktop. It scored 18 points and also had the PiP feature along with a fully functional infra red remote control.

Among the 17-inch LCD monitors, LG Flatron 782LE logged a score of 19 points. It had a DVI interface for connecting the new-generation graphics cards. With a pixel pitch of 0.26 mm, it ensures a crisp display.

Viewsonic VP181 outsmarted its competitors in the 18-inch category. Its black finish made it stand apart. It had an easy-to-use OSD and five downstream USB and one upstream USB ports, which would allow users to connect various USB devices to it. For security, it also provides a Kensington notch and for Mac

A Big Picture

LG Flatron 295 LM

LG Flatron 295LM was an LCD we recieved that had a massive 22-inch diagonal viewable area and an aspect ratio of 16:10. It had a soft-touch back-lit panel which made it very easy to operate the OSD. It also included features such as PiP (picture in picture) and with separate functions for PiP sound and image, this LCD makes sure that the image is crisp and crystal clear.

In our tests it performed brilliantly in the sharpness and resolution, colour and grayscale, and in the miscellaneous test. However, its performance was just about average in the pixel response time test—there was a noticeable blurring when playing games. It fared above average in the image viewing test also. Even though one could not read the document on screen when viewed at an 80-degree angle, there was no different colour tinge to the screen. Overall, an excellent product.

Price: Rs 2,80,000

Sharp LL-T15V1 (15-inch LCD monitor)

Decision Maker

	Office Productivity	Home, Internet and Entertainment
You need	A display that reproduces crisp text and office applications	A slim, smart looking display with support for a high resolution and excellent colour reproduction
Look for	15- or 17-inch LCDs	17- or 18-inch and above LCDs
The models	Philips 150MT, Sharp LL-T15S1, Viewsonic VE 170MP	Samsung SyncMaster 171MP, Sony SDM-N80
Price range	Up to Rs 45,000	Rs 50,000 and above

Feature and Specification – LCD Monitor

SCORE BOARD

Brand	LG	Philips	Samsung	Sharp	Sharp	Convergent	LG	Samsung	Viewsonic	Viewsonic	Sony	LG
Model	Flatron 568LM	150MT	Syncmaster 151MP	LL-T15S1	LL-T15V1	Easel CT-170	Flatron 782 LE	Syncmaster 171MP	VE 170MB	VP181	SDM-N80	Flatron 295LM
Size (inch)	15	15	15	15	15	17	17	17	17	18.1	18.1	22
Pixel Size (mm)	0.3Hx0.3V	0.297Hx 0.297V	0.297Hx 0.297V	0.297Hx 0.297V	0.297Hx 0.297V	0.264H x 0.264V	0.264H x 0.264V	0.26x0.26	0.264H x 0.264V	0.28(H)x 0.28(V)	0.2805(H) x0.2805(V)	0.294(H) x 0.294(V)
Luminance/cd/m²	250	310	260	200	260	200	200	250	220	235	200	180
Max. Resolution/ Refresh Rate	1024x768 @ 75 Hz	1280x1024 @ 75 Hz	1024x768 @ 85 Hz	1024x768 @ 75 Hz	1,024 x 768 @ 75 Hz	1280 X 1024 @ 75 Hz	1280x1024 @ 75 Hz	1280x1024 @ 75 Hz	1280x1024 @ 85 Hz	1600x1200 @ 75 Hz	1280x1024 @ 85 Hz	1600 x 1024 @ 60 Hz
Vertical Scan Rate (Hz)	56-75	56-75	56-85	60-75	56-75	56-75	56-85	56-85	50-75	50-75	48-85	56 - 85
Horizontal Scan Rate (KHz)	31-61	31-61	30-69	31.5-60	24.8-60.2	31.5-80	30-85	30-81	30-82	30-95	28-92	30 - 80 kHz
W x H x D (mm)	389x382x162	394x366x200	357x360x175	368x170x355	340x322x 187	424x456x199	399x427x235	412x414x203	540x520x270	445x459x243	432x400x195	542x375x353
Weight (Kg)	5.1	5.8	3.5	4.1	4.2	6.5	7.5	4.85	8.5	9	6.5	11.3
Warranty (years)	3 yrs on site	3 yrs on site	3 yrs *	3 yrs on site	3 yrs on site	1 yr carry in	3 yrs on site	3 yrs *	3yrs**	3yrs**	2 yrs on site	3 yrs on site
Price (Rs)	35,000	69,900	70,000	38,000	33,000	57,200	55,000	75,000	71,000	1,55,000	1,29,900	2,80,000
[A] Performance (70 %)												
Sharpness and Resolution	4	16.67	12.67	16	16	4	10	16	16	8	18	16.67
Colour and Grayscale	8.49	9.84	10.17	10.83	11.16	9.16	10	9.67	11	8.66	11.33	11.67
Miscellneous Effect	1.83	3.67	3.16	2.67	4	2.33	1.5	3	3.5	2.33	3.33	3.33
Pixel response time	4	5	2.67	4	6	6	3.66	5.33	5	6.33	5.3	4.33
Viewable Angle Test	8	7.33	9.33	5.33	8	12.66	8	14	9.2	16	4.3	11.33
[B] Feature (30 %)	16.5	20	18	15.5	13	17	19	20	17.5	24	20	17
Overall (A+B)	42.82	62.51	56.07	54.33	58.16	51.15	52.16	68	62.20	65.32	62.29	64.33
Rating	B-	B+	B	B	A	B-	B-	A	B+	A-	A	B+
Vendor Details												
Contact	LG Electronics India Ltd.	Philips India Ltd.	Samsung	Sharp Business Systems		Convergent Communica-tions India P Ltd.	LG Electronics India Ltd.	Samsung Electronics	Roop Technology P Ltd		Rashi Peripherals	LG Electronics India Ltd.
Phone	0120-4560900	022-6912255	011-6322517	022-2027506		080-6612973	0120-4560900	011-6322517	022-6631921		022-8260258	0120-4560900
E-mail	ddavar@ lgindia.com	debasish.mitra@ philips.com	marketing@sam sungindia.com	it-shrp@ltbkh. ltindia.com		mktg@conver-gentindia.com	ddavar@ lgindia.com	marketing@sam sungindia.com	roop@vsnl.com		ho@ rptechindia.com	ddavar@ lgindia.com
Web site	www.lgindia.com	www.philips .com	www.sam-sungindia.com	www.sharp.com		www.conver-gentindia.com	www.lgindia.com	www.sam-sungindia.com	www.rooponline .com		www.rptechin-dia.com	www.lgindia.com

*On line in Metroes/others carry in **Pickup and drop charges to the nearest service centre will be borne by Viewsonic

lovers it provides a converter which makes it one of the most versatile LCDs.

Making a choice

We received a total of 12 top quality LCDs. These LCDs were expensive too, with the average price over three times that of conventional CRT monitors.

15-inch LCD monitors: Here **Philips 150MT** came up as the clear cut choice for our Best Performance award. It notched up an overall score of 62.51 and included a host of features such as a built-in TV Tuner with PiP (picture in picture) option.

The best value for money that a user can get in this category is from **Sharp LL-T15V1**. It's overall score was 58.16 and it comes with a distinct price advantage—it costs almost half the price of Philips 150MT.

17-inch LCD monitors: We received only four models here. The competition here was largely between Samsung's SyncMaster 171MP and LG's FLatron 782LE.

LG's FLatron 782LE (17-inch LCD monitor)

Samsung's SyncMaster 171MP walked away with our Best Performance award in this category due to its top-notch design and top class performance (overall score of 68). The Best Value award in this category went to **LG's FLatron 782LE**. With a decent overall score of 52.16 and a price of just above Rs 50,000, it makes for a good buy.

18-inch LCD monitors: 18-inch LCD monitors are still rather out of reach for most users in terms of availability and price—we received just two pieces for testing. The Digit Best Performance award winner was **Viewsonic VP181**. It scored a good 65.32 points with a price tag of Rs 1,55,000.

The competitor in this category was **Sony SDM-N80**. It was the only LCD monitor in this comparison test to use an external power supply, which made it resemble a small CPU. Coming at a very attractive price of Rs 1,29,000, and with an overall score of 62.29, this one is our choice for the Best Value award in this category.

Philips 150MT

Philips 150MT provides the user with an array of ports for connecting a DVD player, Video CD player and a VCR. It also has a TV coaxial-IN port and includes the PiP feature.

In our test, this LCD scored extremely well in the sharpness and resolution test—there was no pixel bleeding or blurring. This ensures sharp and clear images, making movie watching a joy on this monitor. It also scored extremely well on the features front. Its performance in the other tests was just about average, however.

Though it's priced high, it does include a plethora of features and should prove to be a good buy for those who like to mix work and play.

Samsung SyncMaster 171 MP

This one is a masterpiece when one looks at the design. It also performed exceptionally well in the viewable angle and sharpness resolution test. There was no colour tinge on the LCD even when viewed from an 80-degree angle. At that angle, we were able to read the document displayed on the screen, but not very clearly.

In the Pixel Response Time test, we noticed a lot of blurring while running the *Quake III* demo. So if gaming is what gets you going, this one's not for you. Overall, this LCD combines good looks with performance.

Sony SDM-N80

If you are looking for a sleek LCD, which would match your tastefully furnished house, then your search should end with the Sony SDM-N80. This extremely well designed unit provides the user with a back-lit panel. Strangely, it has a separate power unit that mounts all the connectors. This was the only LCD we received that had such a feature. This LCD came with a DVI-A–to–VGA cable. Considering the fact that it's difficult to find a standard DVI digital cable, it would have been better if Sony had included it along with

this product. One nice feature about this LCD was its ability to automatically adjust brightness to varying light conditions.

It was the highest scorer in the sharpness and resolution test—the pixels displayed where extremely bright, with no visible blurring. In the rest of the tests, it scored equally well, except in the viewable angle test where its performance was below average. When viewing the screen at an 80-degree angle, we couldn't read the document. Plus there was a noticeable colour tinge.

Overall, Sony SDM-N80 is quite reasonably priced considering the features it provides.

DIGIT TEST CENTRE

HEADLINE

GRAPHICS CARDS

Enough is not enough when it comes to 3D graphics cards. Before you take the leap and buy the latest card with truckloads of memory and breakneck clock speeds—besides the promise of a shattering on-screen gaming experience—ask yourself how much power do you really need and, more importantly, do you have the system to support it? The newer cards based on the GeForce 3 and GeForce 4 chipsets need a high-horsepower system to belt out the ultimate gaming experience. If you have anything less than a 1 GHz-based system with at least 256 MB ram and a 17-inch monitor, you are not doing justice to the power of these cards.

The number of games that support the high-end features offered by the top cards of today is the lower side too. This brings us to the value segment cards based on the various GeForce2 MX chipsets (MX-200, MX400, and MX). These cards are priced a lot lower and yet, offer a reasonably good gaming experience at normal to high resolutions.

Most manufacturers provide additional ports like Dual-Display and TV-Out S-Video in their cards. Useful software and games are also bundled along with these cards—this makes them a great buy. In this test, we compare 21 such value-added cards that hit the sweet spot without burning a hole in your pocket.

Overview of the cards

A plethora of value-based cards found their way into our comparison test, ranging from the old M64-based cards to the formidable GeForce2MX chipsets. Most of the MX-based cards featured additional ports like TV-Out, S-Video in/out, and so on. The Matrox cards sported dual-display ports. We also received cards based on the different variants of the ATi Rage 128 chipset.

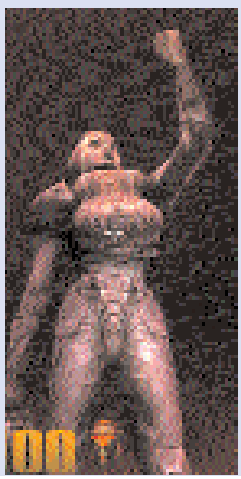
Synthetic tests

Our first round of tests included synthetic benchmarks which test the performance of 3D cards on individual parameters. In 3DMark 2001SE, the cards that failed the test altogether were the Matrox G450 and the Maxforce Riva TNT M64. The Matrox card was the 16-MB PCI based version and it failed this test because the test by itself requires xxx MB memory.

The cards that did well in this test were the ones based on ATi Radeon and GeForce2 MX chipsets. The Asus card to top the score chart was the V7100 Deluxe Combo—it scored 2590. Competition came from the Radeon-based Ennyah Radeon VE, which also performed pretty well to log a score of 2061. But the cards that really stole the show were the HIS GeForce2MX-400 and the HIS GeForce2

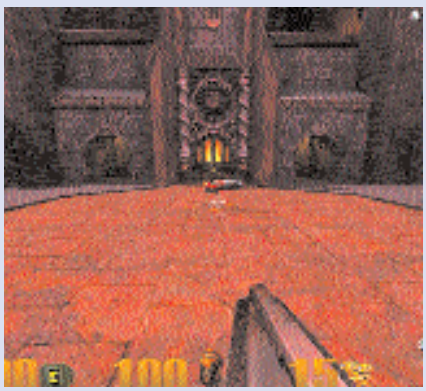
Pathe breaking features

Increasing frame rates alone is one thing and breathing visual reality into games is another. Leading chip manufacturers try hard to bring out features in their chips that make 3D games look more lifelike. But, till now, only a few have made any major impact. Here are some such features that helped the cause.



Anti-aliasing: This feature was introduced by 3dfx. Simply speaking anti-aliasing means reducing the 'jaggies' that you see on the edges of textures in a 3D game. Modern cards support up to 4X AA. Enabling this feature does reduce frame rates considerably but the trade off is the near-perfect picture quality.

Anisotropic filtering: This is an advanced texture-filtering technique that greatly enhances image quality in scenes where objects extend deep into the background from the foreground.



Caption

Environment mapped bump mapping: Introduced by Matrox, this is a shading technique that uses multiple textures and lighting effects to simulate wrinkled or bumped surfaces. Previously, textures in games never used to cast their own shadows or reflections, for example, ripples in a pond. But with bump mapping, the surface detail of a 3D texture is brought to life.

Transform and Lighting: Introduced by nVidia, this feature uses two separate engines on the GPU for providing scenes with an extremely high polygon count without sacrificing on frame-rate. Transform determines how complex objects can appear in a scene without sacrificing the frame-rate. Lighting techniques, on the other hand, change the appearance of objects based on light sources.

nFiniteFX: Introduced by nVidia, this feature gives game developers the freedom to program a virtually infinite number of custom-made special effects like underwater refractions, facial expressions, etc. This means that game characters and envi-

Glossary

Test Drive > Display systems

Pro. The former notched an impressive score of 2712 and the latter produced a stupendous score of 4509!

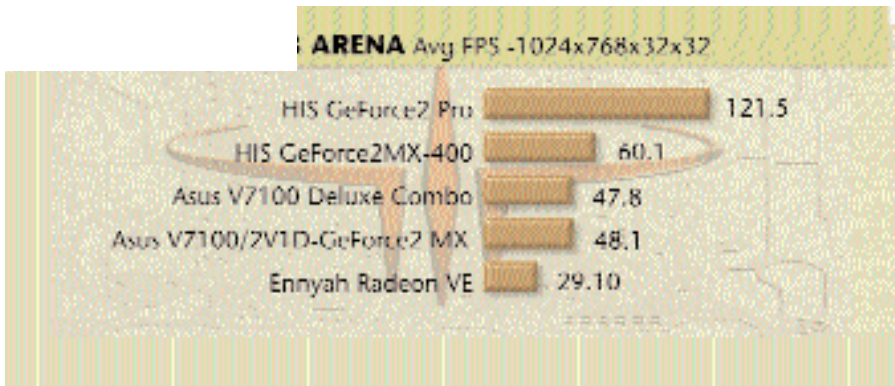
Moving on to the synthetic test based on the OpenGL API, we got to see a different story altogether. The Trident Blade XP, which managed to whip up 1078 marks in the 3DMark 2001SE test, actually failed in the vulpine GLmark test. The Asus V3005 card based on the SiS 305 chipset could only complete the test in the lowest resolution (640x480x16, the lowest detail). In this test the cards based on the Riva TNT2 M64 chipset showed severe artifacting, though they were able to complete tests without any hang-ups. The top TNT2 M64-based card in this test was the Pixelview Riva TNT2 M64, which scored 46.8 fps in the low-quality mode. This card was closely followed by the Maxforce card based on the same chipset. Though all the cards based on the various ATi chipsets managed to pass this test, none of them came close to offering any competition to cards based on nVidia's GeForce2-MX chipsets. Even the MX-200 based cards easily overtook them and produced impressive scores. The best ATi chipset-based card here again was the Ennyah Radeon VE; it was the only one close to hitting the 60 fps mark, and it also managed to return an average of 57 fps in low-quality mode.

Stay away from...

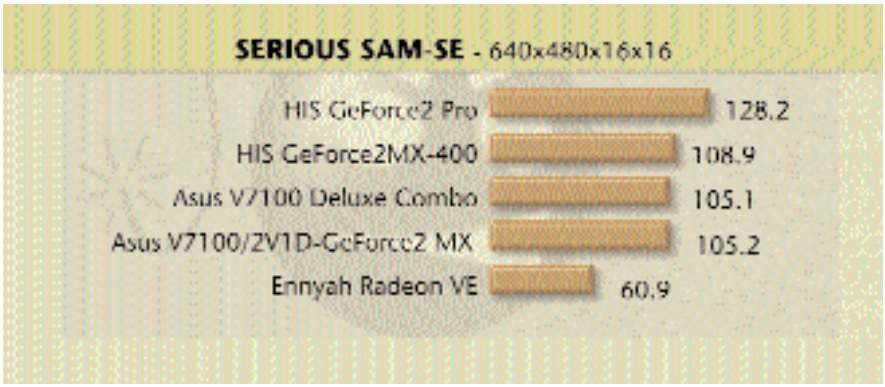
- Older PCI based cards with 2 MB VRAM
- Cards based on chipsets like SiS 6215, Cirrus Logic 5440, S3 Trio 64V
- Older cards based on chipsets like SiS 6326 and Trident 9750. They feature the AGP interface support, but some of the chipsets in them do not have support for OpenGL based games. The low RAM onboard severely reduces performance because most of the games today require at least 8 MB of video RAM.

REAL WORLD TESTS
Direct3D

Real world tests stress every component of a 3D graphics card to the maximum when the settings are upped. We used Evolva Ver944 as our Direct3D real world test benchmark. There were some parts in



Ambient light: An all-directional light used to uniformly illuminate objects from all directions.
API: Short for 'Application Programming Interface', this is a standard programming interface which enables game developers to write applications to a standard without having to worry about the hardware implementations. API allows a single application to run



the test where some of the cards almost froze. Here, too, there was noticeable artifacting when the test was run on M64-based cards. The Trident Blade XP was very disappointing. Even though it returned an average of 25.5 fps, there was major texture loss during the major part of the test.

OpenGL

For measuring real world OpenGL gaming performance, we used Quake III Arena patched with ver 1.30 and Serious Sam: Second Edition. The Quake III engine is very unforgiving and sucks every last bit of juice from the cards when the settings are at maximum. Here the 16 MB PCI-based Matrox G450 and the Maxforce RivaTNT2 were not able to take the pressure and failed to respond when we ran the test at the maximum resolution of 1600x1200 at 32-bit colour and 32-bit texture depth. But most of the cards, including the ones above, returned very playable scores in low-quality mode. The best score here from a GeForce2MX-200 based card was from the Asus V7100 Magic Geforce2MX-200. This card was able to churn an average of 140.3 fps, which is pretty good news considering the price. The Trident BladeXP, which came in as a surprise, scored 79.2 fps.

But the one card that shattered the fps barrier with a massive average of 355.4 fps was the HIS GeForce2 Pro. The onboard 64 MB of DDR memory is one of the reasons for such a high score. In the high-quality mode, the HIS Geforce2MX logged a score of 60.1 fps, proving that playing high-end games with some of the effects turned on would not be a problem at all.

While running the test on cards based on the MX-200 chipsets, performance was found lacking. These logged a considerably lower average of around 20 to 25 fps at high quality mode. Here, the performance loss occurs mainly because the default high-quality settings stress the cards by turning 32-bit colour and 32-bit textures on. The Mercury Rage 128 Ultra and the Gigabyte Rage 128 Pro too just managed to crawl their way out of the benchmark with an average as low as 11.4 and 9.6 fps, respectively (at what setting?). The only card that showed its class throughout the benchmark was the HIS GeForce2 Pro with 64 MB of DDR memory. Even at an overload resolution of 1600x1200x32x32 with all the effects on, the card was able to spew out a playable average framerate of 53.3 fps.

The second OpenGL-based real world test was Serious Sam-SE, which too was conducted at three different settings. In max mode, we found that the HIS GeForce2 Pro, which blazed through the other tests, slowed down a bit and returned a score of only 29.3 fps.

Image quality

This part will include 4 screenshots with pointers. 2of AA and 2 of AF (enabled and disabled)

The image quality test was carried out to verify the clarity of image output in

A look into the future

Present day graphics cards let you play games in 32-bit colour depth and 32-bit texture depth along with features such as Anisotropic Filtering, Environment Mapped Bump Mapping, Anti Aliasing at 4X, and Transform and Lighting. All of this can be rendered at a very playable 60 fps at a resolution of 1024x768.

But gamers demand ultimate realism and true-to-life in-game effects such as real-time shadows and near perfect facial expressions. The future 3D games based on new game engines like Doom III and Unreal II could very well incorporate these in game effects and 64-bit colour depth seems to be the way these games will take. This allows 16 bits per channel (ARGB), which translates to 65,536 levels of intensity per channel, compared to only 256 levels per channel found in 32-bit colour. This would eventually mean that when multiple layers of blending, fog, haze and transparencies are used, there would be no colour banding or separation visible.

But this won't come easy; swapping textures with 64-bit colour intensity would also require higher bandwidth to facilitate smoother gameplay. This would be made possible through AGP 8X, which will soon wriggle its way onto the next generation of high-end motherboards and graphics cards; presumably it will run at 533 MHz.

Game developers would also be looking to program games that sport new visual features such as dust, realistic water textures and various other particle effects. Such high-end graphics will be made possible with the next generation of APIs such as OpenGL 2.0 and DirectX 9.

Future games would use increasingly complex geometry which would hog much needed bandwidth. NURBS (Non Uniform Relational B Splines) seems to be the solution because it would enable complex calculations without considerably bringing down precious bandwidth. Another interesting inclusion could be Displacement Mapping. Unlike Bump Mapping which changes the surface, Displacement Mapping changes the entire object. The shadows cast by 3D textures through Bump Mapping often have a distorted look. This could get corrected by Displacement Mapping.

We could also expect features like Z-Gamma correction, higher order surfaces and real time dynamic shadowing.

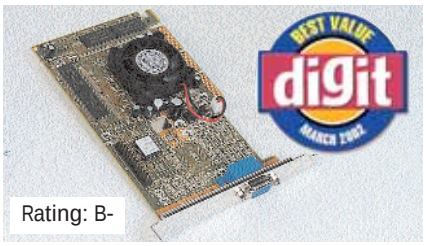
Making a Choice			
	Limited budget (support for decent refresh rates at low-to-medium resolutions)	Should run most games, but price is a consideration	Top-notch performance in 2D/3D, price no bar!
You need	A card that will run at 32-bit colour depth at 1024x768 resolution at 85 Hz with support for the odd game at low resolutions.	A card that will give you a minimum of 30 fps in low-to-medium resolutions with little compromise in quality.	Maximum performance with all the eye candy enabled and no compromise on either resolution or quality.
Look for	Cheaper or scaled down variants of faster chips. At least a card using an AGP interface with minimum 8 MB onboard RAM.	A card with at least 16 MB or more memory running at 100 MHz or higher.	A card with 32-64 MB of RAM running at 166 MHz (preferably DDR) coupled with deluxe features such as VIVO and stereo glasses.
Models	Ennyah Rage 128 Plus	HIS GeForce2 MX-400-GF-NV11-400	HIS GeForce2 Pro-GF-N16
Price range	Up to Rs 2,500	From Rs 2,500 to 8,000	Rs 8,000 and above

any given 3D card, both for 3D games and applications. Apart from checking the image quality from the screenshot that was taken from a default location in Quake III, we also looked for artifacting, texture loss, etc, while running the different benchmarks.

