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Trust in Security

What is it about screensavers that gets a million unsuspecting people clicking on a worm every time? Every year brings new e-mail worms that are the fastest ever and the largest ever, yet they all use the same simple social-engineering trick. They exploit trust. If you are in someone's address book, you are likely to have trusted relationship with them. Thanks very much for the screensaver, friend.

Why should you care, or even need to know about updates? They should just happen in the background, without any need to know at all. There is already too much complexity to deal with; no point in adding another decision-making to the loop, when you can't really make an informed decision. How do you know how severe a flaw in your OS is? Every flaw is severe, if you are connected to the Internet.

Anti-virus and firewall software let you update automatically. And users understand why they need to do so, see the importance of that need, and let them get on with their business. An OS update, on the other hand, means that you have to choose with trepidation, from a list of updates presented to you.

The update for the critical flaw that knocked Windowsupdate.com off the Internet was around for weeks before the attack occurred. Why did users choose not to update their Windows? How does lack of trust sound?

Trustworthy computing means things don't go wrong. It means that if things go wrong, your business won't be disrupted while things get fixed. It means that your data and your privacy are secure.

There is no trust. Things go wrong all the time. Patches that are intended to fix the things that go wrong, mess up things that weren't wrong in the first place. And few people actually believe that when Microsoft is scanning your computer, they are not going to read everything you want to keep hidden. They don't, but the impression is the only thing that counts. Security is all about trust. If the good guys don't build trust, the bad guys win. And the 'good' guys in this picture, have a long road ahead.

And while we wait, all we can do is cross our fingers and choose to update.

sumod_hajela@jasubhai.com

Sumod Hajela
Assistant Editor

> "Every flaw is severe, if you are connected to the Internet"

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SEPTEMBER 2003

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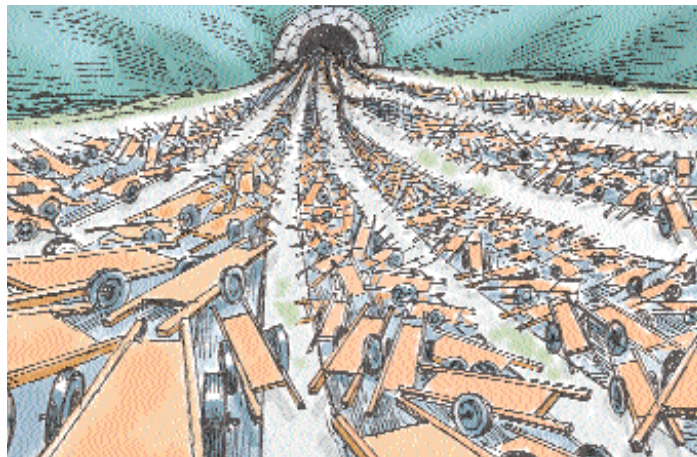
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Reviewed this month

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ON THE CD

digit interactive

KNOW YOUR CD

PLAYWARE\ARENA\EXTRAS

This section brings you a selection of new levels, upgrades, patches, add-ons, maps and other stuff to make your gaming experience better. This month we have patches for *Chaser, WarCraft III: The Frozen Throne* and *Humvee Assault.*

The *Chaser* patch upgrades the game to v1.47 and fixes problems pertaining to sound, anti-cheat and server memory allocation. The *WarCraft* patch fixes some map crashes while the *Humvee Assault* patch addresses problems such as random crashes and slow loading times.

MUST TRY SOFTWARE

The Hulk

In this 3D action fighter you fight a stream of soldiers in a gas station and

then face off a tank. The Hulk's various punches and shooting moves work in combination with directional movements and each other, so a controller works better than the keyboard.
Size: 166 MB
Playware\Arena\Games

PowerDVD 5

The PowerDVD trial version offers complete DVD playback, with a plethora of tweakable features just to suite your taste. It supports worlds leading standards for DVD playback on a PC. It supports Dolby Digital, Dolby Headphone, Dolby Pro Logic II, DTS and SRS TruSurround XT audio features.
Size: 6.5 MB
Mindware\Software\Multimedia

WindowBlinds

WindowBlinds is a desktop enhancement software. It changes the look of windows completely. After installing the program, you will have a fully skinnable user interface. You can change many things such as the style of the title bars, buttons, toolbars, etc. The current version uses a