The cards based on the M64 chipset suffered here. They showed serious artifacting in our synthetic benchmarks. All of the cards tested displayed good image quality in 2D and there was nothing noticeable to point out. However, in 3D image quality test, we could notice minor glitches.

Making a choice

In terms of pure performance the HIS GeForce2 Pro – GF-N16, is the undoubted winner with its GeForce2 Pro GPU and 64 MB of DDR memory. Playing high-end games at high resolutions will be no problem with this card. The icing on the cake is the TV-Out port included in the card. Our Best Value award goes to HIS GeForce2 MX-400. This GeForce2 MX-400 GPU based card comes at an unbelievably low price.



HIS GeForce2 Pro – GF-N16

The GF-N16 sports nVidia's GeForce 2 Pro graphics processing unit. It features a core clock speed of 200 MHz and the memory runs at 400 MHz DDR. With 64 MB of onboard DDR memory and a total memory bandwidth of 6.4 GBps, playing games at higher resolutions shouldn't be a problem. With this card you will experience smooth gameplay even with features like anisotropic filtering and anti-aliasing

When things slow down and the machine's not too hot, when applications take long to load and performance goes for a toss, then you know it's time to put your PC through a STRESS TEST!

There's nothing like the speed of a brand new PC. But over time, things start to change. Suddenly, applications don't load as quickly as before and simple tasks such as copying files take a lot longer. All in all, performance starts taking a nosedive.

A careless computer technician checks around and declares everything in working order while you keep insisting that the PC is slow. He recommends you to upgrade or purchase a new PC and throws some fancy figures at you. By this time, you're so brainwashed that you're actually letting yourself take his advice seriously.

Wait! This is one scenario that we hope you don't have to face—at least not after reading this. It's completely natural for a computer to lose its edge over a period of time, but that doesn't mean that it's gone forever.

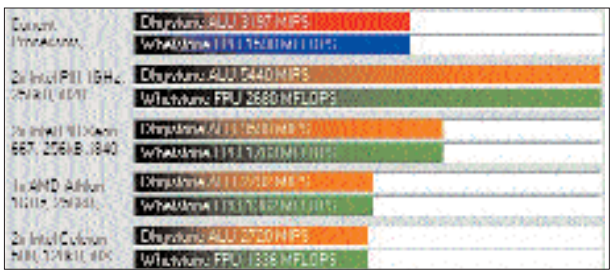
In this article, we've uncovered some sure-fire ways of using conventional benchmarking software to ensure that your system is running to its fullest possible capability.

Each hardware category that we take you through is important in maintaining overall system performance. If one particular area isn't doing too well, it could have some negative effects on the speed of your PC.

THE CPU

Let's start with the head of the computing body, the central processing unit (CPU). The CPU is perhaps the single biggest factor impacting overall system performance. PCs are, in fact, sold more times on this one spec fication alone than all the other features combined together! It's this same reason that makes CPUs the choicest component to overclock and tweak.

SiSoft Sandra 2001 is amongst one of the most comprehensive benchmark applications currently available. The software specialises in individually testing and reporting the performance of various subsystems within a PC. To give your chip a thorough shakedown, start up the SiSoft Sandra benchmark.



SiSoft Sandra's comparative analysis puts your PC in its place once you see the power-houses you're up against

Locate the icon for CPU testing, double-click, and the test will immediately launch. Your test scores will arrive mere moments later—you'll see a comparative summary of your PC's scores and that of other machines.

What to expect

SiSoft Sandra provides a specific frame of reference when benchmarking your PC. It only presents results of other machines with a configuration similar to yours, giving you a very good idea of where your system stands. Use can use the following figures to supplement your comparative efforts.

500 MHz CPU: 1350 ALU/670 FPU
1 GHz CPU: 2740 ALU/1363 FPU
1.5 GHz CPU: 3800 ALU/1940 FPU

Warning

Running any sort of CPU benchmark puts a lot of stress on the chip, since it utilises most of its resources. If the CPU is faced with another task, its performance scores under SiSoft Sandra will suffer.

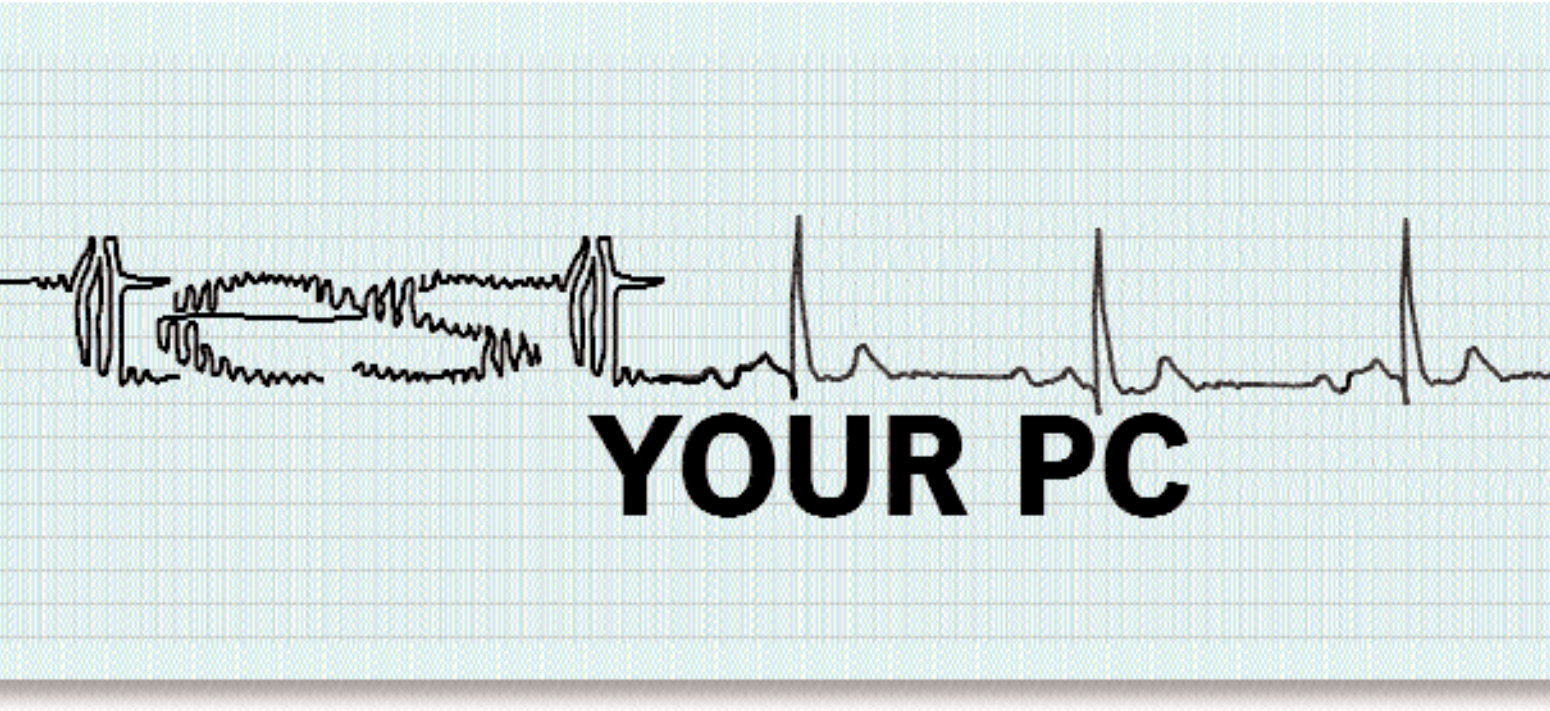
Close all running programs before running the test. Also, be sure to turn off all power management options in the BIOS so that the system does not slowdown while you benchmark.

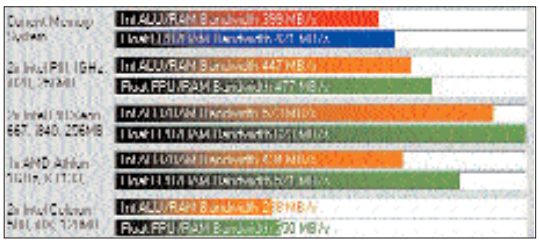
System Prerequisites

486 or higher CPU, 12 MB of RAM, 10 MB of hard disk space

THE MEMORY SUBSYSTEM

The performance of physical memory is a key component of overall PC speed. Being one of the slower components inside a PC, it tends to hold up other processes





Compare the performance of your system's memory subsystem with that of other machines

that need access to it. So as you can see, keeping an eye on how fast your memory works is absolutely critical.

To benchmark memory, startup SiSoft Sandra and you'll be presented with a number of icons, each designed to carry out a different test or task. Again, ensure that no other applications are running while the benchmark does its thing.

Double-click the icon which reads 'Memory Performance' and the program will begin the testing process. The test scores show a comparative summary between your PC's memory subsystem versus that of other machines.

What to expect

500 MHz CPU: 500 MBps
1 GHz CPU: 950 MBps
1.5 GHz CPU: 1500 MBps

Warning

To ensure the most accurate results, avoid moving the mouse or pressing any keys on the keyboard while the test is running. Also, to ensure that you are getting maximum marks for your rig, make sure that your motherboard drivers are installed properly. If you're unsure about this, one quick way to check for gaps is by navigating to ***Control Panel > System***. Under the 'Device Manager' tab, look out for any exclamation symbols under the System Devices tree. If one or a few happen to appear, reboot your system into Safe Mode and remove them by highlighting the entry and clicking 'Remove'. Reboot the computer and you will be prompted to install the correct drivers as necessary.

System Prerequisites

486 or higher CPU, 12 MB of RAM, 10 MB of hard disk space

THE HARD DISK SUBSYSTEM

This is perhaps the most underrated component of a PC. After the CPU and memory, the hard disk is the next determining factor in how fast your system works. This is because a lot of information required to run applications is not loaded in the physical memory (RAM) and needs to be read from the disk. HDTach is an extremely powerful tool which rigorously investigates hard disk activity across a series of parameters from seek times to transfer rates. It is fast becoming the *de facto* standard in fixed storage performance testing.

Install HDTach and close all running programs before launching the test. Usually, hard disk benchmark tools need plenty of space for temporary files, a shortage of which could yield highly inaccurate results. Before you start the examination, be sure that HDTach inspects a partition with at least 500 MB of free space. If your hard disk is partitioned into more than one segment, use the part that doesn't hold the Windows operating system.

Once you've selected the right partition for testing, begin the test. The test could take up to 45 minutes depending on your configuration.

Another way to check hard disk performance is through SiSoft Sandra, the Swiss-army knife of benchmarking tools. Double-click the 'Drive Performance' icon. Under Drive Selection, choose the partition you wish the program to test. The test should begin and last approximately five minutes.

What to expect

7200-rpm drive: Average of 35 MBps bandwidth, 11.8 ms or lower access time
5400-rpm drive: Average of 25 MBps bandwidth, 13.1 ms or lower access time

Warning

HDTach doesn't work too well with RAID0 arrays when the Advanced Size Check is

SiSoft Sandra 2001 TE, 3DMark 2001 SE, HDTach, Quake III: Arena, Evolva v938, Serious Sam SE and more

enabled with both hard disks set as Master and Slave. Also, ensure that the correct hard disk drivers are installed, check your motherboard's drivers, and verify that they are of the latest version.

For optimum results, enable DMA mode—a tweak which has been described in the Tips & Tricks section of the magazine later on.

System Prerequisites

486 or higher CPU, 12 MB of RAM, 2 MB of hard disk space for the program

THE GRAPHICS SUBSYSTEM

For the avid 3D gamer in you, nothing less than a smooth 60 frames per second (fps) will do. There are a number of ways to go about checking out how fast your graphics subsystem performs.

Quake III

Though the technology behind the game was optimised for older generation graphics cards, *Quake III* is still the most widely used gaming benchmark.

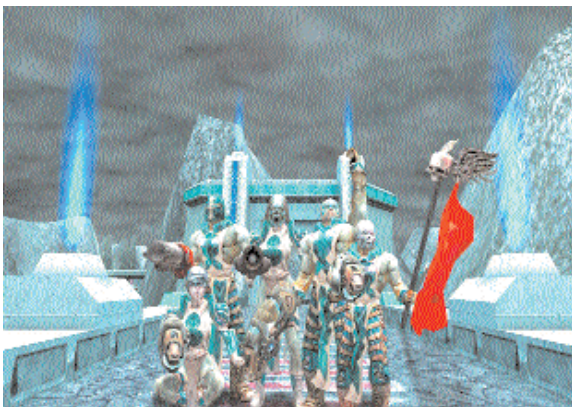
To benchmark your graphics card using *Quake III*, load it up and wait until the main menu comes up. You must then proceed to the console window. Do so by typing the tilde character (~). Invoke the benchmarking process by first entering ***timedemo 1*** followed by the [Enter] key. On the next line, key in ***demo demo001*** and hit [Enter]. The game will load the demo and within moments, you will see a sequence of frames being played back at high speed. Sitting through the demo should only take a few seconds and it will end seemingly abruptly. When it does so, it will take you back to the main menu. To see your score, hit the tilde key again, and this will bring up the console window. Repeat this test at least two more times and take the average as your final score.

What to expect

500 MHz CPU with TNT2: 40 fps
1 GHz CPU with TNT2: 65 fps
1.5 GHz CPU with TNT2: 76 fps
(Tested at 1024x768 with 32-bit colour)

Warning

Before running this test, you might want to disable sound, which, if left enabled, could affect the scores you obtain in your graphics tests. This could lead to a huge disparity—and make your graphics card look bad—when comparing scores across benchmarks, especially for those using built-in audio. Motherboards that come with built-in audio use soft audio, a technique that uses the CPU instead of audio hardware for processing sounds. This consumes lots of system resources and can cripple video performance as much as 20 per cent. You can disable on-board audio by entering the system BIOS and disabling it from there.



The lords of *Quake* don't want you for their next deathmatch, they want your video card!

Benchmarks in *Quake III* are those that shift heavily with changes in hardware. Even swapping out and exchanging motherboards can have an influence—by as much as 10 per cent. The key to keeping accuracy is to abide by some sort of uniformity in not only your hardware but also your software. We've seen that even disabling Windows Task Manager (with no tasks running) gave us a boost of about 2 fps. Of course, such a rise is negligible since most scores range in the 100s, but the point to note here is that the benchmark is very sensitive.

System Prerequisites

233 MHz processor, 32 MB RAM, 128 MB of free hard disk space, 3D graphics card with support for OpenGL

Quake III is perhaps the one video subsystem benchmark that has managed to gather a universal appeal for itself. Since it doesn't examine any specific features of a graphics card other than OpenGL 3D acceleration, it doesn't matter how old or how outdated your 3D card is.

Most users should be able to squeeze within these specs, though we strongly feel 32 MB of system memory to be seriously low. 128 MB is the sweet spot for the game; with so much memory, there could be no other bottlenecks, other than your video card, that is.

Serious Sam

For those of you who lack revolutionary gaming hardware yet don't subsist on what's left at the bottom of the technology barrel, there is plenty of middle ground. There are a couple of benchmarks for your video card that know what to check for, and how to check it.

Serious Sam is one game that features some pretty nice visuals, actually better than most games. And for this, it uses something known as a Transform and Lighting (T&L) engine. T&L is essentially a hardware feature ingrained into the core of a 3D accelerator card. Not all cards have this trait—the first one was nVidia's GeForce 256. All cards released after this one, ATi's Radeon for instance, have included support for this breakthrough in graphics technology.

The game uses OpenGL like *Quake III*, ➜

More Test Software

Quite a few system-wide inspection methods are available for download. Recently, MadOnion, the creators of 3DMark2001 SE, released a comprehensive diagnostic utility called PCMark 2002. It is an easy-to-use benchmark that delivers high-end diagnostic tools in the hands of novices. You can download this utility from ***www.madonion.com.***

Sysmark 2002, made by BapCo, is another system-wide diagnostic tool that provides an application-based benchmark that reflects usage patterns for business users to enhance office productivity and aspects like design and multimedia. For more information, take a look at ***www.bapco.com.***

with two different modes of benchmarking. One is called Benchmark and other Timedemo mode.

The Benchmark mode delivers figures that are not related to the game at all. Basically, the test examines your video card and returns actual values for details such as fillrate and geometry speed. With Timedemo, the game plays back a sequence of in-game frames and calculates how quickly the video card can render and display them onscreen.

To begin your evaluation with *Serious Sam* in Benchmark mode, enter console mode by hitting the [Esc] key once. Then type ***/benchmark()*** and hit the [Enter] key. For the Timedemo, bring down the console in the main menu and type ***/dem_bprofile 1***, hit the [Enter] key and select a demo you wish to run. Once the loop is completed, revert back to console again to find your score.

What to expect

500 MHz CPU with GeForce2: 44 fps
1 GHz CPU with GeForce2: 60 fps
1.5 GHz CPU with GeForce2: 74 fps
(Tested at 1024x768 with 32-bit colour)

Warning

Ninety per cent of the bugs reported with *Serious Sam* are due to bugs of OpenGL drivers. If you have a card that's over a year old, it would be wise to get your drivers up to speed so that the game actually works!

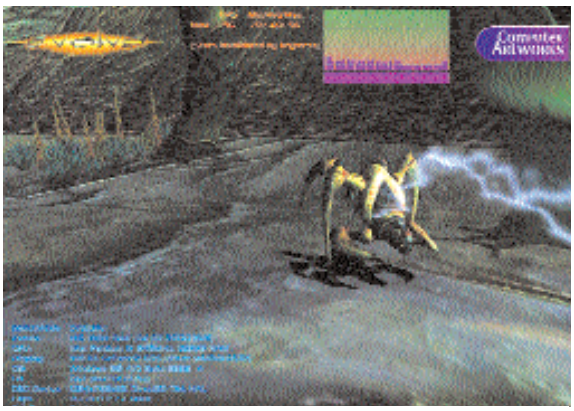
System Prerequisites

AMD K6-3 400 MHz, or 300 MHz Pentium II chip, 64 MB RAM, OpenGL or DirectX 8 3D accelerator with 16 MB, 200 MB free disk space

Evolva

Evolva is a game that uses Microsoft'sDirect 3D API and, like *Serious Sam*, the title heavily checks the T&L performance of your video card. *Evolva* supports a wide range of DirectX 7 options including large textures, bump mapping and hardware T&L. It has also proved itself to be well suited to newer chips, both from AMD and Intel, since the underlying code has been heavily optimised for SSE multimedia instructions.

There are two *Evolva* benchmarks available: a standalone Rolling demo which also features a benchmarking mode, and a patch for the retail version of *Evolva*. We will be using the Rolling demo for benchmarking. After you've installed



Evolva Rolling Demo is perfectly suited to test the older generation of graphics techonology

Evolva, navigate to its program group through the Start menu. Click and execute the *Evolva* Rolling demo with bump mapping. The test infinitely loops, so once one segment is complete and while it attempts to load again, press the [Esc] key—this will break the demo and show a text file filled with results.

What to expect

500 MHz CPU with GeForce2: 70 fps
1 GHz CPU with GeForce2: 94 fps
1.5 GHz CPU with GeForce2: 115 fps
(Tested at 1024x768 with 32-bit colour.)

Warning

With the Rolling demo comes two separate tests. One test uses bump mapping while the other one doesn't. Aside from this detail, both the tests are essentially the same. If you have a graphics cards based upon the GeForce2 (or higher) or ATi's Radeon, opt for the choice with bump mapping; owners of the original GeForce 256 and S3's Savage 2000 should use the one without it.

System Prerequisites

233 MHz processor, 32 MB RAM, 200 MB free hard disk space, DirectX 7 and a video card with 16 MB RAM

3DMark 2001SE

MadOnion's 3DMark 2001 SE includes many tests monitoring several aspects of your graphics card. From hardware transforms to polygon-crunching large scenes, 3DMark 2001 SE really works with 3D hardware to the fullest. Once you've installed the software and are ready to begin testing, the first thing you need to do is to disable all running programs. Close everything in the system tray. Also, keep in mind the more invisible tasks running in the background that might not be so obvious to locate. In order to get rid of these, hit the [Ctrl] + [Alt] + [Delete] keys which brings up Windows Task Manager. From here, you can disable most unnecessary processes that are running in the background.

Once you have that out of the way, it's time to start benchmarking your graphics card. Fire up 3DMark 2001 SE. Now you have to set up and specify which tests to run. Click the 'Tests' button from the main menu and check all the areas that apply. Unregistered users of the 3DMark software can still carry out all performance-related tests, minus the image quality tests, which hold no bearing on 3D performance in the first place.

Loop through the series of tests for at least three times, where your final score would be the average of the three test runs. If your system crashes before the testing is done, reboot your computer and re-run the test from the beginning after carrying out the necessary steps for getting an optimum score.

To see where you stand, 3DMark 2001 SE includes an online result browser that lets you compare your score with other users that have a similar hardware configuration.

What to expect

Naturally, you'll be looking for a comparative figure to hold up against your own results. When your scores fall between different system configurations, your score should be somewhat proportionate to your PC's place in the table.

500 MHz CPU with GeForce3: 3800
1 GHz CPU with GeForce3: 4960
1.5 GHz CPU with GeForce3: 6182
(Tested at 1024x768 with 32-bit colour)

Warning

If you want 3DMark to complete its tests successfully, ensure that the test settings are set to something more down to earth.

The visual beauty of 3DMark soothes the boredom of lengthy benchmarks

Going haywire isn't the answer; full-throttling resolution and other settings only heighten the risk of the testing process getting interrupted by a crash.

Keeping it conservative is vital not just for stability, but also for the scores to scale better in comparison. It is also an excellent method for pointing out performance gains from tweaks and hardware upgrades.

System Prerequisites

In order to run 3DMark2001 SE, your PC must meet some of today's prevalent standards. It's nothing that a two-year-old computer cannot match, aside from the graphics card perhaps. That needs to be current, of course. Here's the minimum you need: 500 MHz processor, 128 MB RAM, 100 MB of free hard disk space, DirectX 8.1 coupled with a 3D accelerator fitted with 32 MB of local memory

That last specification needs a little clarity. Since 3DMark 2001 investigates the performance of pixel and vertex shaders, it requires DirectX 8.1 to be installed. Also, it only makes sense to run it on a card that supports such graphical facets. And the eligible contestants are few; only the Geforce3, Radeon 8500 and later cards will do.

If you own anything that's at least one generator earlier, you may wish to use something else such as *Quake III* to benchmark your graphics card.

Making sense of the numbers

You've just seen how to benchmark and examine the performance of various systems that work in your PC. Furthermore, we've presented some comparative basis for you to work with. If you find that your numbers don't match up to the expected level, there could be some problems that needed fixing.

Starting with the video subsystem, there could be various minor issues that you could fix before embarking on an upgrade. A simple driver upgrade could fetch you a decent 10 per cent improvement. At the same time these driver upgrades will never show any significant improvements if the system is already heavily bottlenecked. A slower CPU and memory subsystem can be the worst companion to a graphics card.

Any amount of tweaking under those circumstances will achieve no improvement in performance unless you upgrade the core CPU and memory subsystem. A system running on a FSB of 66 MHz simply cannot keep up with modern applications and games. Try changing the drive to a faster 7200-rpm disk but you will find no improvement in loading times. These benchmarks will show you how the core subsystem of your PC is affecting various other subsystems and vice versa.

A thorough analysis of the scores can lead you to the right bottleneck, showing you exactly which subsystem is falling behind others. As an example, try running a GeForce3 card in a 500 MHz system and observe all game benchmarks. You will find all scores hitting a wall, no major improvement despite lowering resolutions, reducing quality and so on.

But, if everything is in order inside your PC and you still find yourself dissatisfied with the results, then there is another way we can help you. For performance boosts and tweaks on every major system in your PC, turn to our Tips & Tricks section. It's perfectly themed for those of you who want more speed and won't settle for anything less.

PRASHANT MASRANI

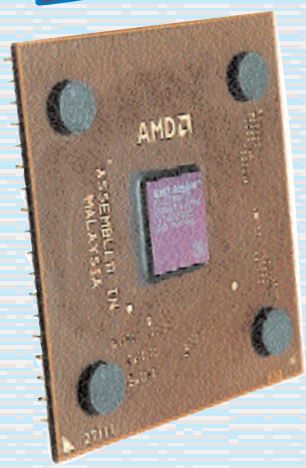
Bazaar

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

digit PRODUCT OF THE MONTH APRIL 2002

AMD ATHLON XP 2000+

No Stomach for *Quake*



The AMD Athlon XP 2000+ runs at a 'low' 1.67 GHz! But as amazing as it sounds, it still beats everything out there when it comes to raw performance. This processor is based on the Palomino core that has been fabricated using the tried and tested 0.18-micron process.

The Athlon XP 2000+ broke all previous benchmark records. It took just 6 minutes 40 seconds to complete the POV Ray (ray tracing) test, beating the previous record (7 minutes 2 seconds) and proving its supreme FPU (Floating Point Unit) capabilities. New records were also set in Business Winstone 2001 and Content Creation 2001 with its scores of 60.6 and 84.5 respectively. The processor, however, lagged severely in *Quake III Arena*. The scores here were at least 20 per cent lower than the P4 2.2 GHz. The only disconcerting area was its heat dissipation; although the Palomino core generates a lot less heat, this processor requires a heavy-duty heatsink/fan combination to keep its cool. Also the core is unprotected (unlike the P4, where the core is protected by a metal heat spreader) and calls for careful installation.

Price: Rs 20,000
Contact: Avnet Max
Phone: 011-6250250
E-mail: aashish.gupta@ avnet.com
Web site: www.amd.com

SPECIFICATIONS

0.18-micron Palomino core, runs at 1.67 GHz
Benchmarks: 6 minutes and 40 seconds in POV Ray, 60.6 in Business Winstone score, 84.5 in Content Creation 2001score

AMD ATHLON XP 2000+	A-
Performance	★★★★½
Build Quality	★★★½
Value for Money	★★★
Features	★★★★½
OVERALL	★★★★

Adcom TV Tuner Card

Cable on your PC

Based on the CA8208 chip, this 'tuner only' daughter card lets you watch your favourite TV channels on your PC. Apart from the TV antenna cable port, it also provides you with different ports such as Audio IN, Audio OUT, Video IN, and SVHS IN. The package includes a quick reference manual and remote control. You can also connect devices such as a camcorder and save your recorded videos on the PC. The card offers decent quality reception and the price is simply irresistible.

Price: Rs 2,400
Contact: Advantage Computers Pvt Ltd
Phone: 011-6485384
E-mail: ales@advantagetime.com
Web site: www.advantagetime.com

SPECIFICATIONS

PCI interface, bundled remote control

Adcom TV Tuner Card	B+
Performance	★★★½
Build Quality	★★★
Value for Money	★★★½
Features	★★★½
OVERALL	★★★½

Yatish Suvarna
Reviewer, Test Centre

"Though the Athlon XP 2000+ lagged a bit on the gaming front, its score on other parameters propelled it ahead of the competition"

Logitech QuickCam Pro 3000

Better than the Rest

The QuickCam Pro is not just another Web cam. Instead of the low quality CMOS sensor used in other low-end cameras, Logitech has used a CCD sensor, which produces crisper and more detailed image quality. Bundled software includes Digital Radar II video monitoring software, Microsoft NetMeeting, Reality Fusion GameCam SE, CrestaCards Video greeting software, MGI PhotoSuite III SE, and the MGI VideoWave III SE for performing various tasks such as Web casting, motion detection, still photography, etc.

The camera has an onboard shutter button for taking still digital photographs and a built-in microphone for video conferencing/chatting.

Also, it has a privacy cover for blocking broadcasts without switching off the camera, and a SmartClip for laptops and flat panel monitors. The price is a little high but if you consider its bundled software and free services, this camera is worth it.

SPECIFICATIONS

CCD sensor, onboard shutter button, USB interface

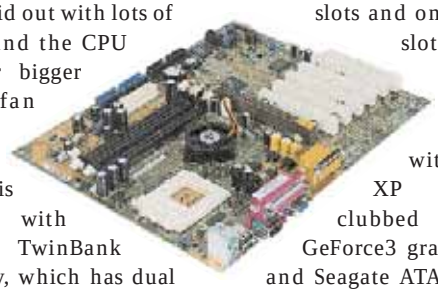
Price: Rs 9,000
Contact: Logitech
Phone: 022-6427501
E-mail: crescent_fernandes@logitech.com
Web site: www.logitech.com

Logitech Quickcam	B+
Performance	★★★★
Build Quality	★★★
Value for Money	★★★½
Features	★★★★½
OVERALL	★★★★

ASUS A7N266-E

Good for Work and Play

A7N266-E is the nVidia nForce420 chipset based solution from ASUS. The board is neatly laid out with lots of space around the CPU socket for bigger heatsink/fan combinations. The board is equipped with nVidia's TwinBank technology, which has dual channel support for DDR SDRAM. The board is first in the market to sport Dolby 5.1 audio and S/PDIF IN/OUT connectivity. This audio support is integrated into the nVidia MCP-D south bridge chip. Also, the ASUS ACR module is provided with the board to get Dolby 5.1 working out of the box. The board has six PCI slots and one AGP Pro slot.



The board was tested with Athlon XP 2000+ clubbed with a GeForce3 graphics card and Seagate ATA100 7200-rpm hard drive. It gave good overall results in all the tests. This board also features the TwinBank technology, which is basically a dual channel DDR solution. It is enabled only when you occupy the third DIMM slot along with another. When the TwinBank feature is used, the effective theoretical memory bandwidth doubles. In Business Winstone 2001 it gave an impressive 60.6 marks whereas in Content Creation 2001 it managed 84.5. In the *Quake III* test also, the board was able to reach a high score of 162.7 fps in max mode and 316.2 fps in normal mode. This qualifies it for the serious office user and the gaming community as well.

The board came complete with a detailed manual, software CD, Messiah and *Star Trek: New World* game CD. This motherboard is a good choice for those looking for pure performance, with no budgetary constraints.

Price: Rs 14,950
Contact: Zeta Technologies
Phone: 022-4102288
E-mail: sales@zetaindia.com
Web site: www.zetaindia.com

SPECIFICATIONS

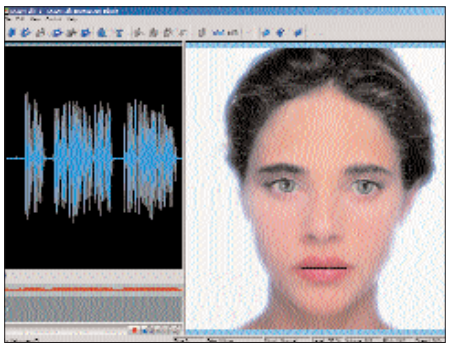
TwinBank technology, Dolby 5.1 audio and S/PDIF IN/OUT connectivity, six PCI slots, one AGP Pro slot
Benchmarks: 60.6 points in Business Winstone 2001, 84.5 points in Content Creation 2001, 162.7 fps (max mode) in Quake III, 316.2 fps (normal mode)

ASUS A7N266-E	A-
Performance	★★★★
Build Quality	★★★★
Value for Money	★★★½
Features	★★★★½
OVERALL	★★★★

CrazyTalk Standard Edition 2.51

Sets Tongues Wagging!

CrazyTalk can make a plain looking image talk. This utility can add voice and animation to an image without any additional hardware. You can also generate outputs of presentable quality with natural or synthetic voices and different emotions.



CrazyTalk has built-in 2D models such as a man, woman, robot, etc to choose from. The software did a good job with our test image. It not only moved the eyes and lips while talking but even the jaw, which made it look very real!

Here you can use your own image instead of the built-in images. The configuration of images is a bit tricky—if not done properly you might end up with a completely distorted image. The text to speech feature, however, needs a lot of improvement, as there was some amount of skipping with words such as 'technical', but most simple words were spoken well.

The utility is available for $39.95 (approximately Rs 1,957) and is a great tool for presentations and even for reading back text.

Price: $39.95 (approx 1,957)
Web site:www.reallusion.com

SPECIFICATIONS

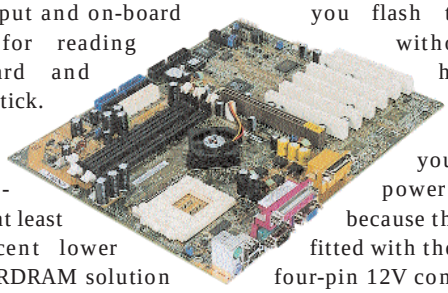
Built in 2D models

CrazyTalk SE 2.51	B+
Performance	★★★½
Ease of use	★★★½
Value for Money	★★★★
Features	★★★★
OVERALL	★★★★

ASUS P4B266

Excellent Design

ASUS P4B266 is a DDR solution based on the Intel 82845D North Bridge and 82801BA South Bridge chipsets. The board is bundled with a CMEDIA audio chip capable of six-channel audio output and on-board support for reading smart card and memory stick.



The board's performance was at least 25 per cent lower than the RDRAM solution in most tests, but it managed to overtake the RDRAM score by a good margin in the the CPU Dhrystone (MIPS) and Whetstone (MFLOPS) tests.

It has a neat design and boasts efficient component and connector layouts. For example, the floppy drive connector is turned 90 degrees to allow for easy connectivity of the cable. The P4B266 is USB 2.0 ready and has six PCI slots, 4x AGP support and one CNR slot. The board came bundled with the USB 2.0 module, S/PDIF module, software CD and a detailed setup and user guide. The ASUS MyLogo is automatically installed with the ASUS update utility and lets you flash the BIOS without any hassles. EZ Plug lets you use your old ATX power supply because the board is fitted with the auxiliary four-pin 12V connector.

This saves additional expenses on power supply for a P4 board. The price is well worth its features and performance.

Price: Rs 13,500
Contact: AsusTek Computer INC
Phone: (0) 9820539949
E-mail: rajshekhar_bhatt @asus.com.tw
Web site: www.asus.com.tw

SPECIFICATIONS

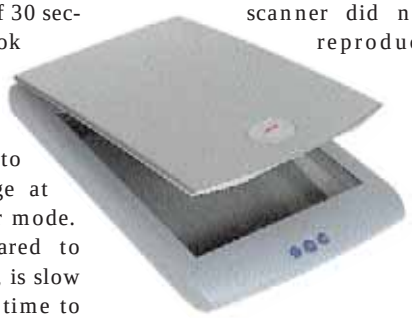
Intel 845D chipset, can support up to 2 GB of PC2100/PC1600 DDR-RAM, CMEDIA audio chip capable of six-channel audio output, Intel 10/100 Mbps LAN controller and on-board support for reading smart card and memory stick, six PCI, 4x AGP and 1 CNR slot

ASUS P4B266	A-
Performance	
Build Quality	
Value for Money	1/2
Features	
OVERALL	

UMAX Astra 4500

A Cheap Home Solution

Astra 4500 is a 1200x2400 dpi scanner from UMAX with a 48-bit depth. The scanner is slim and light but has a high warm-up time of 30 seconds. The scanner took 5.6 seconds to preview the test image at 200 dpi and took 1 minute 8 seconds to scan the same image at 300 dpi in full colour mode. The scanner, compared to others in its category, is slow and took a lot more time to scan the IT8 card at 600 dpi in full colour mode. When checked against the test image, we found that the scanner did not reproduce original colour and wasn't even able to capture the colour tones properly. The TWAIN driver of the scanner is simple enough to use but the icons are not intuitive and will need getting used to. The scanner came bundled with the TWAIN driver, ScanSoft OCR software, MGI PhotoSuite SE and PaperCom Document Manager. Home users who occasionally have to scan documents or images will find the Astra 4500 a cheap solution.



Price: Rs 11,750
Contact: Neoteric Informatique
Phone: 022-4172600
E-mail: sales@neoteric-info.com
Web site: www.umax.com

SPECIFICATIONS

1200x2400 dpi capable, 48-bit depth
Benchmarks: 30 second warm up time, 5.6 second preview time at 200 dpi, 1 minute 8 seconds at 300 dpi

UMAX Astra 4500	B
Performance	
Build Quality	
Value for Money	1/2
Features	
OVERALL	

PC BOOSTER 1.0

Fast and Painless

You've probably noticed your PC running slower than you'd like and wished at times that something could be done to increase the speed without having to delve into the intricacies of registry editing. PC BOOSTER 1.0 is an application that can make you a pro at tweaking the performance of your machine. This small utility (1.3 MB download size) from Inkline Global (***www.inklineglobal.com***) has a plethora of options for tweaking the system, desktop, Start Menu, Internet, disk drives, memory as well as boot up and shut down. This utility literally takes care of the entire system.

Some of the features tested that made a real difference in the performance of the hard disk were disk caching, which can change the cache size up to 2 MB, and enabling of FIFO (First In First Out) mode for applications that read and write randomly, thereby increasing the overall performance of the machine.

For speeding up the Internet, it provides you with various options including deletion of cookies, clearing of temporary Internet files as well as tweaking MTU (Maximum Transmission Unit) and RWIN (Receive Windows) settings.

With a good looking interface as well as detailed help for every command, this utility is suited to beginners and users who would rather not directly mess with the registry.

Price: Shareware $29.95 (approx rs 1,467)
Web site:www.inklineglobal.com

SPECIFICATIONS

System Requirements: Windows 95/98/Me/NT/2000, 3.46 MB install size

PC Booster 1.0	B+
Performance	1/2
Ease of use	
Value for Money	1/2
Features	1/2
OVERALL	1/2

Discreet Cleaner

Presentations with Streaming Video

This software is your one stop solution for capturing, formatting, encoding and publishing video on a PC and even on the Internet. The clickable 'Video Hot Spot' feature lets you create links in a video and run them simultaneously, making the presentation livelier. The bundled Stream Publisher technology lets you publish projects directly to a streaming server.

It supports all popular and major file formats including MPEG1 and MPEG2, and provides complete integration with popular Web design tools such as DreamWeaver, Director 8.5, etc.

It can also be easily integrated with video editors including Discreet Cinestream. MotoDV is another built-in function that allows you to capture digital video (DV) directly through cameras via FireWire ports at extremely high speeds. Also, this version of Cleaner supports multi processor systems to maximise performance. The number of files supported in a single batch has been increased from 1,500 to 2,000 files. Installation is easy and takes little time, which makes it convenient even for a novice to use the application.

SPECIFICATIONS

System Requirements: Macintosh: MacOS 4.0 & higher, QuickTime 4, 64 MB RAM, 20 MB hard disk space, IEEE FireWire port Windows: Windows 98/XP/2000, QuickTime 4, 64 MB RAM, 20 MB hard disk space, IEEE FireWire port
Specifications: Supports QuickTime, RealSystem, Windows Media, MP3, MPEG1 and MPEG2, complete integration with DreamWeaver, GoLive, Flash and Director 8.5 Shockwave Studio

Price: Rs 29,550
Contact: Discrete
Phone: 022-6952000
E-mail: selina.pinheiro @autodesk.com
Web site: www.discreet.com

Discreet Cleaner	B+
Performance	4½
Ease of use	4
Value for Money	4½
Features	4½
OVERALL	4½

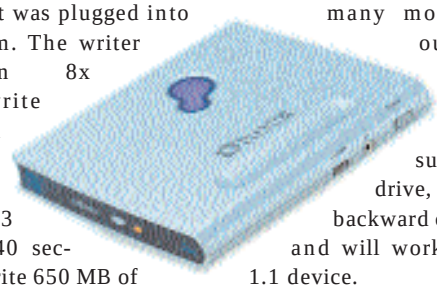
Bimal Unnikrishnan
Head, Media Studio

The ability to use clickable hot spots in a presentation is a godsend for a home user and multimedia professional

PlexWriter PX-S88TU

What's Writin' Slim?

PX-S88TU is a slim and lightweight USB 2.0 compliant writer from Plextor. The drive was detected the moment it was plugged into the system. The writer has an 8x write/rewrite speed and 20x read speed. It took 13 minutes 40 seconds to write 650 MB of data which contained files of different sizes, on the CD-R media. The drive had a very high random access time of 116 ms as registered by Nero CD Speed test and managed to read data at a speed of 6x only.



Being lightweight, it is useful for those who need to move their drive from place to place often. The only problem with the drive is that it does not come bundled with a USB 2.0 card and there aren't many motherboards out there with onboard USB 2.0 support. The drive, however, is backward compatible and will work as a USB 1.1 device.

Its price of Rs 19,950 seems quite high considering it lacks a USB 2.0 card.

SPECIFICATIONS

USB 2.0 compliant, backward compatible with USB 1.1 devices, doesn't include USB 2.0 card
Benchmarks: 13 minutes 40 seconds in write test, random access time of 116 ms

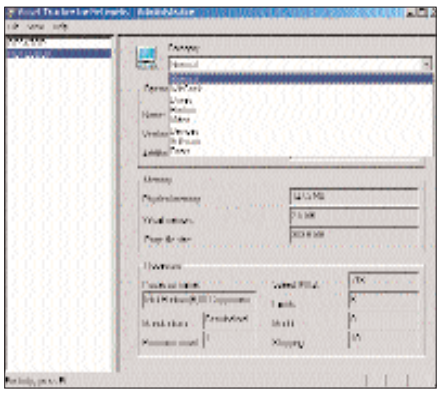
Price: Rs 19,950
Contact: Zeta Technologies
Phone: 022-4102288
E-mail: sales@zetaindia.com
Web site: www.zetaindia.com

PlexWriter PX-S88TU	B+
Performance	4
Build Quality	4
Value for Money	3
Features	4½
OVERALL	4½

Asset Tracker

Keeping Tabs

Want to keep a tab on the software installed on your PC or check the system details in the form of a report? If you're a system administrator you might probably want to keep a check on each machine right from software installed, to networking details, drivers installed, devices, network shares and any errors that occur on the user's machine. Asset Tracker allows you to keep track of hardware and software. For instance, if someone wants to know the user status compiled in the form of an HTML report with details such as complete login name, full user name, password, age, last logon/ logoff, password expiry and other details in case of a security breach,



this data can be made available by as little as a mouse click.

The data generated can also be exported in various industry standard formats including CSV, Text, MS Access ODBC, MS Excel ODBC, and HTML.

Installation is not very simple and the utility is meant only for those who understand networking. It requires you to define a shared folder to collate and compile data at a common repository.

With minimal system requirements, this application is a tool that system administrators would love to have for maintaining a log of PC details (including hardware and software). This application can also keep a check on software piracy.

SPECIFICATIONS:
Data generated can be exported in CSV, Text, MS Access ODBC, MS Excel ODBC, and HTML formats

Asset Tracker	B
Performance	
Ease of use	1/2
Value for Money	1/2
Features	
OVERALL	1/2

Price: 25 PCs $199 (approx Rs 9,751), 50 PCs $299 (approx Rs 14,651), 100 PCs $399 (approx Rs 19,551)
Web site: www.alchemy-lab.com

WebCopier 3.0

Browse Offline

The main function of WebCopier 3.0 is to download Web pages to be viewed later. This is useful for people who access the Net using a modem and get disconnected every now and then. The utility is very simple to use—you have to simply start a new project and the wizard guides you through the process.

This utility can even encrypt the downloaded page and save it. You can also define the maximum file size to be downloaded. WebCopier comes bundled with a browser using which you can browse the Net and start downloading links without having to leave the application.

The interface is simple and has big icons, but they are not self-explanatory and the cursor has to be placed on each to know more about it.

WebCopier 3.0 is skinnable and comes bundled with three skins. The software is available for $30 (approximately Rs 1,470), which is a bit too much but if your modem disconnects often then you might want to try it out.

Price: $30 (approx Rs 1,470)
Web site: www.maximumsoft.com

SPECIFICATIONS
Bundled with browser

WebCopier 3.0	B
Performance	
Ease of use	1/2
Value for Money	
Features	
OVERALL	

OCKAM PowerHouse

Missing a Writer

The PowerHouse is the first PC built on the 2.2 GHz P4 (Northwood) processor and includes the Intel D845BG board, 256 MB DDR-SDRAM, Leadtek Winfast GeForce 3 Ti 500 and a 41-GB 60 GXP IBM hard drive. Its only drawback is that it lacks a CD Writer. The machine performed well in gaming and office productivity suites. However, the scores were 10-15 per cent lower than those of a similary configured RDRAM based system. Although a trifle expensive, its top-notch performance and excellent build quality won't disappoint gamers and PC enthusiasts.

SPECIFICATIONS:
P4 2.2 GHz, 256 MB DDR-SDRAM, 41 GB HDD, Leadtek Winfast GeForce3 Ti500, 56 K modem, ASUS 52x CD-ROM drive.
Benchmarks: 293.3 fps (high quality mode) in Quake III; 1 minute 48 seconds for video encoding; 25 seconds for audio encoding; 8074 in 3DMark 2001; 76.3 in Content Creation 2001; 60.6 in Business Winstone 2001

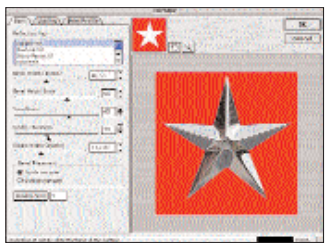
OCKAM PowerHouse	A-
Performance	
Build Quality	
Value for Money	1/2
Features	
OVERALL	

Price: Rs 93,000
Contact: OCKAM
E-mail: sales@ockamindia.com
Phone: 022-6330375
Web site: www.okamindia.com

Eye Candy 4000

Effects Plus

Eye Candy 4000 is a set of filter plug-ins for Adobe Photoshop. Eye Candy has a total of 23 filters such as chrome, jiggle, water drop, etc. The interface used with this plug-in is clean and easy to use even for novices. Web developers can make good use of filters such as fur and star to make their Web pages look more attractive. This plug-in even works with later versions of other widely used software such as ImageReady 1, Macromedia Fireworks 2, Deneba Canvas 6, Corel Photo-Paint 8, Jasc Paint Shop Pro 5, etc. The preview window lets you view effects before actually applying them to objects, giving you the option to modify the effect on the fly. This plug-in is available for $169 (approximately Rs 8,112), which is a bit expensive, but then designer tools have always been costly. However, considering its numerous filter effects, this plug-in is well worth its price.