Microsoft certified way of extending Windows XP to support additional 'visual styles'. Apart from cosmetic effects, it also adds skins on the title bars of windows, MP3 players etc. The software also provides customised control over the double-click, and the right-click actions on the title bar, and many other enhancements.
Size: 5.05 MB
Mindware\Software\Home

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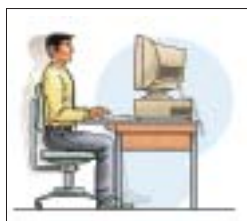
Danger Ahead

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

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

Yahoo! SiteBuilder 1.0.1
Size: 15.4 MB
Mindware

The Great Escape
Size: 240 MB
Playware

Expect these on the October 2003 CDs

WEB SPECIAL

Where there is a WLL, there is a way

It's starting off carrier wars all over the country, but can WLL-CDMA services possibly be the ones to get India connected?

index ■
■ colophon

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news feed

snapshot

35 million
Americans **download music** files
and about
26 million
share files online.

Source: Pew Internet and American Life Project

Unzippin stuck zips

Everybody's favourite compression format, the zip format, may soon be incompatible across different decompression tools. It all started with the introduction of the AES encryption feature in two of the popular zip tools—WinZip and PKZip. PKZip implemented AES encryption, but didn't disclose any details. Later on, when WinZip implemented it, the resulting encrypted archive turned out to be incompatible. However, by default, WinZip and PKZip use the same non-encrypted version that is compatible with the long-stable standard zip format, and should be usable by all. The encrypted archives though, will not be compatible across different tools, at least for now.

You will either have to avoid using the encryption feature or be sure that the recipients know which tool was used to zip and lock.

Arcade Ahoy!

Though not quite in the league of Electronic Entertainment Expo (E3), the Classic Gaming Expo 2003 that took place over the 9th and 10th August brought together over 1200 vintage gamers to Las Vegas. With the expo celebrating everything about the gaming industry's colourful past—from ancient coin-operated arcade games, to those built for the Apple II, Amiga, Atari 2600 and the Commodore 64—this was a celebration of the history as well as simplicity, charm, and appeal of yesteryear's games. The event also brought together video gaming legends including Activision designer Steve Cartwright and Rob Zydbel, both of whom worked on several Atari VCS game titles. The event's highlights included an exhibition that puts hundreds of ancient gaming devices and memorabilia on display, as well as the chance to play over 50 arcade games for free.

High Speed Wireless Multimedia

The Institute of Electrical and Electronics Engineers (IEEE) has put forth its new 802.15.3 standard for wireless personal area networks (WPAN) that allows data transfer rates up to 55 megabits per second, thus substantially increasing the 1 mbps speed. According to the IEEE, it allows up to 245 wireless devices to be connected within 300 feet.

The distance plays an important role in speed. For a distance of 300 ft, the transmission speed would be 22 mbps, while for a distance of 165 ft, the users will get the maximum speed of 55 mbps.

This standard has come up due to a demand for connecting multiple devices at low cost and running high-bandwidth applications. In order to minimise costs, the need of external components has been kept low and the required two chips fit within a compact Flash Card.

To phone a Thief

Thieves are now sure to have a tough time selling stolen mobile phones. Phonetrack, launched by Phonetrack Africa Ltd, inserts identification marks, such as the owner's photographs and alternate phone numbers into the mobile phones permanently. "Our facility configures the handset's motherboard, making it hard to erase the photo and the alternative phone numbers because doing this would mean destroying the phone," says Ernesta Jalipa, director of Phonetrack. The company is currently working on a software that would enable it to block the handset in case of theft, by using the phone's serial number. Re-activation of the hand set will be possible after recovery.

ILLUSTRATIONS: Mahesh Benkar

■ Microsoft to release Office 2003 on October 21, 2003 ■ Nokia to acquire Sega technology for multiplayer Internet-based gaming

Google's news for you

Google is now going beyond just giving you all the search results in the world. A new feature in Google News lets you monitor a topic and receive e-mail alerts just as news reports on that topic break out. Still under beta testing, the Google News Alerts tool provides you daily notifications or bulletins as the news is reported.

A number of Web-based services such as Yahoo! and MSN have begun showing a keen interest in the search engine business and are gearing up for the big fight with Google. Yahoo! has already attempted to even out the competition by providing customised news alerts too.