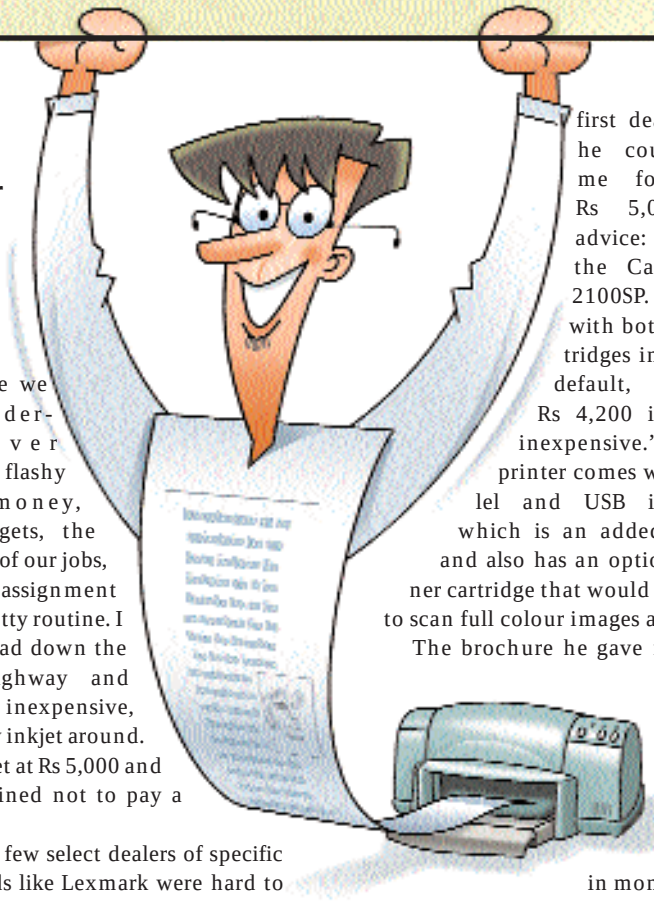


Price: $169 (approx Rs 8,112)
Web site: www.alienskin.com

Eye Candy 4000	A-
Performance	
Ease of use	
Value for Money	1/2
Features	1/2
OVERALL	

Investigating INKJETS

ILLUSTRATION: Mahesh Benkar



Agent 001 trolls the market for printers under Rs 5,000

While we undercover agents lead a flashy lifestyle—money, women, gadgets, the works—some of our jobs, like printing assignment reports are pretty routine. I decided to head down the hardware highway and track an inexpensive, decent quality inkjet around. I set my budget at Rs 5,000 and I was determined not to pay a paisa more!

I located a few select dealers of specific brands. Brands like Lexmark were hard to find, though their Z12 printer is fairly popular. It is touted as one of the cheapest inkjets that you can buy off the shelf, but beware! Dealers will try to convince you that this printer really does cost as low as Rs 3,000. The catch is that it comes with only a black ink cartridge and the colour cartridge will set you back by another Rs 1,500. So you end up paying around Rs 4,500! Some system integrators will also bundle this printer along with the system that you are purchasing—just ensure he bundles both the cartridges.

At Lamington road, Mumbai, I expected some frank opinions on an inexpensive, good quality inkjet printer. So I asked the first dealer what he could offer me for under Rs 5,000. His advice: "Opt for the Canon BJC 2100SP. It comes with both the cartridges installed as default, and at Rs 4,200 it's pretty inexpensive." This printer comes with parallel and USB interfaces, which is an added benefit, and also has an optional scanner cartridge that would allow you to scan full colour images at 360 dpi. The brochure he gave me stated that the printer could do 5 ppm (pages per minute) in monochrome.

On further investigation, I found that the printer comes with no 'Power-on' switch, which basically means it runs directly off the mains. Though this is not a major problem, it made me a little uncomfortable about it.

My next stop was at an exclusive Epson dealer. He quoted that the Epson C20SX was a hot favourite in the market. It retailed for Rs 4,600, which did fit my budget. What the dealer did not tell me was that this printer is notorious for a rather peculiar problem—you can change cartridges only through a software; try to do it manually and the cartridges will be rendered useless! Also the process takes long.

Trudging on, I landed at a retail shop selling all popular brands. I also spotted Sharp AJ-1100 printer. The price was a little out of my range at Rs 6,000 and had a single four-colour cartridge. Other high-end HP models included the HP DJ845c (Rs 8,000) and the HP DJ920c (Rs 10,500)—superb quality but beyond my budget!

Then I found an exclusive HP dealer. There I learned that the ever-popular DJ640c was on its way out, and their new kid on the block was the DJ656c (HP updates models every few months or so). This printer retails at Rs 5,000, but with a little haggling you could get it for under Rs 5,000. It is a pretty neat printer—the brochure screams a duty cycle of 1000 pages per month with 512 KB of built-in RAM and USB connectivity. The print quality was pretty good too. The brochure claims a maximum of 600x300 dpi on photo quality paper.

The older DJ640c too retails for about Rs 5,000 odd, is parallel port driven and has similar specifications. "You can find HP printer service centers anywhere you go and you shouldn't have any trouble getting your printer serviced". This is where other printer brands fall short. HP's cartridges are also fairly inexpensive and easily available.

Sadly, the market is full of fake printer cartridges that could ruin your printer, so always go to an authorised service centre for spares or help.

Also, make sure you don't get conned into purchasing those 'printer + scanner' combinations. You will generally end up buying older, or phased out products with no real cost benefit. Just do a little hunting and you will end up beating the combination price!

SHOPPING TIP

Consumables: Find out the price of the cartridges much in advance. High operation costs can hurt in the long run.

Quality: Photo-quality inkjets generally print at about half the speed of your average inkjets and have high operation cost. If you don't plan to print too many images, opt for a regular inkjet.

Resolution: Take the dpi (dots per inch) specifications claimed by most manufacturers with a pinch of salt. The best way to evaluate print quality is to compare actual printouts.

Speed: Manufacturers list print speed in pages per minute (ppm). These are usually measured at low-quality 'draft' settings using very simple text pages and can be unrealistic under normal use.

Interface: A printer that uses a USB port is usually much faster than the old-fashioned parallel port models.

BEST BUY OF THE MONTH

Pentium 4 processor

Looking for a cheap P4-based system? 1.6 GHz P4 (Northwood) with 512 KB cache is going for as low as Rs 9,000.

ILLUSTRATION: Ashwin Boricha

SERVE IT HOT!

Welcome! The dish of the day is broadband. We serve healthy portions of personal servers to all of those with a 24/7 connection, and our hospitality extends to the entire Web. Hungry *kya*?

The hunger for speed never satiates, but if you are one of those souls blessed with a broadband connection, then it's time to whet your appetite. Rather than just being a passive user of unlimited connectivity, you can turn creative and dish out your own content by running a personal Web server, an FTP server or even an audio streaming server off your own machine. Work up a healthy appetite, there is lots you can do with unlimited connectivity!

A complete meal

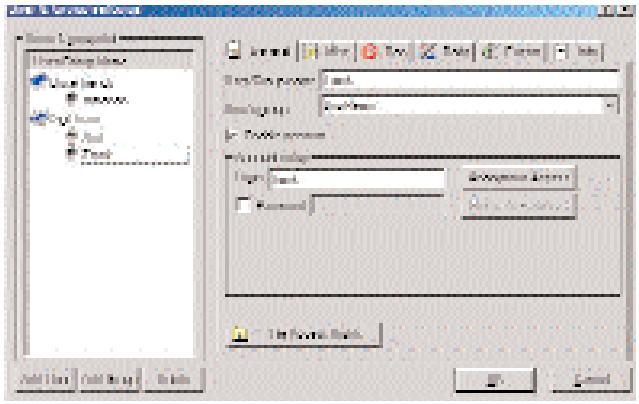
One way you can really exploit your broadband connection is by setting up your personal Web server. You save on money, you have more freedom, and you can share all kinds of data with the ease that equals sharing data on a LAN.

A note for dial-up users: Don't get disheartened. You can run a server from a dial-up connection too, with the only difference being that the IP assigned to your machine will change every time you reconnect. Since you can't keep informing all your friends about the changing IP address every now and then, use redirection software like DNS2Go (*See box: 'Compass to your Computer'*) to route the requests to a particular domain to your computer. This way, you won't have to bother about your PC's changing IPs.

So, before we start off on our tech-dining experience, we assume that you have a 24-hour connection and a static IP, not to mention a burning desire to create an online presence. You have to remember that installing a server is not as tough as it sounds. Some people even mockingly refer to it as a 'child's play'.

The entrée

An FTP server which lets you share files is a great way to get started. People all over the world set up FTP servers to share music, videos, and all kinds of data; it's not smart to be left behind, is it? Try the easy-to-use CesarFTP, a small and easy-to-configure software that won't give you any installation problems. After you've launched the application, you'll notice that the FTP server component launches



Customise user settings in CesarFTP

in a split window. The left-hand side of the window shows the status, such as whether the user is connected or not, and other such miscellaneous details. The right-hand side pane lists ping details and the requests made by each user in a text form. All buttons and menus are self-explanatory. Now we'll just whiff the main options which are needed to get your FTP server up and running.

You need to create user accounts before anyone can use your FTP server, or at least an anonymous user account for everyone to log on to the server. CesarFTP allows you to create different groups and share various sets of files with separate groups. Users can be created and assigned to the groups of your choice. You can create a group of close friends, a group of not-so-close friends, and an 'others' group. It's even possible to share only very minimal files with the 'others' group while at the same time sharing everything with your group of 'close friends'.

To do this, observe the traffic light in the main window. If it's green, click on it to shut down the server temporarily. Then click on the button with the icon representing a man in the controls bar below the menu. This brings up the 'User Group & Settings' option. Click on the 'Add Group' button to create a new user group. Let's name it 'Close friends', for example, and create another group by name 'XXX' (this can be any name you like). Create users by clicking on the 'Add User' button and assign them to appropriate groups in which you want them to be present. Here you can also set the options for whether the user has to login with a user name and password or can be given anonymous access. Setting up rights and privileges for users accessing your FTP server is wholly at your discretion. Once the users and groups are created you can share files by clicking on the 'File Access Rights' button to add or delete shares.

When you are done with this, you are ready to start your FTP server. Click on the traffic lights icon on the control bar and start the server. You will see a confirmation text on the right-hand side of the window that the FTP server has been started at default port 25 successfully.

Congratulations! All configurations are complete and your server is up and running. Tell your friends to get online immediately and connect to your FTP server. They can use either the console mode or an FTP client or browser. Just tell them to enter ***ftp://yourip*** and they will be prompted to log in. As soon as your friends give the proper account details that you've set for them, they'll be able to log on. Once logged on, they can access all the files that you want to show them. For example, if a not-so-close friend visits, you can prevent access to certain files.

The main course

If the food of the undernourished soul is music then streaming audio makes for a fulfilling main course. You can turn your computer into a digital music station for broadcasting music.

Setting up the server

The first part of getting your streaming audio server up and running is not difficult. We recommend AnalogX SimpleServer:Shout streaming server because it is the simplest and the easiest to configure. Install the application by invoking setup. Once the installation is complete, launch the server. The application opens as a small

HOT Tip! If you have registered a proper domain like www.domain_name.com, then you can log on to the site of the domain name provider and set your URL to point to your own static IP provided by the DSL/cable service company.

Compass to your Computer

For ensuring a 24-hour access to your PC you require a static IP address. While people with a DSL connection might have one, most others will have to use a URL redirection utility, which directs your domain visitors to the new IP every time your machine is assigned one.

STEP 1 Go to ***www.dns2go.com*** and download the software. Register a friendly domain name that you could share with your friends. For this exercise we used the domain name tintinsclone.dns2go.com. Once you have completed the registration process for the domain name, you will be sent a registration key via e-mail. You need to use this registration key to activate your domain using the DNS2GO software.

STEP 2 Install the DNS2GO software on your PC. Start up the software after installation. You are prompted with a registration window in which you enter the domain 'tintinsclone.dns2go.com' and the registration key that you received via e-mail. Clicking OK will send details to the server. As soon as the information has been updated, the software connects your PC to its parent server. The 'Status' tab lets you monitor the status of the current connection.

STEP 3 The 'Service settings' tab is where you set the redirection of the requests made to your domain. Whenever you are online, you can set the software to point to your current IP. This means that visitors to www.tintinsclone.dns2go.com will be redirected to your local machine for page requests.

All this happens so transparently that the user accessing your Web page won't worry about where he or she is accessing the Web page from.

STEP 4 The software also lets you specify options when you are offline. You can choose to display a default offline page to the user who accesses your page or redirect him/her to another Web site. All this information is stored in your profile on the dns2go.com site.

So your software need not be actually working to redirect and route requests.

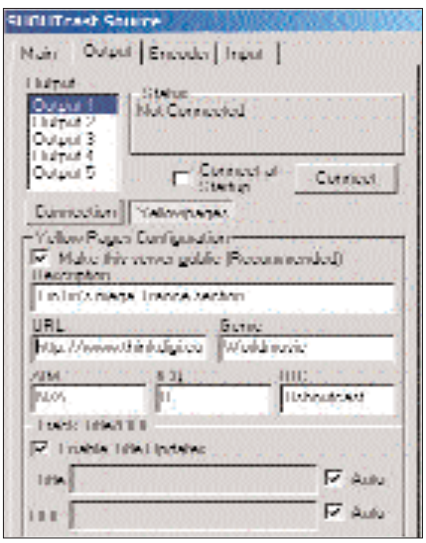
window with four buttons. The one placed at the top of the window displays your machine's current IP. The remaining three buttons adorn the bottom portion of the window. The second of these buttons is meant for configuring the streaming server—the configuration options are pretty simple except for the redirection entry. This allows you to use the music coming from another server as the source for your own server. Perhaps you could share the music from your favourite Internet radio station with some of your friends. Just enter the address of that server in the URL redirection box. The last button is used to 'Start' and 'Stop' the stream of music being broadcast from your streaming server.

Setting the source

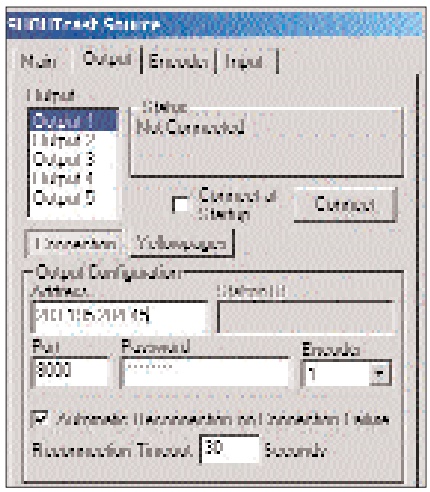
Before you can actually use Simple Server:Shout as your streaming server you need to provide it with the music stream. You can use Winamp as your own source by installing a SHOUTcast DSP Plug-in for Winamp which can serve music to the Distributed Network Access System (DNAS). This can be found at ***www.shoutcast.com*** download section. The installation will create a new entry in your DSP plug-ins list in Winamp.

You are now ready to stream your music. Open Winamp and press [Ctrl] + [P] to open up preferences and navigate to DSP/Effects under the plug-ins category. You will see SHOUTcast source for Winamp in the right-hand-side pane. This confirms that your installation was OK. Choose the plug-in by clicking on it.

This opens the plug-in window in which you can make the required configuration changes. The Main tab shows you



SHOUTcast DSP plug-in for Winamp



Specify your server connection details

the total duration for which each output was active. This tab also displays the sound input levels from your Winamp.

The Output tab is the one in which the server connection details are specified. Click on 'Output1' from the Output list. Check that the 'Connection' button is pressed. Enter the IP of your machine as shown on SimpleServer:Shout (if you are a DSL/cable user, enter the static IP provided by your ISP). Leave the port at its default setting of 8000. Enter the same password as in the configuration section of the streaming server. Select 1 from the 'Encoder' drop-down menu. Here you can also set the 'reconnection timeouts' in case of a connection failure.

The 'Yellow pages' is useful if you want your server to be listed at various audio streaming index sites. Check the 'Make this server public' box. This ensures that your server will be listed in those music sites whenever your server becomes active.

In the 'Encoder' tab, choose 'MP3 encoder' from the 'Encoder type' drop-down list and from the 'Encoder settings' drop-down list, choose the speed at which you would prefer to relay your MP3s to the server.

Once all these settings are done, go back to the 'Output' tab and click on the 'Connect' button. The DSP plug-in will start relaying a stream of music to the waiting server.

Now it's time for a test run. Click on the 'Start' button and get your SimpleServer:Shout running. A small window pops up saying: 'Waiting for encoder to connect'. Provided that your DSP plug-in is streaming music properly, anyone can connect to your audio stream and listen to the music that is playing.

Now that you have set up a personal radio station on the Web, give your friends a buzz and ask them to listen in. All they have to do is click on the 'Add' button in their Winamp play list window and choose 'Add URL'. This opens a small text window. Tell them to enter the URL or IP of your server. For example, here your friend can enter ***http://203.195.204.45:8000*** assuming that '203.195.204.45' is the IP of your streaming server. Double-clicking the entry added in his play list will connect him to the live audio stream from your PC.

Dessert

The really sweet part of having your own server is being able to run a personal Web server. We have something really light and free that is available at ***www.analogx.com.*** Just download SimpleServer application and click 'Install'. Launch the application from ***Start > Programs*** menu and you will see a small window with four buttons. The button on top shows the IP (static/dynamic) assigned to the PC on which SimpleServer runs. There are three other buttons at the bottom of the Window. The first button tells you about the creator of the software. The button in the middle lets you select the path from where all your Internet pages will be served through the Web server (this will be a directory in which all your Web pages and images are stored), and the last button lets you start and stop the server. Tasty, isn't it?

Setting it up can also be done in a jiffy. First, store all your Web pages and images in the folder from where the Web server will serve pages to visitors. This is the page your friends and relatives and everyone else will see by typing ***http://yourip*** in their browser. It's as easy as that.

Before you burp

There you go, your server meal is complete. Hope you enjoyed this experience for you'll be busy in the near future, telling your friends how to set up their own servers! Meanwhile, after dessert, we could've had coffee and cigars while streaming videos to friends, but sadly, all software for these purposes is strictly commercial. There is no such thing as a free meal, you know. But don't lose hope, it will be here one fine day, sooner rather than later. As of now, we hope you enjoyed that nice, fulfilling broadband meal!

VIDYARAMANAN S.

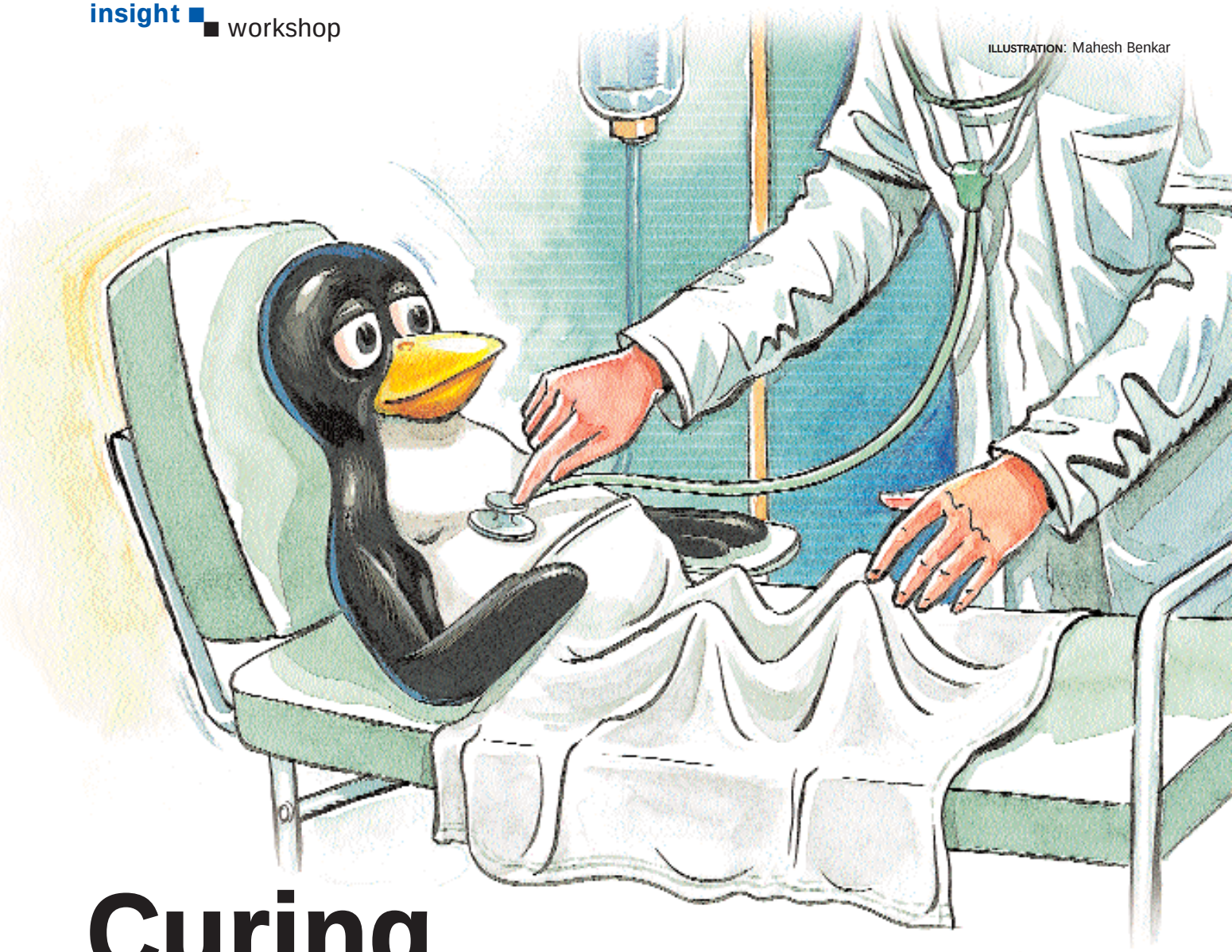


ILLUSTRATION: Mahesh Benkar

Curing the Penguin

If Tux is unwell, here are some quick fix remedies to get him up and running

Incompatibility with hardware is a big concern for those shifting from Windows to Linux. Linux distributions have gone a long way in tackling the compatibility issues, but you too can exercise caution by ensuring that you get the latest distribution of the particular Linux flavour you are using. For example, if you are using processors like P4 and Athlon, the best choice would be to run either RedHat 7.2 or SuSE 7.3 as they have the latest kernels and other resources available. However, if you are unlucky and get stuck with a problem where a device is not getting identified or performing properly, don't panic. The glitchtes are easier to handle than you might think.

BIOS bedlam

Plug-and-play peripherals such as graphics cards, soundcards and network cards might cause problems in Linux, however a small BIOS tweak will resolve the problems.

Go to the BIOS settings at boot-up. This can be done by pressing the [Delete] or [F1] keys (depending on your BIOS type). Now select the 'PnP/PCI Configuration' option from the main BIOS menu. Here you will see an option called 'PnP OS Installed'. Try toggling this option. For example, if it is at Yes, make it No. Save the settings and restart the computer.

Toggle the PnP OS Option to fix truant devices

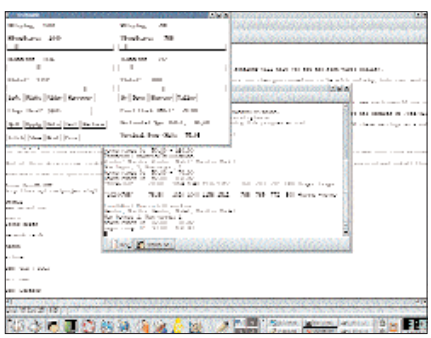
Tweaking the BIOS will help you get rid of only some of the problems. The common problem areas are usually related to your PC's monitor, graphics card, soundcard , network card, modem, printer, USB devices, DMA and scanner. Let's tackle these issues one by one.

Monitoring the problem

If your video quality isn't good enough, tuning the settings will help you get a better picture. Most monitors available today are supported under Linux. If Linux detects your monitor as generic, you will get a paltry 640x480 resolution even though your monitor is capable of much higher resolutions.

To fix this you need the horizontal and vertical refresh ranges of your monitor. Dig out the monitor manual for this. If you don't have the manual, go to the site of your monitor manufacturer to get the necessary technical details or try getting those at ***www.monitorworld.com.*** Once you've got them, it's time to get your monitor back in shape.

Before you get down to rectifying the problem, log in as root and make a backup of your configuration file using the command ***cp /etc/X11/XF86Config /etc/X11/XF86Config.bak.*** This will help you restore the old configuration in case you goof up. Now use a utility such as Xconfigurator (RedHat) or YaST (SuSE) to configure the monitor. Use XF86Setup only as a last resort. Keep the monitor type as generic. Fill in the horizontal and vertical refresh rates. Set the colour depth to 16-bit colour or less for optimal performance at resolutions higher than 1024x768. The higher the colour depth, the lower the performance.



Xvidtune helps you realign the screen

HOT Tip!

If you want to resize your screen, use xvidtune to align the screen properly. Most default setups have misaligned screens.

Grappling with graphics

If the performance of your graphics card is suspect, get hold of the latest Linux drivers. Most well-known graphics card manufacturers have Linux drivers on their Web sites.

In case you locate the drivers, check out Linux Hardware Database (LhD) at ***www.linhardware.com.*** Another source you could try is ZDNet's LhD at ***http://lhd.zdnet.com.*** In the remote possibility that you are still stuck, try ***http://lhd.zdnet.com/links.html*** to find some other sources to procure your drivers.

Most of these drivers come in different forms (rpm, srpm, tar, etc.), so you can pick and install the one that's suitable for your flavour of Tux. The driver you install might also require you to make modifications to the kernel. Have a look at the README or INSTALL text file that comes with the drivers for more details on the installation procedure.

Sound struggles

The common problems are when the soundcard suddenly stops working or is not detected at all. The way to tackle this is by using the command ***sndconfig*** which will configure your soundcard in most cases. In case it doesn't, you might have to reconfigure your kernel. While doing this, make sure that you select the limited sound support option, or else it will be a messy affair. After reconfiguring and rebooting, try the commands

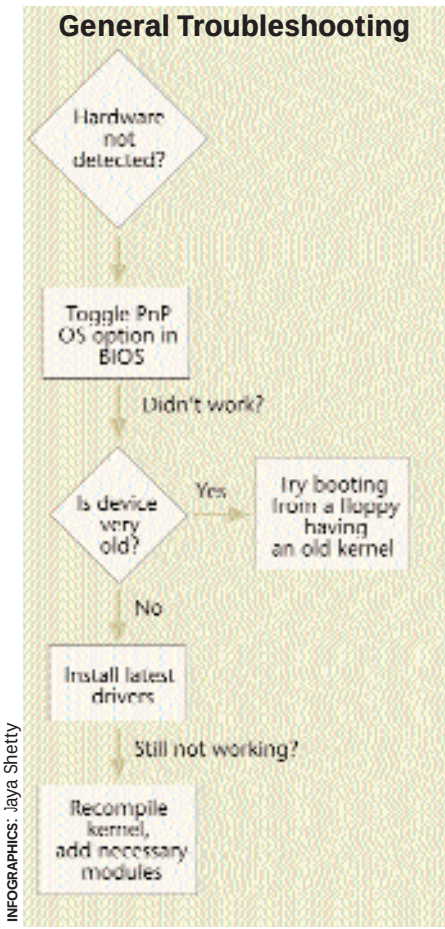
cat /dev/dma

cat /dev/sndstat

This will give you a list of DMA channels allocated and the installed soundcard drivers. If you can see the card in the list, then you are all set to play some music.

HOT Tip!

For OpenGL support in Linux API visit, ***http://oss.sgi.com/projects/ogl-sample/ABI/*** OpenGL: ***www.opengl.org***



INFOGRAPHICS: Jaya Shetty

Just in case this doesn't help you, try installing ALSA. You can get the modules from ***www.alsa-project.org.*** Various versions of ALSA work only with specific kernel versions. So find out the kernel version your ALSA version needs and upgrade accordingly.

Network nuisances

Of what use is that network card if it doesn't keep you connected? The first thing you need to do in case of problems is to get all the information about the card and the drivers. Now that you've got details, it's time to get down to work.

The best way to try out is to use the command:

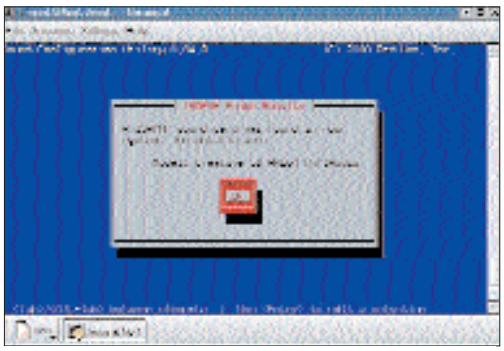
cat proc/pci/

If that didn't work, try the command:

dmesg|grep eth

HOT Tip!

Absolutely no idea about details of your network card? Find the details at: ***http://linuxdoc.org/HOWTO/Ethernet-HOWTO-4.html#mystery***



sndconfig usually sets up the soundcard for you

The result of this command will be something like this: ***eth0:**********.** If you can't see details like I/O address, media type, hardware address, IRQ, etc, then it means that the driver for the card hasn't been loaded yet.

Take a look at ***/lib/modules/2.4.10/kernel/drivers/net*** (the path may be different on your system depending on your kernel). This will help you find out if you have the required module for your network card.

Log in as root and use the ***modprobe*** or ***insmod*** commands to load the driver if it is compiled as a module. For example, type ***insmod <module.o>***, where <module.o> is the specific module you need to add.

There's a possibility that you still face problems. If so, compile a new kernel with the required modules. That ought to do the trick.

Using the ***ifconfig*** command will help you find out whether the drivers have been installed properly or not.

Modem mystification

If you have one of those external modems, it ought to work fine since most of these are supported by Linux. Even if you have some problems with these, you can easily get the drivers from the Net and get it to work. The problems surface when you have one of those software controlled internal modems known as Winmodems. You fell for the low price, didn't you? It is easier to buy a new modem than get one of these to work with Linux.

If your problem is "How do I recognise a Winmodem?" then check the modem's manual or packaging. In case it says Softmodem or Winmodem, then you have a problem. Some of the other common names are HSP, HSF, HCF, host-based, etc. Another tell-tale sign of softmodems is the 'Only for Windows' marking.

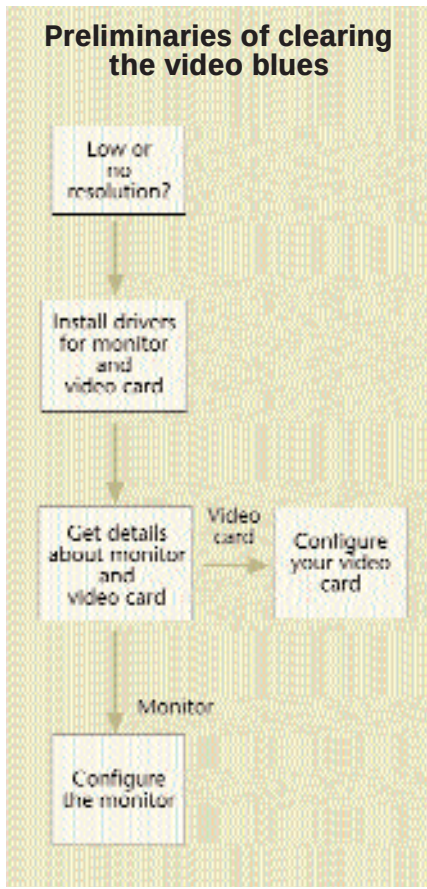
If you have a Linmodem (Linux modem), support for Linux won't be a problem. Once you've found the drivers, take some time to read the documentation. This will help you a lot in getting that modem up and running.

HOT Tip

IF you have Palm OS 4.0, ColdSync is the only tool at present to connect with Palm Download it from: ***www.ooblick.com/software/coldsync/*** Need solutions for USB device problems with Linux? Subscribe to ***http://www.linux-usb.org/mailing.html#users***

HOT Tip

Search for Linmodem drivers at: ***www.idir.net/~gromitkc/winmodem.html*** or ***http://linmodems.technion.ac.il/resources.html***



Printer pauses

Communication problems could cause your printer to generate printouts with jumbled characters. This might also cause the printer to print non-stop. In order to rectify this, take out the paper from the inkjet printer or open the paper trays in the case of a laser printer. Now use the ***lpq*** command to find the queue which is printing. Remove the print job using the ***lrm*** command.

However, this command might not clear the print job from the queue. Use the command ***fuser –k /dev/lp0*** if you have a parallel printer or ***fuser –k /dev/usblp0*** for USB printers.

Scanner blues

SANE (Scanner Access Now Easy) is the best way to get your scanner to work with Linux. SANE will get you around most commonly faced scanner problems.

The First thing to do is to check the list of scanners supported by SANE at ***http://panda.mostang.com/sane/***. Most

Up with USB

USB devices are known to cause a lot of problems with Linux. Kernels after 2.2.7 come with a built-in USB suppport. Hence, a recompiling the kernel will get your USB device up and running.

When compiling the kernel, select Support for USB in the USB support option. Then select the motherboard support option depending on your PC's motherboard or USB adapter. Check your motherboard manual for this.

Now its time to select the USB device you want to add. Selecting the USB Human Interface Device (HID) support adds support for input devices such as keyboards, mice, joysticks, etc. Other options such as USB Scanner support, USB Audio support, USB Modem support, etc can be added depending on your USB device.

When you are through with rebuilding, install the new kernel with the new modules and reboot.

Some necessary modules to be loaded are usbcore.o, usb-uhci.o, uhci.o or usb-ohci.o, in addition to modules like scanner.o depending on the type of device you're installing.

The site ***www.linux-usb.org*** has a list of working USB devices for Linux which will help you find out if your USB device is supported in Linux. This site also has a lot of tools and APIs.

DMA Issues

There are lesser DMA issues with Linux these days since most of the kernels allow you to enable them without any problem, unless you are using a really old motherboard. Some of the older chipsets have faulty DMA implementation, which means DMA won't work no matter how hard you try. Another problem might be due to broken cables. In that case, replacing the cable might help.

Another area where you could have problems with DMA is when you are using devices that use the ISA bus. ISA devices do not use the standard DMA channels. So if you think DMA is creating problems, try removing the ISA cards one by one and running Linux. This will help you troubleshoot the device that's causing the problem. Upgrading your kernel might help here.

HOT Tip

rcidedma status command helps you check if DMA is working or not.

parallel port, SCSI, and USB scanners are supported by SANE.

If your scanner is in the list, download and install SANE from ***ftp://ftp.mostang.com/pub/sane***. Read the README file after unpacking the tar archive.

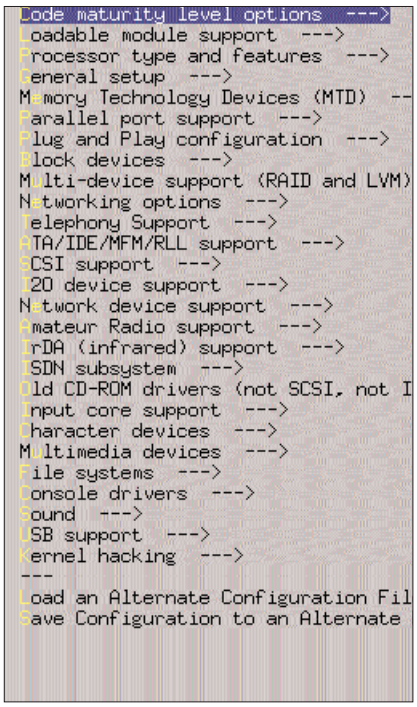
Using an image manipulation program like GIMP which has GTK libraries is necessary to use SANE.

After SANE has been installed, use this command to check scanner status:

scanimage –list-devices

This will give you a message like:

device



Menuconfig helps you easily load modules

HOT Tip

Need more information about loading modules? Have a look at ***www.linux-doc.org/HOWTO/HOWTO-INDEX/index.html***

`#########:/dev/scanner' is a ******* scanner***

device `pnm:0' is a Noname PNM file reader virtual device

device `pnm:1' is a Noname PNM file reader virtual device

########## is the name of your scanner and ********** is the type of the scanner.

The second and third lines 'pnm:0' and 'pnm:1' will be displayed even if you don't have a scanner connected to your PC.

Now that you've got a finger on Tux's pulse and know what ails it, you can work towards quick cures to get it to work happily with different devices d

ANIL PATRICK R.

tracking the code

Concurrent Versioning System is a unique concept that lets multiple programmers track the simultaneous changes during the working of the project.

Programming remains a dark art for those of us who have never dabbled in it. Even people who have done some programming—say, a short course in Visual Basic at a neighbourhood computer training institute—are well aware of the huge gap between amateur programs and the full-scale commercial software applications.

Isn't it a mystery to you how something as complex as an operating system, which requires scores of people working in tandem for long periods of time, is created? Programmers depend on certain specific techniques to create those wonderful applications which perform magic on your desktop. Besides the trusted text editor and the all-powerful compiler, professional programmers also depend on version control tools to help them with their jobs.

Déjà vu

CVS or Concurrent Versioning System generally refers to an ability to create and manage different versions of the same file. This concept is of prime use in environments where a lot of people work simultaneously on one big programming project, and they require the ability to store previous versions of the files. Developers can record the history of their source files and avoid major problems caused by bugs creeping into software during its long and complicated development cycle. Often, when a large group is working simultaneously on a project, bugs get introduced into the system which might not be detected until much later when the modifications have already been made. Also, what happens frequently is that when a developer makes a change that fixes a minor problem related to functionality, he or she could end up creating a completely new set of problems that cause the application to cease functioning. Version control is particularly handy in these kinds of situations because it allows you to revert back to the version which works. Plus, having earlier versions helps in case there's a loss of data, and it provides you with a trackable record of the work that has been done in the past.

One of the more common (and basic) examples of version control is the versioning feature in Microsoft Word. It allows you to save multiple versions within a single Word document. The software also allows you to review the differences between two versions of the document using a feature that highlights only the changes that have been made.

Another form of version control is provided by the ARJ archival format. Users of this software can save multiple versions of any type of file—not just Word documents. Chapter archives in ARJ are very useful for backing up frequently modified file sets. You can create a sequence of snapshots of a directory that changes over time and ARJ saves only the files that have changed. When you extract the contents, it recreates the complete file set as it was at that point in time. Since each chapter archive can contain up to 250 chapters, this means considerable space savings when compared to the usual practice of using multiple separate archives for backup.

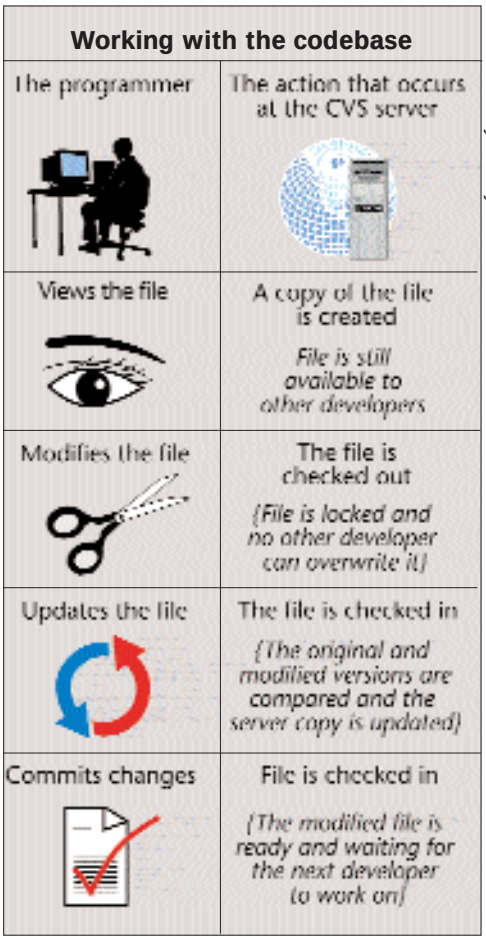


ILLUSTRATION: Jaya Shetty

The dark secret

A CVS stores files in a central location which is accessible to all the users of the files. A copy of the file needs to be 'checked out' by a developer, who then works on it and will 'commit' the changes back into the central repository when he or she is finished. Files which are being moved between the developer's location and the repository are scanned for changes before updating to prevent the work of one programmer from being overwritten by another, which would be a major disaster.

Versioning on the Web

In large-scale projects which involve programmers from different locations all over the world, like open source projects, things are a little more complicated.

With developers working at odd hours and across different time zones, giving a developer exclusive rights to a file would prevent any other developer from working on that file. This would quickly frustrate developers who would find that they are unable to work on a file when they actually find it convenient to work.

KDE, and GNOME.

CVS tackles this problem with its unreserved 'checkout' model which means that a single developer does not get exclusive rights to a file. Other developers can also refer to a copy, make changes to it, and then check it back in.

To eliminate the possibility of loss of work due to overwriting of versions by work done by another developer, CVS detects when multiple developers make changes to the same file. The system then automatically merges those changes and updates them as long as the changes have not been made to the same lines of code. As an additional safety measure, just in case the system is unable to safely resolve the changes that have been made to the code, the developer or the designated administrator for that set of files is asked to merge them manually.

> "CVS allows developers to retrieve old versions of code and track the bugs that might have crept in"

This system ensures that a history of each file is retained—this allows you to track who made what change and why, so that at any given point of time, you can restore the file to one of its previous stages.

In order to save on the disk space that would be occupied if each version were to be saved as a separate file, CVS stores all the versions within a single file. This approach is very intelligent because it works by recording only the differences between the various versions.

Critical to Teamwork

Version control is imperative for software development teams. While individual developers want version control to ensure that they do not lose work, every member within a development team must have access to a data central server.

When all members of the team are working from a single office, this is pretty straightforward: you just need to set up the CVS server on a machine on the local network. A developer can 'check out' a file from the server to work on.

When he has completed the modifications that he needs to make, he just 'checks in' the modified file into the repository.

While a particular file has been 'checked out,' the system does not allow any other developer to 'check out' and modify the same file.

However, CVS's built-in client-server access model allows any developer who can connect to the Internet to access files on a CVS server anywhere on the globe. This is why CVS is popular with several open-source projects like Mozilla ***www.mozilla.org/cvs.html*** the GIMP, ***http://cvs.xemacs.org/*** , XEmacs,

A CVS for everyone

The epicentre of the Open Source movement is SourceForge.net which offers the single largest collection of applications and source codes on the Internet. SourceForge provides Open Source developers with free services like project hosting, bug and issue tracking, version control, and project archival.

SourceForge.net offers you access to a number of project development resources. All you need to do is create a new account. Amongst these is access to your own personal CVS repository, the contents of which can be accessed through the use of a Web-based interface.

The popularity of SourceForge, especially with Open Source developers, is really highlighted by the prominent projects that have found their home there. These include The Freenet Project, phpGroupWare, Python, Gaim and kicq to name a few .

Is version control for you?

While CVS is designed to address the needs of developers, it is versatile enough to be useful to others too. Writers, for instance, could use it as a means to back-up their work. If your PC is connected to the Internet a CVS is very useful when you are collaborating with different writers or need access when you are travelling far from home.

System administrators would also find it a boon because they could use it to keep track of critical configuration files. Changes to the files can be maintained in the CVS tree so that they always have the option to roll back to an older working file in case the changes that were made did not work exactly as planned. This is especially important to those system administrators who have to manage large server farms. They can maintain a CVS tree of the configurations for each server—this would mean that whenever a new server is added, they could quickly locate the ***config*** file for a similar machine and get it up and running in no time.

KARAN MANRAL

30Minutes Expert

Partition your Hard Disk

Computers today ship with hard drives that are more than 8 or 10 GB large. To use this huge space effectively you can to split it into smaller logical divisions using Partitioning software. However, most users find the task quite daunting. This 30-minute guide is aimed at making you comfortable with the nitty gritties of hard disk partitioning. We are using the software called BootIT NG, which you can also find on the cover CD.

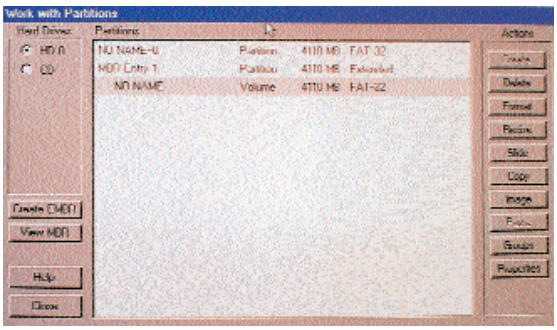
Creating the BootIT NG boot disks

You need to first create a boot disk of BootIT NG. Unzip the installation files to a temporary directory. Launch the single executable file in the unzipped collection. Leave the settings in the following window as default.

The application prompts you to insert a floppy to start the boot-disk creation process. The application erases all the data in the floppy and copies the necessary partition manager software and a small OS that will be required to boot the PC. Once the boot-disk creation process is complete you can press [Esc] to close the application. You now have a bootable floppy ready for the actual exercise.

Divide and Rule!

STEP 1 Now you are all set to start the disk partitioning process. Insert the bootable disk into the floppy drive and reboot your computer. (Check your BIOS settings to ensure that the first boot device is set to floppy).



Partition window lists the drives and the partitions

STEP 2 When your computer boots through the floppy it opens a graphical interface with mouse support. When you are prompted with the BootIT NG installation on your hard disk, click 'Cancel' and enter the maintenance mode (a message window states that you are entering the maintenance mode).

STEP 3 When you enter the maintenance mode you will see a screen with the following options listed:

- Settings
- Partition Work
- Resume
- Backup
- Restore
- Reboot

Find BootIT NG on 'system utilities' section of Mindware CD

Leave the options in 'Settings' at default. Resume takes you to the BootIT NG hard disk install screen. BootIT NG can also act as a backup and a restore utility and hence the options of Backup/Restore. The Reboot option lets you reboot your machine to effect any changes you make.

STEP 4 Click on Partition Work. This opens a window that displays your hard drive as 'HD0' ('HD1' for a second hard drive and so on). Your CD-ROM is also listed in a similar manner.

STEP 5 Choose 'HD0' and then click on the Create button to the right of the screen. This throws open a popup window where you are required to choose the file system you would like the first partition to be formatted with. Choose '11/bh Fat32' from the drop-down list. It's the only FAT32 option available.

STEP 6 In the text area provided, enter the size of the partition you would like to create. Plan before you create partitions. If you have a 20 GB hard disk you might want to create four logical drives of 5 GB capacity each.

STEP 7 Click OK. You will be prompted with a message box that asks you whether you would like to convert this partition into NTFS. Click No and the partitioning process starts. It's done in three phases. First is allocation, then error checking and then formatting. All this happens as a background process.

Your first partition is now created. You can repeat these steps to create more partitions with the remaining free space. You are ready to use the space on your hard disk in an efficient way.

VIDYARAMANAN S

Resizing a Partition

You can also use BootIT NG to resize partitions on your hard disk. However, be aware that though you can resize partitions with the data present on them, there is a chance that you could end up losing data. So, clean up the partition before you resize.

STEP 1 Choose the partition that you would like to resize. Click on 'Properties' on the right and in the window that pops up click on the 'Free' button to look up how much free space is left on the partition. Click 'OK' to close the window.

STEP 2 Press [Alt]+[R] or click on the 'Resize' button to the right of the screen.

STEP 3 In the window that pops up, enter the size of the partition. Click 'OK' to continue. The software warns you with a message on the possibility of losing data. Click 'OK' and initiate the resizing process.

STEP 4 If successfully resized, the software checks for errors on the partition and shows a success message. Click 'Close' to complete the resizing exercise.

STEP 5 If you have made the partition smaller, the free space is listed in the main details screen.

Q&A

CD-ROM drive problems, 3D support disabled, printer acting up? Solutions to all your PC woes

Hardware

GRAPHICS CARDS

Display card shows less memory

Q Recently I purchased a P4 1.5 GHz based system with 128 MB RDRAM and a Riva TNT2 M64 32 MB display card. I installed Windows 2000 Pro and the display drivers that came with the card. But while running games such as *Quake III*, the display is jerky. After opening ***Task Manager > Processes***, I realised that a certain display driver file (Rscmpt.exe) was using all of my CPU time. So now, while playing games, I close the process (Rscmpt.exe) separately. When the process is closed my display properties show only 16 MB memory (Windows 2000 detected only 16 MB memory on its own. It's only after I installed the display drivers that I detected 32 MB memory). A duplicate card doesn't seem to be the problem here as it displays 32 MB memory when I boot my PC (at the beginning before the memory check). Also a certain IC on the card says 32 MB. Installing the latest drivers from the Digit CD didn't help either. Even after installing Windows XP, only 16 MB memory was detected initially and after installing the display drivers from a recent Digit CD, once again only 16 MB was detected. I did not install the default drivers I got with the card. Please help.