Stamp of Identity

Snail mail could soon be getting smarter, if recent research by the US Postal Service (USPS) is successfully implemented. According to its study, mail could be more efficiently tracked and delivered, if sender identification techniques are built into the postage systems of the future. The USPS is looking into creating personalised stamps that embed digital identification information. It claims that not only will this enhance tracking,

but also ensure overall security of the mail system. However, civil liberty activists are quick to point out that this violates the right to privacy and free speech as it denies you the option of sending mail anonymously.

OWN ONE?
Tell us more, and WIN!

Microsoft: Copycat Monopoly?

A federal jury in the US ordered Microsoft to pay a sum of US$ 520 million as damages to Chicago based Eolas (Embedded Objects Linked Across Systems) and the University of California. Eolas claimed that Microsoft used its system of placing small interactive content such as applets on Web pages with Internet Explorer that was bundled along with Windows. The University of California holds the patent to the system while Eolas owns the technology rights.

The final damages figure was calculated to be US$ 1.47 as royalty per unit for the 354 million copies of Windows, sold from November 1998 to September 2001. Microsoft said that the patent did not have any validity and that it would be filing an appeal against the verdict and the damages awarded.

redalert

Backdoor.Sdbot.P

Backdoor.Sdbot.P—a variant of Backdoor.Sdbot—is a backdoor Trojan Horse that affects all Windows systems. The infected system allows unauthorised remote access. The Trojan infects the %System%\Mscedit32.exe file, modifies certain registry values and takes control of the IRC client in the infected PC, using which it downloads and executes files to launch DOS attacks on a target defined by the creator.

Remove the Trojan by disabling system restore and reverse the changes made to the registry. Also update the virus definition. Visit *ttp://securityresponse.symantec.com/avcenter/venc/data/backdoor.sdbot.p.html* for further details.

W32.Sobig.F@mm

This is a mass mailing and network-aware worm that infects all Windows systems. It scans the host for files with extensions such as txt, wab, htm, etc., and sends a copy of itself to all the addresses it finds in these files. The worm uses its own SMTP engine to propagate and attempts to create a copy of itself on accessible network shares. It uses a fake sender address (*admin@internet.com*) when it propagates itself. Visit *http://securityresponse1.symantec.com/sarc/sarc.nsf/html/w32.sobig.f@mm.html* to download the removal tool.

statattack

Who cares?

College graduates	56%
Parents	58%
Ages 30-49	63%
Non - students	63%
Part - time students	72%
Ages 18-29	72%
Non - Parents	75%
Full - time students	80%

■ Downloaders who show the least concern for copyright infringement
Internet Population

Source: Pew Internet and American life project

Concentration of the top 500 supercomputers

- Middle-East 0.8 %
- Africa 0.6 %
- South America 0.6 %
- Australia 1.2 %
- South-East Asia 6.6 %
- Japan 8 %
- USA \ Canada 51.2 %
- Europe 30.8 %

Source: www.top500.org

Sony wades through gloomy waters

Sony PS2 sales dropped by almost 2 million as compared to last year. To remove the gloom, Sony is planning to provide a push for its next generation products—the PSP portable gaming console and the PSX home entertainment system. The PSP is Sony's answer to the Nintendo Game Boy Advance—the undisputed leader in the portable console gaming industry. The PSX is tipped to be an entertainment system integrated with a Playstation. Both appear to be quality products that could capture the market if appropriately priced.

SONY

INFOGRAPHICS: Sachin Dalvi

Microsoft under siege

Anew worm, let loose on the Internet last month, infected Windows 2000 and XP systems by exploiting a security flaw. According to Symantec, around 423,000 systems were affected. Named the Blaster worm, it contained code to launch a scheduled DDOS attack on the windowsupdate.com site on August 16th. The worm was programmed to attack *http://windowsupdate.com*, from where Microsoft had been redirecting users to *http://windowsupdate. microsoft.com*, which is the actual URL. Eventually, it overcame the attack by disabling the automatic re-direction. A removal tool is available at *http://securityresponse1.symantec.com/sarc/sarc.nsf/html/w32.blaster.worm.removal.tool.html.*

A variant of the Blaster worm—Nachi—uses the same security hole to enter the host to remove the Blaster worm file. It then downloads the patch automatically from the Micro-soft site and closes the security hole.