N.K.

Via e-mail

A We recommend that you install the original nVidia Detonator drivers, version 23.11. After installing them, your machine will be able to detect your card and display it as a 32 MB card.

However, if it still refuses to show it as 32 MB, it could be that the memory on your card is corrupt because of which the size of the memory is not registering correctly. In this case you will have to return the card to the RMA centre for evaluating and sort out the problem.

3D support disabled

Q I have a Pentium III computer system (500 MHz), a ZX motherboard, an Intel 740 graphics card and a Creative SoundBlaster Vibra 128 with 192 MB of RAM. My system works well on the Windows Me edition and older versions. But when I installed Windows XP (Professional), DirectX disabled the 3D support. Hence I face a problem while playing 3D games and I cannot work on 3D Max either.

Yogesh Malhotra

Via e-mail

A Since Windows XP is the latest OS released by Microsoft, it is quite likely that the firm might have not included this card in the category extending support for 3D graphics. Hence the 3D support has been disabled. To enable 3D support you will have to install the native drivers for Intel 740. You will find these drivers on the Windows XP installation CD itself.

SOUNDCARDS

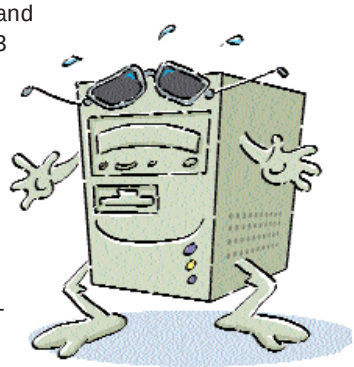
Soundcard not detected in Windows 2000

Q I've a peculiar problem with my soundcard, Creative Sound Blaster Live! Value. When I work with Windows

CD DRIVE

CDs can't be detected

Q I have a Pentium-III 500 MHz processor and 64 MB RAM. It has a 48x CD-ROM, an 8.4 GB hard disk, an 810E motherboard and a 1.44 MB floppy disk drive. I have Windows Me installed. My CD-ROM has started giving me problems. It doesn't always detect CDs and regularly fails to detect MP3 and movie CDs and throws out a message asking me to insert the CD even if there is one in the tray. How I can solve this problem.



ILLUSTRATIONS : Mahesh Benkar

Amit Jeswani

Via e-mail

A This problem has resulted because of dust having settled on your CD-ROM lens. As a result, when a CD is inserted, the lens is unable to read the media. To get your CD-ROM functioning correctly once again, use a lens cleaner to remove the accumulated dust.

98, I can easily use this card (the soundcard uses the IRQ 10). But I can't even install the soundcard when I switch over to Windows 2000. When I insert the installation CD for the Creative soundcard for Windows 2000, I get a message, 'Setup could not find any Creative soundcard on the system. Setup will exit now'. Why is this happening?

Tamal Saha

Via e-mail

A Unlike Windows 98, Windows 2000 uses a dynamic IRQ management mechanism. Hence, your soundcard will not have a dedicated IRQ. You will have to force Windows 2000 to assign one. Besides, this card consumes two IRQs (one for regular working, and the other for DOS sound blaster emulation). If the problem persists even after manually assigning an IRQ, change the PCI slot. This should solve the problem.

Soundcard set at wrong interrupt address

Q I have a Pentium 233 MHz with a Creative Vibra128 soundcard and Windows 98 and XP Pro. The soundcard is not recognised by either of the OSs. I downloaded the latest drivers for XP and Windows 98 and installed them. While rebooting the system, I get an error message that the soundcard is set up at the wrong interrupt address, and that I should use automatic settings on the properties page of the soundcard on the Device Manager. It also states 'Audio PCI is disabled'. The interrupt request is set at 11. In the BIOS (Award) IRQ 11 is set as Secondary and configured as PCI/ISA. Changing the interrupt of the soundcard to any number does not help. The system sometimes freezes while working, something that did not happen before installing the drivers.

Sriram Kannan

Via e-mail

A This problem arises because of an IRQ conflict. Go to your BIOS (press [Delete] while the system is booting up) and assign an IRQ address to the soundcard, which is not being utilised by any other device. Your soundcard should work fine now and your machine will not freeze.

CD-WRITING

Burning Errors

Q I have a Pentium II with 128 MB RAM, a 20 GB hard disk and a 40x CD-ROM drive. I have Windows 98 as my OS. I recently installed a CD-Writer, but I get the following error while writing to the CD: 1. Error reported by output device D0100: I/O error (02/00/001) sense code 0x00 2. T0100: I/O error (06/C5/00) - write error - buffer under run occurred.

Hemandra Badani

Via e-mail

A You are getting this error because you have encountered a buffer under run. Apparently, your CD-Writer does not have any buffer under run protection. To avoid getting this error, do not try CD-to-CD copying on the fly. Instead, choose to create an image as offered in the options. Also reduce the writing speeds to a lower rate and then try copying.

PRINTER

Too long to print

Q My HP 840C Plus printer takes a long time to start printing. Even the preview takes a long time to show up. I downloaded the latest drivers but that has been of no use. I have a P-III 500 MHz based PC with 128 MB RAM running Windows 98.The printer port is a parallel port.

Ramaswamy

Via e-mail

A The preview time may be long because of the file being heavy. However, if a light file such as a text file takes too long to preview then the program you are viewing it in is not correctly installed. Try reinstalling the program. In order to speed up the printing process go to your BIOS (press [Delete] while the system is booting up) and under Communication Port select the Parallel port and configure it as ECP + EPP.

RAM

RAM problems

Q I am using a Compaq system with 128 MB RAM and a Celeron 433 MHz processor. I just bought 128 MB of RAM. I removed one stick of 64 MB RAM provided by Compaq and put the new RAM in its place. On starting the computer, it gave an error: 'NTLDR missing' and didn't boot. I have tried putting all three sticks at once and also adjusting the ones provided by Compaq, but it doesn't help.

Madhav

Via e-mail

A It is possible that the RAM timings did not match, because of which the OS encountered a page fault causing file corruption and damage to critical OS files. To fix this, first install just the 128 MB RAM module and reinstall the OS.

Another cause of the problem could be different RAM specifications although usually asynchronous timings and sizes should not make a difference to the OS with your current configuration, since the memory and the CPU FSB is set to 66 MHz. Nevertheless, depending on the motherboard and the chipset implementation, this can vary and some modules may not work in conjunction with others. Hence, even after reinstalling the RAM if you get the same error,

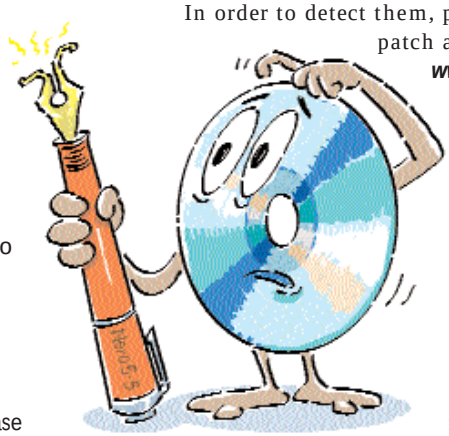
CD-not-writing

Q I recently bought a 24x CD-RW. I have Windows 2000 with SP 2 and the software bundled with the drive was Nero 5.5. I tried installing Easy CD Creator 5 Platinum but while installing, it showed an error saying, 'No compatible drives detected. Do you want to install Direct CD?'

I went ahead with the 'No' option. It did get installed but when I ran it, it showed a message reading 'No suitable recording drives available'. Please advice.

Kuldip

Via e-mail



A Certain 24x CD-Writers are not detected. In order to detect them, pick up the latest patch available at ***www.roxio.com***. Applying the patch should solve your problem. However, we strongly recommend you to use the software that is bundled along with your CD-RW—Nero in this case—as manufacturers usually provide you with software that they know is best for their product.

replace the RAM with specifications similar to that of the other RAM.

SPD error

I have a Pentium III 800E processor on an Intel 815EEA2 motherboard, 128 MB PC100 RAM, nVidia Riva TNT2 M64 graphics card, and a Creative Vibra 128 soundcard handling the multimedia. I have Windows 98 SE running on my PC. I had a 48x CD-ROM, but recently I bought a 24x CD-RW. Of late, at the beginning of boot up, I get a message saying 'Serial Presence Detected (SPD) and essential data missing'. I think there is a problem with the motherboard. Can you resolve the problem?

Sundeep

Via e-mail

There is no problem with the motherboard. It is just going through the normal detection routine. When it finds the RAM's SPD, it detects no information in it and hence you receive this error message. To avoid receiving this message, you should go to your BIOS and manually select the RAM timings there.

GAMING

Quake III unplayable with some mods

My PC's configuration is: Pentium II 300 MHz processor, a Riva TNT2 16 MB graphics card, 128 MB RAM and a 20 GB hard disk drive. I can play *Quake III* at 32 fps at 1024x768 smoothly with no crashes or problems. I can also play some mods such as *Capture the Chicken*, *Rune* and *Eternal* without any problems. But some of the mods such as *Alchemy*, *Avalanche* and *Head Hunters* refuse to work. Whenever I start them through the mods menu, the game restarts as usual but stops with a white screen and does not go further. If I bring the console down, it gives a message saying, 'REGisterFont: Free Type Code Not Available'. I have to quit the game using the command ***/quit***. The mod files are the latest and I have the latest *Quake III* patch 1.31 installed. Please help.

Jatin Kapadia

Via e-mail

Try running the mods through the batch files that come with the mod and it should run fine without giving you any error. If you still receive this error, then the mod files do not comply with the latest *Quake III* point release. Hence, you will have to wait for a patch update.

Software

Outlook blocking e-mail

I recently upgraded to Office XP from Office 2000 Professional. My OS is Windows Me and I use IE 6.0. I use Outlook as my default mail manager. However, with Outlook XP, I find that it automatically blocks all attachments carrying .exe extensions while downloading mail from my mail server. Please tell me how I can turn this off as I already have Norton 2002's e-mail protection option activated.

Gourav Mahapatra

Via e-mail

Microsoft Outlook 2002 by default blocks e-mail attachments, which have extensions such as .vbs, .exe, .com and others. This is done so as to prevent viruses—most of which come in these forms—from accessing your files and folders.

If you want Microsoft Outlook 2002 to display files with these extensions, you can do so by installing TweakXP. This utility has an option that allows Microsoft Outlook 2002 to display such files.

Tweak XP lets Outlook 2002 display e-mail attachments

Playing DVDs in Windows Media Player

I upgraded to Windows XP (Professional) on my laptop. I had heard that Windows Media Player bundled with XP was supposed to play DVDs automatically. But I am unable to play DVDs using Windows Media Player or any other software. Do you have any solution for me?

Dilip D'souza

Via e-mail

To enable Windows Media Player to play DVDs you have to apply a special patch available at ***www.microsoft.com***. You can even enable Windows Media Player by installing Customiser XP, a third-party tweak utility.

You can also buy a DVD player software such as Cyberlink Power DVD.

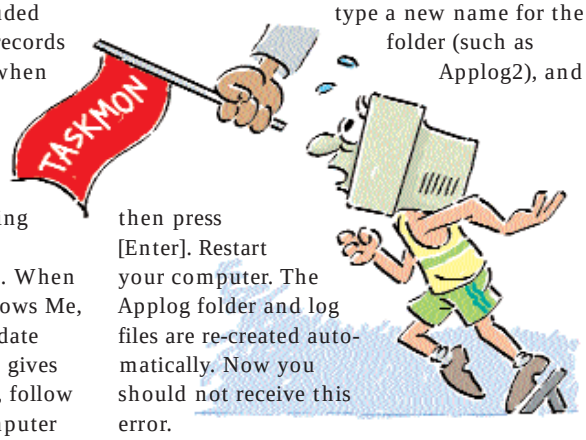
Damaged log files

Whenever I start or shut down my PC, I get the error message: 'TASKMON caused an invalid page fault in module KERNEL32.DLL.' Please help me.

S. Gopal

Via e-mail

The Task Monitor tool that is included with Windows 98 and Windows Me records the disk-access patterns of programs when they are started. Task Monitor stores this information in log files in the Applog folder. Task Monitor also records the number of times you use a program. The error you are getting is because the log files in the Windows\Applog folder are damaged. When you shut down Windows 98 or Windows Me, the Task Monitor tool attempts to update these log files and the failure to do so gives this message. To resolve this problem, follow these steps: Double-click the My Computer icon on the desktop and then double-click the drive that contains the Windows folder. On the View menu, click Folder Options and then click the View tab. Under the Hidden Files section, click Show All Files and click OK. Now double-click the Windows folder, right-click the Applog folder, click Rename, type a new name for the folder (such as Applog2), and then press [Enter]. Restart your computer. The Applog folder and log files are re-created automatically. Now you should not receive this error.



FAQs

Formatting hard disks

Q Does formatting hard disks regularly harm it in any way?

Abhinav Asija

Via e-mail

A There is no documented evidence that regular formatting of hard disks causes any sort of damage to it. However, we would not recommend it.

Virus problem

Q Recently, as I was scanning my hard disk using Norton Antivirus 2001, it detected a virus called JS.Exception.Exploit. As Norton failed to repair it, I sent it to quarantine. Will it affect my system files if I delete it from the quarantined items?

Siby

Via e-mail

A When a machine is infected with a virus it is not necessary that the anti-virus program will be able to recover the infected file as that depends upon the extent of damage caused. Hence, when the anti-virus detects a file that is infected it first tries to repair the file and if it can't, it will quarantine the file, as it did in your case. Once the file is quarantined it means the file has been isolated and it can no longer spread the infection to other files. Deleting a quarantined file might cause problems if it is a system file. Hence, it'd be better to leave quarantined files as they are.

HDD error

Q I clean formatted my hard disk and installed Windows 98 SE. After that, when I started my machine, it loaded Windows. But when I try to open a program, a blue screen appears saying 'Disk Write Error'. When I boot after this, an automatic surface scan begins but after some time it again gives this error and I am forced to reboot. Please help.

Sandhya

Via e-mail

A It appears your hard disk has developed bad sectors as a result of which you are experiencing this problem. We advise you to take a backup of your data on a different media and then try running a utility called DFT from the official Web site of IBM, ***www.ibm.com***. This will analyse your hard disk and give you a report as to whether your hard disk is in good condition or not. If your hard disk has developed bad sectors, the DFT utility will try recovering them.

If it can't be recovered then you can give it to the RMA centre for repairs or ask the dealer for other options if you have a warranty.

Hide your folders from other users

Assigning folder passwords

Q I have a folder in my office computer, which contains several confidential files. How can I prevent an unauthorised person from gaining access to this folder? Can I assign a password to this folder so that only those who know this password can open it?

Malhotra

Via e-mail

A You can prevent others from accessing your confidential folder by following any of the two methods. The first is to use a third party encrypting utility, which allows you to set a password. But a better method is to use a utility, which can hide the selected folders so that no one except you would be aware of those folders. You can use a software called Magic Folders, available at ***http://www.pc-magic.com***, to hide your folders. You will have to enter a password to gain access. Alternatively, you can install a software called Secure IT 2000, manufactured by Secure IT (***www.secure-soft.com***), which gives you a 448-bit level encryption.

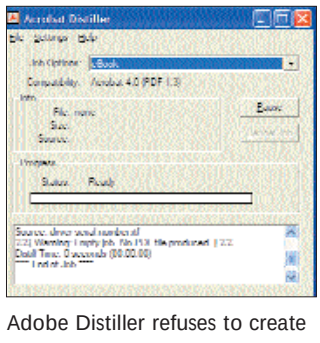
Creating PDF files from Office XP

Q I recently installed Adobe Acrobat PDF Writer (version 5) and upgraded from Office 2000 to Office XP. I remember when I had installed Office 2000, I could create PDF files from my Word or Excel documents from the Office program itself. I can't do so now. I tried doing it manually from Acrobat Distiller but it keeps generating errors. Please help.

Sandip

Via e-mail

A You are unable to create PDF files from the Office document because you have not installed the patch that has been exclusively released by Adobe to fix this problem. You can download the patch from ***http://www.adobe.com/support/downloads/detail.jsp?ftpID=1309***. Install the patch and you should not face any troubles anymore.



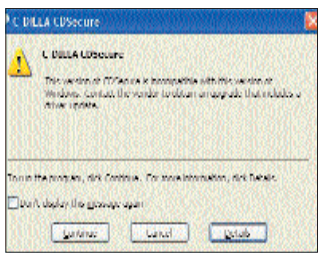
Adobe Distiller refuses to create PDF files

Running 3D Studio Max 4 on Windows XP

Q I installed 3D Studio Max 4 and it was working fine on Windows 2000. I later upgraded my system to Windows XP, after which whenever I try to open the program it generates errors and says failed to C-dilla. I then tried running the program through the 'Program Compatibility Mode' but the result is the same. How do I get the program running in Windows XP?

Anand Mishra

Via e-mail



3D Max can't run in Windows XP

A You are getting this error because Windows XP recognises this software as an extremely old one and hence it give errors while initialising the program. In order to make the program run you should go to ***www.macrovision.com*** and download a program that can make 3D Studio Max run in Windows XP.

Send your problems to sos@jasubhai.com or write in to Digit, D-222/2, Om Sagar, MIDC, Nerul-400 706

tips & tricks

Power up your PC

Before you spend on costly performance upgrades, try these tweaks that promise to turn your aging beige box into a digital hotrod!

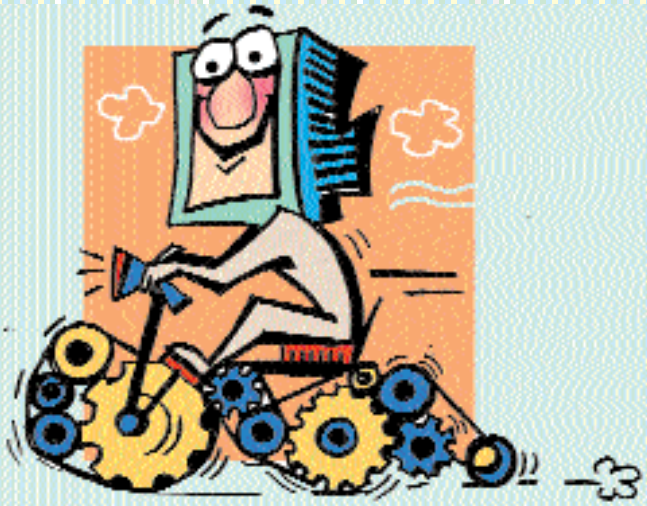
ILLUSTRATIONS: Farzana Cooper

Tips & Tricks
On Windows XP
FAQs on AMD's Hammer

contents

IN THE FAST LANE

Fix the BIOS settings to shed precious seconds from boot time. Fine tune CPU settings for superior system performance



Reducing boot time

Minimise the time it takes for your computer to boot by changing a few basic settings. Enter the BIOS by holding down the [Delete] key once you switch on your computer and go to the Advanced BIOS options of the main BIOS menu.

Begin by ensuring that the Quick POST (Power-On Self Test) is enabled. If the option is available, disable the selection that performs a floppy drive seek during boot up. Furthermore, in the same Advanced BIOS screen, set your first boot device as your hard disk, or the system will waste several moments in attempting to boot from another device such as the floppy, CD-ROM or Zip drive.

These steps alone can cast off up to 15 seconds of boot time.

Boosting memory speed

Being one of the major bottlenecks in overall performance, a slight boost in memory speed can have a deciding effect on how peppy your PC is. If you have 133 MHz (or faster) modules installed in a relatively modern motherboard, you can adjust the system memory frequency accordingly. The PC133 specification delivers 33 per cent more throughput over the PC100 variety, which comes in useful with regard to memory demanding programs, especially games. More often than not, *Quake III* shows at least a 15 per cent rise in fps just by using quicker memory.

You can squeeze your system's memory for more juice by lowering the time it takes to respond. Usually, system memory takes about three cycles to react. However, most memory modules can do it quicker. Let's try bringing this value down further. Proceed to the Advanced Chipset option and select the entry that reads as SDRAM CAS Latency Time. Bring the value down by a notch from 3 to 2. While inside the same set of options, look for SDRAM RAS-to-CAS Delay and SDRAM RAS Precharge Time and change those to two as well.

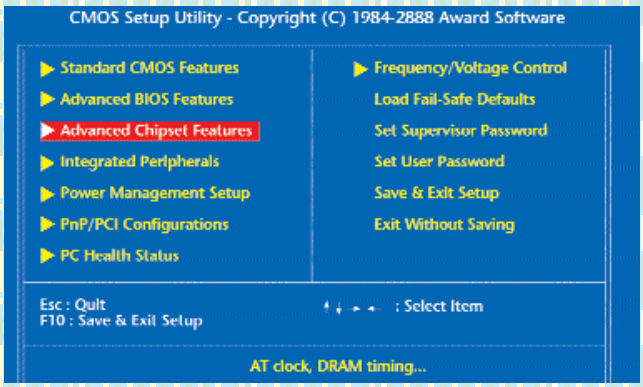
The final scene to conquer on the memory front comes with adjusting how much time it takes for data transactions to happen. The default value for this is 6/8, which is slower, albeit more stable than lower values. Lowering the number will boost system performance, but at the risk of stability. It's usually possible to bring the SDRAM Cycle Time down to 5/7; your hardware should be able to handle it. Look for this particular entry in the Advanced Chipset option.

Cache is the key

A cache, in computer terms, is nothing more than a digital scratchpad used for storing frequently accessed information. It works the same way as memory does, but its lightning fast speed set it so apart, they had to change its name. A CPU sports a dedicated cache where it jots down its calculations. If you take away its cache, then the CPU reverts to RAM, with a performance hit so incredible you'll undergo a first hand feel of its significance.

System memory also moonlights as a cache. It's slower than CPU cache, but faster than BIOS firmware. Enabling system and video BIOS caching copies the firmware into the main memory, where it can be accessed rapidly.

As with many of the tweaks given here, these two options are present in the



Press [Delete] at system startup; it should get you into the blue world of the BIOS

Crash Recovery

When tweaking the BIOS settings, experimenting with the possibilities are the best way to tune your PC for peak performance. But during this process, you might end up pushing it a bit too far—enough to prevent your PC from booting. If this happens, turn off the computer and wait for at least 7 seconds before switching it back on again. Just as soon as you do this, simply hold down the [Insert] key for a few seconds and the BIOS settings will revert back to their factory set values.

Advanced Chipset entry. Most PCs can safely run this tweak for a small performance increase.

Flash your BIOS

Upgrading your BIOS to the latest version increases speed and stability. It also offers new features and more compatibility to your system. Go to the manufacturer's Web site and download a BIOS flashing utility and a copy of the latest BIOS version specific to your PC. After downloading, make a boot disk and extract the files onto it. To do this, right-click on the floppy drive in Windows Explorer and select Format. Under Format options, click 'Create an MS-DOS startup disk'. Restart the system and boot from the floppy.

Before flashing, eliminate all possible electrical disruptions. Think twice about this procedure if you live in an area prone to electrical outages. If the flashing process is interrupted, you might have to replace your motherboard.

Accelerating AGP

For those with middle-aged PCs, enable AGP 2x (under Advanced Chipset option) to double the amount of throughput from your graphics card. Owners of new computers should do the same with AGP 4x. This will deliver higher frame rates in games.

By default, the AGP device waits for two cycles between each data transaction. Reduce this delay to one cycle by making the necessary changes in 'AGP Master 1WS Read/Write' option, usually found in the Integrated Peripherals category.