In another incident, a DOS attack on its premier site, Microsoft.com, caused it to be inaccessible for around two hours. Claiming that this was not an attack by the Blaster worm, the company officials said that they were investigating the occurrence together with the FBI.

snapshot

In **2003**, over **13 million smart phones** are expected to be sold—many of them powered by the **Symbian OS**

Source: IDC

Microsoft now atop your TV

Microsoft announced a tie-up with Time Warner Cable and Comcast Corp, which dominate the US cable TV market, to conduct field trials of its set-top box software. Time Warner will test TV Interactive Program Guide (IPG) software while Comcast will test Microsoft's TV Foundation Edition, along with IPG.

IPG enables users to find shows and customise viewing. On the other hand, the TV Foundation Edition allows operators to create channels that can be easily found and bought by the consumers, as well as broadcast a variety of other services and applications such as games, news and weather updates. Another software—Microsoft TV Advanced—enables the cable to be shared as an Internet connection, thus saving cost to the consumer.

Microsoft has also signed up with three companies in Mexico, which have already begun sending out set-top boxes with Interactive Program Guide (IPG), Foundation Edition software and Microsoft TV Advanced.

Mexican rice-chips

Microchips that provide information ranging from identification to health records are now being sold in Mexico. The chip, dubbed as VeriChip, is the size of a rice grain and can be implanted painlessly in the arm or hip, using a syringe-like device. Health officials and security guards can read data stored on the chip using a scanning device. The chip costs $150 and has an annual fee of $50. The scanning device has a price tag of $1,200. Currently, the chip can be tracked from a distance of 5 miles. But its developers, Applied Digital Solutions Inc, have announced plans to produce a chip that could be tracked using satellites. This would also help tracking down kidnapped people and missing individuals. This technology is already used in US for tracking pets.
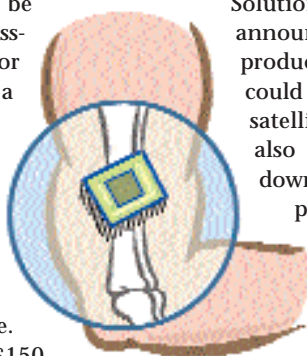
SCO Updated

Santa Cruz Operation(SCO) has announced a license scheme to legalize their copy of Linux, according to which, all end-users using Linux kernel 2.4, or later, need to get the SCO Intellectual Property License. The prices vary from $699 to run Linux on a single CPU server, to $199 for a desktop PC. Incidentally, $7.3 million of its revenues in the third quarter of this year came from its SCO source licensing division.

In a related development, Aduva Inc has come up with OnStage that removes any code violating the SCO license and downloads alternate code automatically.

■ Debian Linux-one of the largest volunteer distributions of Linux-turns 10 ■ Sony unveils a new 8-megapixel digital camera targeted at professionals.

HAM to the rescue

The recent power outage crisis that swept across the eastern United States also put the high-tech communication links used by emergency services in a quandary. It was up to the HAM radio enthusiasts to keep the police services, fire fighters, Red Cross officials and other workers connected in what is now defined as the US's most extensive power outage since 1977. With battery backups and no need for servers and cell phone towers, American Radio Relay League (ARRL) volunteers were in contact with the Red Cross and the Office of Emergency Management, within five minutes of the power going down. The volunteers, for instance, connected one hospital to its ambulance fleet as it went out of power. Officials estimate that between 800-1000 ARRL volunteers were handling communications on the 15th and 16th of last month, till power was restored.

Wi-Fi traffic jam

Researchers at the Centre Nationale de la Recherche Scientifique (CNRS), Paris, claim to have found a critical flaw in wireless LAN technology used for Internet hotspots that could cause a slow user accessing the network to slow down everyone connected to the same access point. The problem lies with the CSMA/CA (Carrier Sense Multiple Access/Collision Avoidance) access protocol that is supposed to grant equal access to the hot spot by all connected devices. This means that users capable of higher speed will get only as much bandwidth as the slowest user.

This will not be apparent to most Web surfers though. The speed bottleneck whilst accessing the Internet through wireless LAN is usually not due to the LAN, but the actual Internet connectivity supporting the LAN. Considering this, the 1 MB limitation shouldn't be too restrictive. But users accessing large files within the LAN will definitely feel the pinch.