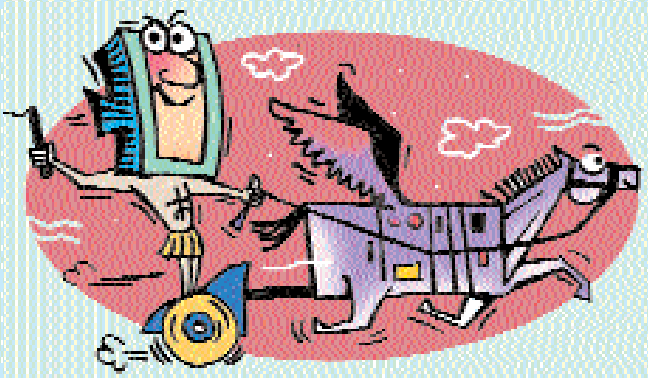
This results in higher graphics performance. Revert to the original settings if you see stray pixels and torn images.

Save memory space and processing power by balancing the amount of system memory needed to store graphical textures. Most new graphics cards come with at least 64 MB of their own memory.

So there is no need to devote more than a few system resources for graphics. Select 'Advanced Chipset' option and move to AGP Aperture Size. Ideally, the AGP Aperture Size should be set between 32 MB and 64 MB.

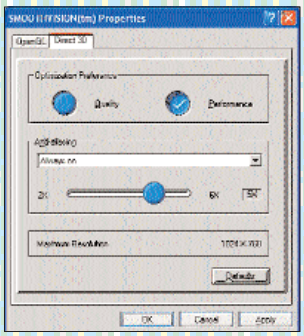
IN THE DRIVER'S SEAT

A well-crafted device driver can enhance your hardware's performance



Graphics cards

Look out for graphics driver updates for added performance and features. At times, major driver releases can really push the envelope of graphics performance. If your drivers are more than a couple of months old, we strongly recommend that you go in for an update.



ATi has a a friendly driver interface

Owners of nVidia-based video cards can download the unified Detonator drivers that work with all nVidia products from the chipmaker's Web site. No matter what brand of nVidia card you own, always download reference drivers from the brand's site to ensure maximum compatibility and performance. Owners of ATi cards must approach driver updates with caution. For years, ATi products have been plagued with poor driver support—bugs and performance hits have ruled the roost. We recommend downloading only certified drivers. And stay clear of ATi drivers that are still in beta.

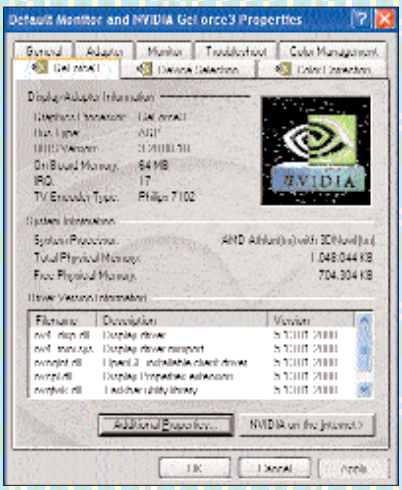
Disable vertical sync (VSYNC)

If you enable this option, your games will normally run faster as the screen is redrawn irrespective of the monitor's refresh rate. Leaving VSYNC on will result in frames being rendered at a slower rate. Disable VSYNC by clicking on an empty area on the desktop and select 'Properties'. Under the 'Settings' tab, click the 'Advanced' button. Look out for an OpenGL or Direct3D

tab if available (not all drivers are designed with similar front ends) and turn off vertical sync.

Enable fog table emulation

Checking this option will allow certain games that improperly access fog to make use of it, albeit with a performance hit. Disable this option when running newer games with full fog support. It will look better and run smoothly, too. You can normally disable fog emulation from the Direct3D and OpenGL tabs within your video card's driver software.



nVidia's drivers keep a tab on versions of each file.

Enable anisotropic filtering

If you want at least some level of visual quality, anisotropic filtering is perhaps the smoothest filtering method available. It definitely results in sweeter images, but enable this option through your video card's drivers only if you have additional performance to spare.

PCI Texture Memory Size

Since the majority of 3D cards use the AGP bus, it's absolutely pointless to set aside memory space for PCI textures. Set this option to zero, again in your video card drivers, to save memory space and to slightly boost performance.

Buffer flipping mode

If this option is available, set it to automatic in your 3D accelerator's drivers. By doing this, you will allow the driver to automatically detect the best method based upon your hardware configuration.

Adjusting colour depth

The more colour you use, the more processing power will it take to render 3D scenes. If the only thing that matters to you is speed and more speed, you'll find that the maximum benefit lies in switching to 16-bit colour mode in all the games that you play.

Motherboards drivers

More than being just functional patches, driver updates for motherboards can deliver rather large jumps in system performance, especially if the drivers contain fixes for major issues. Irrespective of which chipset your motherboard is based upon, there are a few thumb rules for optimising driver related settings for peak performance:

■ Before installing a fresh set of new drivers, uninstall the existing set. Do this from ***Control Panel > Add or Remove Programs***. Select the drivers that you wish to remove and click the 'Remove' button. Thus you can ensure that only the new files are installed and there is no trace of the old ones. The same goes for video cards and soundcards too.

■ When you install an updated driver set, pay close attention to the steps you have to go through. For example, the VIA 4-in-1 drivers, on installing a file, query you as to which corresponds to the proper working of AGP. To questions like these, always select the choice, which reads 'High Performance'. Remember, the decision you make in each of those installation steps will have an influence on how fast your computer system runs.

ADVENTURES WITH OSs

A few clean-ups and tweaks can get you OS on a roll

Start me up!

Let's get right down to the beginning. The first method by which you can get Windows to load faster is by streamlining the startup process. While in Windows, choose ***Start > Run***, type ***sysedit*** which will launch the System Configuration Editor.

Look for the windows that are named C:\AUTOEXEC.1BAT and C:\CONFIG.SYS. Wipe out the contents of each window and save them once you're through. Revert to C:\CONFIG.SYS and add the line:

Stacks=0,0

Get FATter!

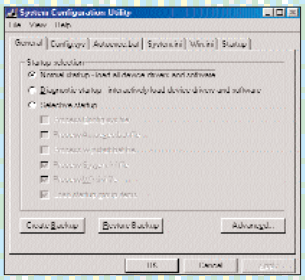
Among the biggest performance boosters within Windows is the tool that converts your hard disk partitions from FAT16 to FAT32. Not only will you recover tons of wasted space, but your PC will also run quicker. Run the Drive Converter if you're using a FAT16 partition. Don't worry if you aren't sure; the tool will tell you if your hard disk is already converted.

Go retro

We know how it feels not to have brilliant sounds and a visually appealing desktop while you work. But these things take up precious time, which could be used towards other, more important tasks. Start by disabling system sounds. To do this, go to ***Control Panel > Sounds***, and under the 'Schemes' section, select 'No Sounds' and click 'OK'. This will add plenty of zip to your PC and even more so if you are stuck with an extremely slow one. If you have a large, high-resolution desktop background installed, throw that out too and you'll be freeing up a good chunk of system memory. To do this, right-click any blank area of the desktop and click on 'Properties'. Select the 'Desktop' tab and under 'Background', choose 'None', then click 'Apply' and 'OK'.

Second Step

Windows 98 incorporates a nifty little utility that allows you to further tweak the Windows startup process—System Configuration Utility. To start the tool, click ***Start > Run***, and type ***msconfig*** and you'll be presented with some more advanced ways to take control of startup files.



SCU is an easy tool to deal with MS-DOS files

■ For some better tweaks, click the 'Advanced' button. However, don't touch anything unless you know what you are doing. We recommend that you check the box against 'Disable Scandisk' after bad shutdown to turn off Scandisk's annoying autorun feature.

■ Clicking the Startup tab will bring up some more interesting startup options. Here, one can manually select which programs must load during Windows startup and which ones must not. Disable those applications that you don't use on a daily basis. This will help you save precious memory space and help boot your system a lot faster.

Direct Memory Access

DMA's benefits are two-fold. Firstly, it allows the hard disk direct access to system memory, and secondly, by circumventing the CPU, lesser time is consumed in getting the data transferred. Hard disks and optical units can benefit from using DMA. To enable it, click ***Control Panel > System***, and click on the 'Device Manager' tab. Under the 'Disk Drive' subheading, click on a device and proceed to the Settings tab. Check the 'DMA' tab, click 'OK' and restart the system for the changes to take effect. Note that this only works for drives that have DMA capability.

Role reversal

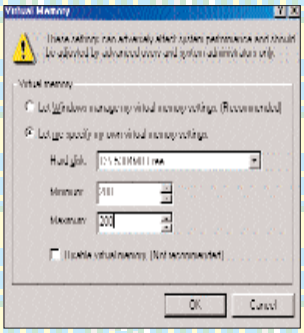
By changing the way Windows looks at your computer, you can speed up access to and from your fixed devices such as hard disks. Click ***Control Panel > System***, and click on the File System tab. Set the typical role of the computer to a network server and set the Read-Ahead optimisation to full.

Defragment

Defragmenting your hard disk fixes up links and positions files so they are quicker to access. Run the Disk Defragmenter at least once a month to keep your computer in good shape. Click ***Start > Programs > Accessories > System Tools*** and click on 'Disk Defragmenter' to set about this task.

Virtual Memory

When system memory runs short, Windows uses the available hard disk space as virtual memory. It's a lot slower than actual RAM but at the same time, it is necessary. If you have a surplus of RAM in the region of 512 MB or more,



In a fixed swap file minimum and maximum values are same

you can disable the swap file altogether, thereby boosting system performance. To do this, go to ***Control Panel > System***. Click on the 'Performance' tab and select 'Virtual Memory'. Click the radio box that lets you specify your own settings and subsequently check the box next to 'Disable virtual memory'.

The other route is to fix upon a swap file size so that Windows doesn't waste any time resizing it. Click ***Control Panel > System*** and go to the 'Performance' tab. Click the 'Virtual Memory' button and select the option that lets you specify your own settings. For an average computer with 128 MB RAM, keep the minimum and maximum size to approximately 200 MB—any more would be a waste of free hard disk space.

PHYSICAL CHALLENGE

Overclocking challenges sheer computing prowess. Get in tune with the full potential of your PC, but remember not to let the PC lose its cool

Airflow

Getting cool air to warm components is the most fundamental cooling principle to adhere to. A traditional ATX cabinet has two fans, one to suck in cool air and the other to expel hot air. But the purpose can be defeated by the presence of loose connectors and cables inside. To maximise the flow of air within the cabinet, carefully twist, tie or tape up all loose cables and place them away from components such as the CPU, hard disk and RAM.

Heatsinks

Knowing that the CPU is the most overclocked part of the computer, getting a high quality fan/heatsink for the chip is essential. Take a serious look at some powerful fan/heatsink combos made by the likes of Thermaltake, Evercool, Akasa and others. A high quality fan would cost you at least Rs 700, but considering its importance, don't even think of settling for anything less.

Spread it!

It's not sandwich spread, but a thin layer of this stuff goes a long way in effectively dispersing heat away from critical components. Thermal paste is the substance that is applied between the heatsink and for example, a CPU. You can even use it with memory modules and video cards. Just make sure you use a very thin layer, otherwise, you'll completely defeat the purpose of using it.

Pencil Surgery

For AMD processor owners, there is a simple trick you can perform to confer your chip with the potential to run at speeds a lot higher than you ever thought possible. Of course, you can overclock by increasing the FSB, but the fun would pale in comparison to what you could enjoy by going all the way. All you need to 'unlock' an Athlon or a Duron CPU is something very simple—a pencil, preferably a 0.5 mm clutch pencil. Do it as we spell it here:

■ Remove your CPU and place it on a flat surface as shown in the picture. Observe the CPU closely and look out for four electrical contacts, or bridges, labeled L1. If the contacts are broken, pick up the pencil and fill in the gaps. If the contacts are in place, skip the following steps and directly attempt to overclock the chip.

■ With a steady hand, work your way across the bridges and connect them by rubbing the pencil back and forth about a dozen times or until the bridges are dark black and not the usual gold colour. Do the same for all L1 bridges and make sure that the pencil marks do not overlap each other, otherwise the trick won't work.

Ensure you don't draw lines that overlap.

■ Now that you have this licked, you're ready to overclock the chip to its limits. Instead of using the feeble FSB method, you can now increase clock speed by stepping up the multiplier.

A typical Duron 600 runs at a 100 MHz FSB with a multiplier of 6, which gives you its 600 MHz clock speed. Now if you were to increase the multiplier to 9, do the math and you'll come up with a 900 MHz overclock. That's a 50 per cent increase in clock speed.

Remember, in order to carry out this procedure, your motherboard must support multiplier adjustments. Some models let you change it through DIP switches while others have it in the system BIOS. You must refer to your motherboard's manual on how to change the multiplier value.

Intel chips

If you're the owner of a PC with 'Intel Inside', the only avenue you have in order to overclock the chip is driving up FSB speeds. Unfortunately, each and every chip made by Intel comes multiplier locked with no avenue to circumvent it. But unlike AMD, processors from Intel

score high marks when overclocked through the front side bus.

Managing memory

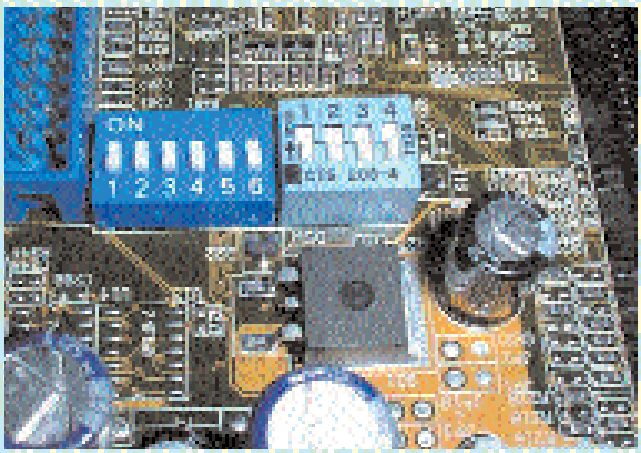
Give your precious memory the pampering it needs to zip through your applications and games. Whether you have a surplus or shortage, tools such as Application Warp Memory Manager (AWMM) (***www.majorgeeks.com***) can take control of how well the system memory is used. With it, you can take snapshots of memory usage analysis and carry out tweaks best suited to your PC's configuration. You can even keep different settings across a variety of programs from games and 3D to business oriented applications. Whatever your need is, AWMM can regulate memory resources accordingly for optimal performance.

Turn up the juice!

One of the more aggressive means of overclocking is by pushing voltage levels higher. The faster a chip processes data, the more power it would need to get the job done. Sometimes, you can squeeze a hundred megahertz more from a CPU just by increasing its input voltage.

But exercise caution as an overload of current can blow the chip to bits. The most effective way of pumping up voltage is to first overclock a component as high as possible using standard voltage. Once a chip has reached its limits, turn up the juice about one notch, approximately 0.1 V and try pushing up the speeds further. Repeat this process till you've reached no more than 2 volts for a CPU, anything higher would not only be dangerous, the benefits are really not worth it.

To increase voltage incrementally, check your motherboard manual on how to manipulate these settings. Since the precise settings vary across each motherboard model, you must begin this research before getting down to the practice of it. If your board supports this exercise, you can either use DIP switches on the motherboard, or make the changes through the BIOS settings itself.



A shot of multiplier and voltage adjusting DIP switches.0

Play it safe!

Taking a strong, techie approach is the right spirit for overclocking. But remember, as with all things electrical, computers too have the potential to shock. Not only can sudden jolts of electricity feel rather uncomfortable, just think about what would happen to your PC if you inadvertently shorted a circuit. Always ground yourself before dealing with the innards of a computer. You can either wear a grounding strip around your wrist or just touch the exposed part of an electrical appliance to discharge yourself.

Secondly, never fail to keep in mind your PC's warranty. Overclocking your PC will immediately void out that precious after-sales service and support, (technically at least). In fact, merely opening the cabinet is enough to deem that service contract null and void. We would recommend that you wait until the warranty period expires—it's vital to your peace of mind.

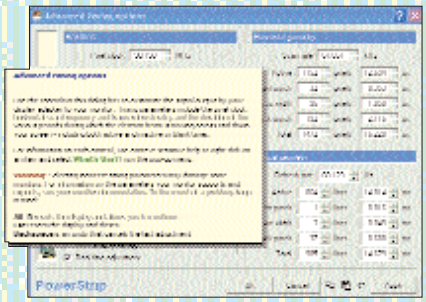
A GOOD WORKOUT

Download applications that will turbo-charge your computer

Overclocking video

If you've mastered the art of overclocking with your CPU, how about using those skills to push your graphics card? The utility PowerStrip (***www.entechtaiwan.com***) makes it easy to manipulate the core

and memory speed settings of your video card. Once you've installed the software, right-click the icon in the system tray, highlight 'Performance Profiles' and click 'Configure'. Here, you can adjust memory and core speed individually simply by dragging the slider up or down.



Powerstrip—a tweak-packed utility

nVidia card owners can download a registry hack called Coolbits.reg (***www.geforcefaq.com/files/coolbits.reg***) that enables an option in the Windows Display panel to allow for core clock and memory clock overclocking adjustments without the need for third-party software. Who knew such a small patch could hold the keys for us to do so much?

Cool water

Overclocking is no mean task. You've got to be on your toes and keep heat levels in check when you do it. Two of the leading utilities—Rain (***www.benchtest.com/rain.html***) and Waterfall (***www.benchtest.com/wfp.html***)—help by cooling your CPU during periods of inactivity. It works for all x86-based processors from Intel, AMD and VIA. The cooling process works by the software issuing commands that put the chip in a digital state of slumber when not in use. They only work for the Windows 9x/Me line because other flavours of Windows do the same thing automatically.

RAMming ahead

While the CPU sprints along with gigahertz swiftness, memory inches along at a fraction of that. Typically, overclocking system RAM is a tedious task but well worth the effort. Tuning memory to strike that heavenly balance between performance and stability can be made easy thanks to software such as SoftFSB (***www.voodoofiles.com/250***), a handy little application that lets users change FSB (front side bus) speeds in Windows without having to restart the computer.

It's the perfect tool in the dry season.

CPUFSB (***www.voodoofiles.com/2679***) is another package similar to SoftFSB, the only difference being that with the former updates are more frequent. To overclock memory, you have to tune up the FSB. Simply select your mainboard manufacturer and model then slowly push the FSB higher, keeping an eye on system stability as you go on.

Athlons ahoy!

Without doubt, AMD's Athlons and Durons are among the most overclockable chips around.

Their immense potential has been given a shot in the arm thanks to a program (***www.ocinside.de/download/l2_speed.zip***) that lets you change the chip's L2 cache divider ratio—the limiting factor in most cases.

Often, Athlon overclocking attempts hit their limits not because the CPU core can't handle a higher frequency, but because the external L2 cache chips aren't up to it. In fact, AMD's own 750 MHz and 800 MHz Athlons use a lower speed L2 cache (2/5 divisor) than slower chips.

Once your chip is unlocked, that is, once the multiplier settings are open, push them as high as possible. As soon as you've reached a comfortable limit, use the L2 cache control utility to lower the divider ratio step-by-step until the chip will comfortably work at the next highest multiplier value.

Cyrix/IBM

Even low-end machines like some embellishment. For those of you still holding on to these dinosaurs, you can perk up chip performance by 10 per cent using 6x86Fast (***www.hardwaresecrets.com/download.html***), a utility that fully optimises CPUs for use with Windows 9x/ME.

Tweak the BIOS

Tired of a BIOS that won't let you tweak your machine for maximum performance? Don't let that get your hopes down.

TweakBIOS (***www.miro.pair.com/tweakbios***), perhaps the best BIOS tweaking utility out there, lets you tune just about every component of your PC without the need to reboot everytime you make changes.

It supports a vast majority of BIOS versions and chipsets, giving you more control over your BIOS than you ever had. All you need is a DOS prompt and you're on your way to a highly tweaked, high-performance power PC.

Cool CPU

It always helps to have reinforcements. When overclocking your CPU the hardware way, some software utilities can fortify your attempts by optimising the chip and keeping it cool at the same time.

That's what CPU-Charge (***www.majorgeeks.com***) is famous for; it even performs a variety of system optimisations to speed up memory and Windows itself.

Castle Wolfenstein makes a comeback

When fighting the undead it helps to take advice from those that have 'been there, done that'! So here are a few helpful tips on zombie hunting in *Return to Castle Wolfenstein*

The heart-stopping follow-up to one of the most revered PC games of all time, *Return to Castle Wolfenstein* (*RTCW*) uncovers Hitler's horrific obsession with the occult, the living dead, and genetic mutations. *Return to Castle Wolfenstein* takes elements from many of last decade's great shooters and is closer to the story-driven shooting action of *Half-Life* and *No One Lives Forever* with some outstanding team-based multi-player gaming.

DIE Infernal Zombies!

There are three types of undead in *RTCW*: normal zombies, armoured zombies and fire breathing zombies.

To deal with normal zombies just shoot at them with your MP40 but don't get too close. Strafing from behind a wall or pillar is a good idea, but finish off the zombie quickly; if they get too close they swipe at you and get to be a royal pain in the neck! When zombies get together in packs, they can also corner you. A good strategy is to shoot them with the sniper rifle quickly.

Never shoot the armoured zombies while they are standing still because the bullets ricochet off their armour. Shoot at them while they are moving. Shoot them in the head or legs as they are protected in the mid section by their shields. A good tactic is to throw a grenade at the zombies when they stop and use corners to shield yourself. Again, never let these zombies get too close.

Fire breathing zombies are hard to kill and you'll come across only a few of them in the whole game. Keep your distance as their fire can travel down nearly a whole corridor.

One other thing—zombies aren't dead till they explode! If they are lying on the ground keep firing at them till they explode.

Strategies for Single Players

■ When you come across a First Aid kit and a Meal in the same room—go for the kit first.

■ The Meal will leave leftovers if you don't need the whole of it.

■ Use [Caps Lock] to toggle between run and walk. Walking allows you to move stealthily and open doors silently. Jump to dodge enemy fire. It makes you almost impossible to hit!

■ Enemies know how to avoid grenades and will sometimes kick them back at you. Make sure you hold the grenade long enough so that the enemy does not get an opportunity to kick it back before it explodes.

■ The Nazis have hidden hordes of stolen gold and treasure. Look for secret passages, breakable paintings and hidden rooms. When you finish a level, you will find out if you discovered all of the goodies.

Save your game frequently!

SRIRAM SHARMA

Multiplayer tactics

If you're carrying one of the heavy weapons, you can switch to a knife or pistol to walk faster.

- It is best to change your player class (example, Lieutenant, Medic) prior to dying so that you'll be ready to reinforce quickly.
- Watch your ammunition levels. Make sure you reload after every battle so you'll be ready for the next one. Fire in short bursts. You'll be more accurate and you'll waste fewer bullets. One well-placed headshot is worth several to the body.
- The Lieutenant is the only person on the field with binoculars. These can be used not only to call in air strikes, but also to monitor enemy movements. A Lieutenant can request an artillery attack by identifying a target through binoculars. Press [B] to select the binoculars and fire to request the attack.
- Medics allow each member on a team to start with +10 health points (to a maximum of 140). This alone makes them important to have around. In addition, they can drop First Aid kits and revive fallen comrades.
- Use your MP40 and fire in quick bursts. Don't use the Sten gun indiscriminately because it will heat up too quickly, making you vulnerable.

Party LAN Style

Put a lot of crazed geeks with their killer wares in one place, lock 'em up, plug them into one huge LAN, and shout at the top of your voice, "Let the games begin!"

"Dapro Kill *na re*! "*Arrey* Stop Snipering Da" "Shut up you camping FAG!" It's 5.30 in the morning, that fragile state between coma and hyperactivity, when a bunch of crazed gamers are shouting obscenities in a deathmatch which has as much aggression offline as online. Maybe it's the round of coffee, maybe it's the adrenaline rush of being in their gaming elements—whatever the reason be, they are busy killing themselves.

Playing with real opponents is a completely different ballgame. To kick ass or to get your ass kicked is a far more personal gaming experience. There's no doubt which is better: fragging real people or bots. Teamplay and deathmatch, clans and guilds, they all make fragging a much more intimate indulgence, for where else can you relish in smack talk, and savour the expression of victory by screaming, "WHO'S YOUR DADDY?"

Anyone who has played a game in a LAN environment knows that playing over the Net can never really match the adrenaline rush that a LAN circuit produces. For those who are yet to be initiated into the underworld of gaming, LAN Parties are one of the most interesting phenomena to pop up in recent years.

The premise of a LAN Party is simple. Take multiple computers, wire them up, and have people playing games against or with each other. Proceed to gib your opponents in marathon gaming sessions that last for days. Of course, other things such as adequate electrical power, food, and an appetite for gore are nice to have, but by no means a necessity.

There are small house parties, where groups of friends will get together to play a few games. Then there are commercial LAN parties like WasteLan and QuakeCon that draw crowds of over 2,000 people with all-night competitions, tournaments, food, drink, and all the other regular stuff that smaller parties usually have.

Online gaming vs LAN gaming

You will often have enough time to catch a rerun of *Friends* while using a

modem to play online. Meanwhile, your counterpart has enough time to watch a rerun of *Walker Texas Ranger* from the moment you fire your rocket to the time it makes its way to the intended target. This is the reason why LAN parties came into the scene—ping, that dreaded unequaliser, which classifies gamers into HPBs (High Ping B******s) and LPBs (Low Ping B******s).

Says Topgun, a LAN party veteran who hosted FragFest IV at Chennai: "You get to scream your lungs out to a person which is not possible online, you get an awesome ping, and you can create servers at the time you need—nice, isn't it?"

A LAN setup provides the best of both the worlds—superb ping and playability, and an easily accessible place where everyone can come in and shoot. This is why the best clans are usually formed around close-knit groups who know each other and communicate a lot more as compared to other loosely formed groups found online.

"Playing on LAN is different from playing online. The gameplay is not the same. Online, you join whichever team you can and the game is often an un-coordinated, chaotic battle that unfolds in real-time. Few people work together properly online. One of the reasons for this is that many players don't know each other at all, let alone understand team tactics. On LAN, all of this undergoes a quantum shift. Not only do people know each other, they also tend to use verbal commands which makes the game much more interesting," says Ricky Kapur, admin at Kawabonka.com, an Indian online gaming service provider.

LAN parties have made baby footsteps in India. Fragfests have been thrown in Mumbai, Bangalore, Chennai, and Kolkata, usually managed by a bunch of gaming enthusiasts who come together and have a gaming binge for a day or two. All of them share an obsession for 3D games and play online regularly.

The action engaged in a LAN party is pretty much confined to the FPS arena. *Counter-Strike* is the LAN favourite, but *Quake III Arena* with some of its mods is quite popular too. *Rocket Arena* is a frequent choice for most of the *Quake III Arena* players.

"We like playing mods like *Counter-Strike*, *Rocket Arena* and *Jailbreak*, but when it comes to teamplay, *Counter-Strike* is still the tops," says Siddhi, a gamer from Chennai.

"It's a pain to set up—carrying your CPU and monitor around is certainly not fun, but once you're there, it's all worth it," adds Grim Reaper, a Mumbai gamer.

Topgun sums it all up: "Even though it seems a lot of trouble at first—and you WILL have problems the first time—don't let it deter you. The experience is just kick-ass and it more than makes up for all the lugging around (equipment)...it's a gamer's dream."

Speed Phreaks: You may come across souped up rigs like these at a LAN party

A LAN party needs...

A big, wide space with lots of electrical outlets—a community hall, work area, cyber cafe, or even a spacious house with no parents would do just fine. The host also needs a hub to plug all the network cables into. Make sure each guest is prepared for the harrowing experience of a

Preparing your PC for the Party

Before proceeding, make sure your computer

- Has a network card installed along with the drivers. You cannot have multiplayer on your computer without a network card.
- Has your favourite games installed with all the requisite patches. Installing software at the party takes time and reduces the amount of time left to play.
- Has no outstanding hardware or software issues; it should be properly configured and tweaked. Get you favourite peripherals along. No excuses will be accepted from whiners at the end.

The gathering of geeks: The CPL events gather huge receptions worldwide, but the record goes to a LAN event held in Norway each April. The Gathering is in fact the world's largest temporary Local Area Network. Their upper limit is 4,500, and with the crew, there are about 5,000 people in the arena. At the 1999 event, there were slightly over 4,000 attendees filling a full-size indoor Soccer stadium. The Gathering is not primarily a gaming party, but also a place where amateur developers release demos of their games.

Not just Fun and Games

For a pastime most often associated with stereotypes of geeks, a shared gaming culture indicates the arrival of gaming as a mature and complex medium.

Currently, dozens of Internet-based multiplayer games exist in an assortment of different genres and styles, the most popular being real-time strategy and first-person shooters. According to recently published statistics, the online gaming industry will reach $1.4 billion by the year 2002. Of these games, the popular ones are those which are more conducive to spectators and professional competition.

Computer games have also become more sophisticated in recent years with the advent of the Internet allowing players to hook up with other gamers around the world. To take things a step further, computer entertainment companies have elevated gaming to competition levels equalling that of professional sports.

Professional Game Providers (PGPs) like CPL and World Cyber Games organise big events, inviting top international players as well as the general public. The contests feature gaming action projected on large screens. And the players are not just playing for the thrill of it either. Gamers now come from far and wide to prove their mettle at live tournaments and LAN parties. A multitude of gamers show up for worldwide tourneys, hoping to win bounties in excess of $300,000!

Seoul kicked off the first World Cyber Games at Korea, with gamers around the world competing against each other. Cyberatheletes from 37 countries, including India, took part in the proceedings. Net cafes and gaming dens have made no small contribution to gaming in South Korea. The country has a huge game-playing population and some 20-odd thousand gaming cafes. The life of a professional player in Korea has a lot of celebrity value attached to it; gamers are recognised on the streets by common people.

Gaming needs money, like any other sport. With the rapid growth of the gaming industry (it's currently valued at 20 billion dollars), it's possible to envision these competitions attaining a higher level of description than just a 'LAN party'. With high-profile event management of LAN parties such as Million Man LAN and the CPL, this phenomenon is as much a cultural indicator of the masses as Woodstock was in the 1960s. Gaming has evolved to the point where teams and clans represent countries, just like professional sports, and is poised to garner a whole lot of popularity and credibility for itself as a sport.

ILLUSTRATIONS: Farzana Cooper

LAN Party. Before you throw a party, tell each of your guests to bring along:

- A computer with games already installed! (BYOC), or Bring Your Own Computer may sound daunting to some people, but you can't have a LAN without computers can you? Every person who wants to play has to get his gear along
- A spike buster to provide enough plugs for all your electrical devices
- A Network Card and some Network Cable (Network Cards are cheap, you can get one for as less as Rs 500)
- A barf bag, since five hours of continuous fragging can make anyone's stomach queasy

As the host, you should also have loads of caffeine-related beverage ready. Make sure all your guests have their network cards installed. It's best to have your guests do this before they arrive, as installing and troubleshooting everyone's hardware at the party is a real drag. Plug one end of a cable into your network

card, and plug the other end into the hub. Do this for all the computers on your network, and presto, you have a LAN! All that's left to do is fire up *Quake*, *Unreal Tournament* or any other TCP/IP based game (these days it's hard to find a multiplayer game that doesn't support TCP/IP). After this, all that is needed is some rad music and you have a party happening!

Looking around

If you're too lazy to go through the pain of organising a LAN party, you could look around for gaming centres or cyber cafe's around your neighbourhood. Dishnet DSL centers are serious about gaming and have well equipped machines. Of course, not every neighbourhood can have a place like Surf's up (Pune) or Hakone (Mumbai), with finely tweaked state-of-the-art computers, but your neighborhood cyber cafe would probably be a great place to hijack for a night.

Cyber cafes are not just places where people go to surf. All the computers are

linked, fairly powerful and can be used to play multiplayer games. Most of the cyber cafe's that have turned into gaming dens have met with a good degree of success. Gaming is quite popular among the visitors, and as we all know and accept, addictive. The mix of playing games with other people is irresistible and should win every one over pretty soon.

SRIRAM SHARMA

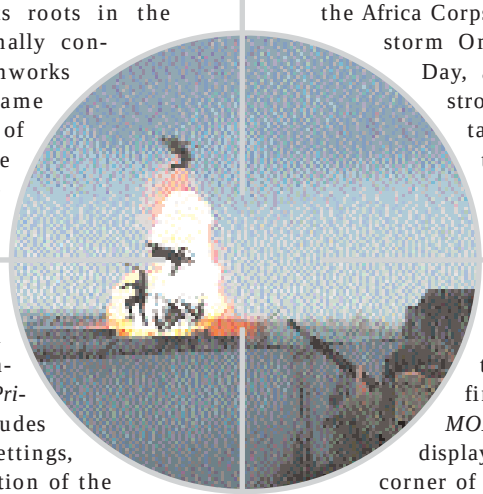
Shoot at Sight

Must-have games that will create a storm

MEDAL OF HONOR: ALLIED ASSAULT

Saving Private Powell

Allied Assault is the first game in the *Medal of Honor* (*MOH*) series to reach the PC—it has its roots in the PlayStation. Originally conceived by Dreamworks Interactive (the game development unit of Spielberg's movie production company), it won the Best of Show award at E3, 2001.



The game is obviously inspired by the award-winning film, *Saving Private Ryan*, and includes several identical settings, including a replication of the Omaha Beach invasion. Thanks to the polygon-crunching powers of today's cards, *Medal of Honor* comes pretty close to capturing the same intensity of war. Set in the war years between 1942 and 1945 in the European arena, you don the role of an elite army ranger, Lieutenant Mike Powell, a versatile soldier involved in every historic Allied offensive during that period. You can spy, snipe, drive a tank, and you are as effective at infiltrating and spying as you are on the front lines of the D-Day invasion. You'll see action against the Africa Corps, sabotage U-Boats, storm Omaha Beach on D-Day, and infiltrate Nazi strongholds and labs to tackle their deadly technological advances.

Even shooter novices should feel at home in no time. The controls let the game shine through. One of the finest innovations of *MOH* is the compass, displayed at the upper left corner of the screen. A small arrow continually points you towards your next objective, and virtually guarantees that you'll never find yourself lost during a mission. This does not mean that the gameplay is always run and gun. Some missions require you to use radio and binoculars, while others require you to find specialty items such as gas masks or ID papers to continue.

EA has found the ideal middle ground between realism and fun. The range of effects rivals Speilberg's Oscar winning film. Facial expressions, immersive gameplay, authentic World War II guns—this game leads in almost all departments.

The game uses a modified version of the *Quake III* graphics engine, with good results. It's not as breathtakingly beautiful as *Return to Castle Wolfenstein*, but is as close to reality as it can get. Character models are equally well done, with excellent facial detail.

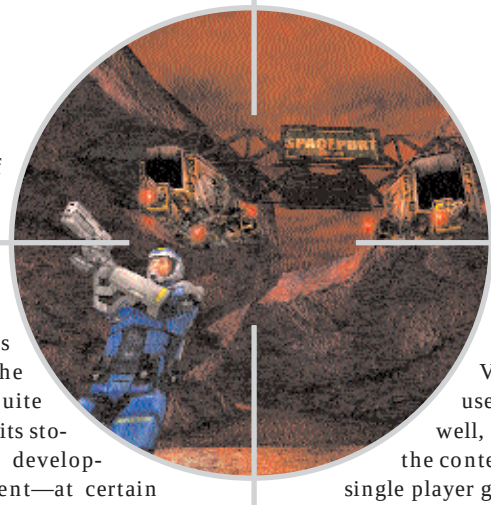
If you have a strong enough rig to crank up the effects, the results are quite spectacular. It does take a monster of a PC to run the game smoothly at high-detail levels, but those with the horsepower to run *Max Payne* and *Return to Castle Wolfenstein* should be covered.

If you're just looking for the best single player experience, a game that makes your jaw drop, feeds your itchy trigger finger, and makes your GeForce3 come to life, then *MOH: Allied Assault* is for you.

Genre: FPS/Action
Developer: 2015
Contact: Origin Marketing
Phone: 022-8801335/8835886
Web site: mohaa.ea.com
Price: Rs 1,299
Rating: ★★★★☆

RED FACTION

Code Red



There are several ways to approach a single player FPS. *Doom* and *Serious Sam* downplayed story and let you kill enemies by the hordes, while *Half-Life* and *No One Lives Forever* are held by a strong storyline. Volition, the minds behind the Descent game series tread another path—by destroying terrains. The most hyped part of the game is the Geo Mod Technology, that lets players blow up objects—walls, ceilings, wooden structures. Players can actually deform the terrain and create improvised 'steps' out of huge rock piles. This lets you interact with the world in a way that has never been done before in an FPS.

The basic premise behind the game is pretty simple. It follows Parker, a miner employed by an oppressive firm called Ultor, on Mars. The goal is to stay alive long enough to bring down Ultor and solve the mystery of the plague which has been affecting all the miners. This journey takes him from gritty subterranean mines to Ultor's pristine science and nanotech labs to the surface of Mars and even onto satellites orbiting high above the planet.

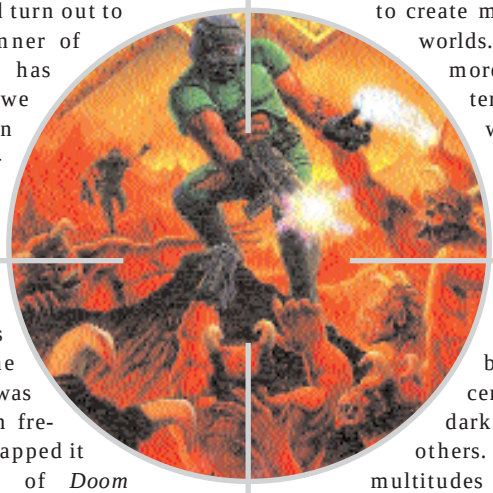
The interaction with the characters is quite low and the game never quite immerses you with its storyline. Character development is non existent—at certain points there's no clear motive as to why Parker needs to mindlessly kill everything in sight. What wins you over is the enemy AI, some refreshing weapons, combined with a pace that will keep you obsessed. *Red Faction* has an arsenal of 15 weapons that you, as the player, can carry around; almost all weapons have an alternate fire mode. The selection of weapons range from the obvious handgun/pistol to the BFG inspired Fusion Rocket Launcher.

The graphics appear a little dated. Games such as *Quake III* and *Max Payne* look better than *Red Faction*, probably because Volition spent more time working on deformable terrain than anything else. Vehicles are fun to use and they handle well, but are pointless in the context of the game. The single player game is a tad brief, a trend seen increasingly in today's games. Like the vast majority of FPS games, *Red Faction* features free multiplayer out of the box. All in all, an above average game that does everything FPSs are supposed to do, and a little more.

Genre: FPS/Action
Developer: Volition, Inc
Contact: Express Interactive
Phone:022-8870017/8850245
Web site: www.redfaction.com
Price: Rs 699
Rating: ★★★☆☆

DOOM: COLLECTOR'S EDITION

One for the connoisseur



The story goes that the name 'Doom' sprang from the effect Carmack envisioned it would have on the game industry. And it did turn out to be true, in a manner of speaking. *Doom* has changed the way we look at action games—deathmatch, mods and multiplayer have became the norm. The graphics, sounds and level conception was revolutionary. The mood of the game was violent, the action frenetic, and gamers lapped it up. The success of *Doom* spawned several clones. Almost every game that followed stuck with some of the concepts that this game created.

The game took *Wolfenstein 3D*'s technology and upped the ante. Texture mapped floors and ceilings were introduced, along with multiple elevations to create much more realistic worlds. The enemies were more plentiful and better animated, the weapons were much more diverse and used different types of ammunition and did varying amounts of damage. The game had varied levels of brightness to make certain areas more dark and moody than others. There were also multitudes of enemies which were far more diverse; they each had their own weapon. All of these features were inspiring to say the least, to the industry.

But that was a long time ago. Almost a decade. A little too old to be hip with the GeForce generation. Unless you're a FPS enthusiast who wants a personal copy of one of the most formative 3D games of the action genre.

This collector's edition brings *Doom*, *The Ultimate Doom*, and *The Final Doom* together in a single pack. An all-in-one CD, in a DVD case. The price is a little on the steep side for a classic game, considering that newer games sell at the same price. But for those who want a piece of the old nostalgia, this pack will bring back sweet memories. It shall also keep you busy until id revives the *Doom* franchise with their upcoming *Doom III*.

Genre: Action
Contact: Milestone Interactive
Developer: id Software
Phone: 022-8381614
Web site: www.idsoftware.com
Price: Rs 699
Rating: ★★★☆☆

Monitors in March

56 monitors, 4 reviewers, 20 days, and hours of hardwork. Digit team invents innovative ways to keep their sanity as they bring you India's first LCD test

The Digital Media Research and Test Centre (DMRTC), which tests new hardware and software for Digit every month, had a 'mighty' March surprise—a test of 56 monitors in less than 20 days.

The Test Centre was humming with activity. Ali, Ashu and Mitul—the reviewers were grappling with the task of testing the monitors, while Yatish grappled with 21 graphics cards (we had to drop this section, you should have seen his face when he was told this). And then there were products to be tested for the Bazaar section.

The DMRTC fell to the same old routine: put in extra hours, pop in early, leave late in the night, live on junk food and cola. Out of extreme circumstances arose innovation. Mitul turned crooner and started singing to keep himself (and others) alert through the strenuous testing process. Pretty soon, the camaraderie turned to warbling. The auditory treat ranged from the very current 'Aslam bhai' to the hip and happening numbers by Shakira.

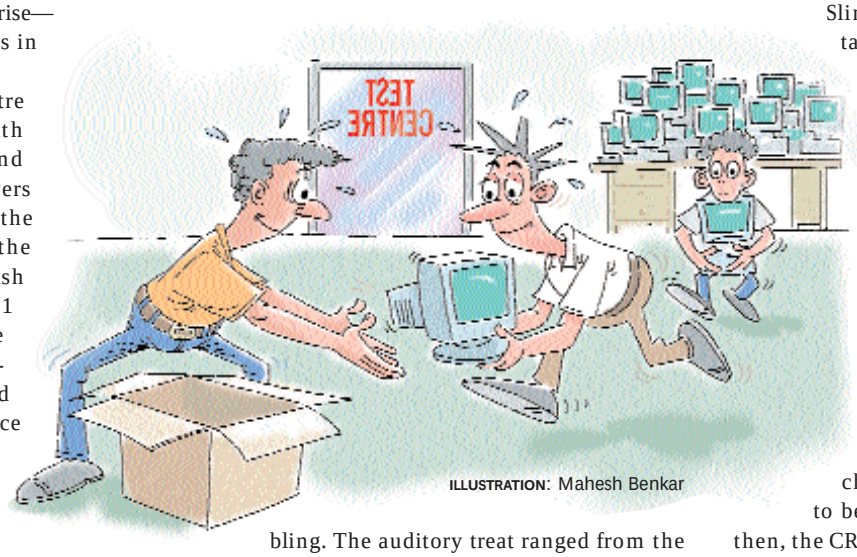


ILLUSTRATION: Mahesh Benkar

There were some other high points in the testing process. One of the monitors tipped the scales at 35 kgs and was priced at Rs 80,000. The Test Centre guys, not missing the slightest of detail, calculated that each kilogram of the monitor cost approximately Rs 2,300.

Slim beauties (LCDs) made the task of going over stats much more intersting. The Geometry test (comprising the Pincushion and Barrel distortion test, Local Regulation test and so on), documenting scores for Screen Pixel Resolution and other tests went like a breeze.

Smiles, songs and fun ended when it was time to bid adios to the monitors. Cladding the matronly CRTs in their brown boxes was a test of muslces. All those huge chunks of polystyrene foam had to be placed in the right way and then, the CRTs heave-hoed into the box....

It made many smile to see the unusually gung-ho gang of reviewers, who sail through all the complex testing processes, suddenly fumble trying to figure out what went in where. Tsk, tsk.

Lights, Camera, Action!

The pressure and accompanying pleasure of triumph only happens when working under deadlines. It's a part of the working of the Media Studio, what with the behind-the-scenes activities like writing and rewriting scripts, shooting sequences, editing, etc, etc, none of which is easy.

The recent CTO Forum held by Jasubhai Digital Media tested our Studio brethren to their limits. Right from the word go, the pace of work could be described aptly in just one word: 'frenzied'. Bimal, Priya, Prashant and Afzal, the pillars of the Studio, scouted all around Mumbai and Delhi, shooting for the event. The studio resembled a modern day war room: ringing phones, heated discussions and all the accompanying action that happens in crunch time. However, the team insisted on quality above all else and kept rejecting scripts for the film; between eight and 10 scripts were rejected because they all missed that essential *something*.

Sleep and food, the two elements that help keep the mind, body and soul together were forgotten. But Prashant took charge and saw to it that there weren't any casualties due to starvation. Afzal, of course, worked as a reality checker. He would give realistic estimates of the time required to finish any particular piece of work, exhorting his colleagues to abandon their over-optimistic estimates.

But in spite of all the hurdles, our stalwarts didn't buckle an inch. After the angst and the agony, the film was extremely well made and ready on time. Appreciation for the film poured in from all quarters when it was screened at the CTO Forum. As a certain author would say, all's well that ends well.

Net(e)scape

Contributed by Sriram Sharma

VIRUS catching on?

A cyber cafe in Mumbai hopes to cash in on the fact that nothing spreads faster than a virus!

Contributed by : R. Chandra

Whoa baby!

'Brand' new baby circa 2002.

Contributed by: Deepak Lunia

Counter-Farce

You've seen *The Lord of the Rings*. But have you seen this?

Taken from: www.somethingawful.com

The Interview

Contributed by: Anshul Chauhan

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 send e-mail to
backbyte@jasubhai.com

The Forwarder's 10-step program

- I will NOT get bad luck, lose my friends, or lose my mailing lists if I DON'T forward an e-mail!
- I will NOT hear any music or see a taco dog, if I do forward an e-mail.
- Bill Gates is NOT going to send me money, Victoria's Secret doesn't know anything about a gift certificate they're supposed to send me.
- Ford will NOT give me a 50 per cent discount even if I forward my e-mail to more than 50 people!
- I will NEVER receive gift certificates, coupons, or freebies from Coca Cola, Cracker Barrel, Old Navy, or anyone else if I send an e-mail to 10 people.
- I will NEVER see a pop-up window if I forward an e-mail ... NEVER —NEVER !!
- There is NO SUCH THING as an e-mail tracking program, and I am not STUPID enough to think that someone will send me $100 for forwarding an e-mail to 10 or more people!
- There is NO kid with cancer through the Make-a-Wish program in England collecting anything! He did when he was 7 years old. He is now cancer free and 35 years old and DOESN'T WANT ANY MORE POST CARDS, or GET-WELL CARDS.
- There will be NO cool dancing, singing, waving, colourful flowers, characters, or program that I will receive immediately after I forward an e-mail. NONE, ZIP, ZERO, NADA!
- And finally, I WILL NOT let others guilt me into sending things by telling me I am not their friend or that I don't believe in God. If God wants to send me a message, I believe the bushes in my yard will burn before he picks up a PC to pass it on!

Now, repeat this to yourself until you have it memorised, and send it along to at least five of your friends before the next full moon or you will surely be constipated for the next three months and all of your hair will fall out!

Contributed by: Sameer Goswami