Txt-a-flop

Ignoring the the fact that the current multi-million dollar movie lack originality or just fail to impress, industry pundits have a new explanation for the nose-diving ticket sales. And if you would believe the movie makers, the blame is being placed on teenagers, who send their friends text messages via cell phone with their verdict on the movie. These messages spread at an alarming pace causing higher rates of average audience drop-off—the number of less viewers in the subsequent week.

Five years ago, the average drop-off between the opening weekend and the next weekend was 40 per cent. Movie makers point out that this summer's average is 51 per cent and drop-off effects are visible on the second day after opening. A good example is *Terminator 3: Rise of the Machines* that witnessed a 56 per cent drop over the first week itself.

Peace, brother

Seagate has tied up with the National Insurance Company (NIC) in India for 'Peace of Mind'—an insurance policy for new PCs with a Seagate hard disk that will cover a wide range of computer components, regardless of the brand.

However, it does not cover the PC's plastic casing, mouse, keyboard and any other external peripherals.

Lately, resellers and customers have been complaining about the higher failure rate of Seagate drives and 'Peace of Mind' seems to be a part of its effort to clean up its act.

Under this three-year insurance policy, consumers will be reimbursed for repair or replacement of parts, regardless of whether the PC is branded or assembled. Currently, VMS India Ltd has been appointed as the one point contact for registering the policy as well as claim related queries.

■ The safety monitoring system of USA's David-Besse nuclear power plant was disabled for over five hours due to the Slammer worm attack

More gadgets, more bins

The US government has made it mandatory for all air travellers to get gadgets such as laptops, cell phones, radios, pagers, music players, digital camera, etc, checked at the security. Travellers will have to place them in separate checkpoint security bins to be scanned with an X-ray.

Post 9/11, The Transportation Security Administration (TSA) started ordering travellers to place their laptops in these bins. However, ever since reports claiming that Al-Qaeda could use common electronic items carried by air travellers to hide weapons, every gadget is being checked.

Experts advice travellers to sync their devices and take backups, in case the gadgets get damaged.

OWN ONE?
Tell us more, and WIN!

snapshot

Nokia is tipped to capture more than **40 per cent** of the cell phone market in **2004** and should sell more than **203 million** units **worldwide**.

Source: Strategy Analytics

Club Nintendo

Nintendo, the popular Japanese video game maker has announced a new customer loyalty program called 'Club Nintendo'. The scheme has been compared to a frequent flyers programs. Sign up for the program and you will be awarded points every time you make a Nintendo software purchase. You can exchange these points for free gifts such as a limited edition control for the Game-Cube, which will not be commercially available. The company's president, Mr. Satoru Iwata, is hopeful that the new program will help boost sales by increasing customer loyalty and improving brand value. Club Nintendo will be launched in Japan and the United States by the end of the year and hopes to have 3,00,000 to 5,00,000 users sign up for the program within the first year itself.

Nintendo will also return to selling simpler software for a larger audience of customers rather than constantly increasing the complexity of its games.

A Hundred-product launch

HP has decided to launch more than 100 products in anticipation of a competitive holiday shopping season that would begin shortly. The product launch covers the traditional strong points of the company such as imaging products and home computing products.

A noteworthy product is the HP Photosmart 7960 Photo Printer—a top-of-the-line industry level printer for quality photo printing; The HP Scanjet 4600 'See-Thru' scanner that was launched is characterised by a radical ultra-thin vertical design for use in cramped conditions. The HP Photosmart Mobile camera allows you to create, edit and transfer images on the go. Another product launch of interest was the DVD Movie Writer dc3000 that allows you to transfer video from tape onto a disk easily, using the analog video capture facility.

tomorrow'stechnology

Analyse me

Cognitive computing looks at developing machines that accurately assess user intent, and learn from previous interactions. Researchers at the Sandia National Laboratories, USA, are working on developing a computer along with a software that could eventually think like a person. Earlier systems tend to work within logical processes, something that we humans don't always do. Later, the focus shifted to machines that could be considered as synthetic humans—those that looked at the more logical cognitive patterns as well as organic factors. Cognitive psychologist, Chris Forsythe, and his team then moved to looking at integrating robotics with models of human cognition, and realised that the model could be used to create intelligent machines. Currently, the Sandia team is looking at 'extraordinarily perceptive techniques' with cognitive systems to aid analysts and critical decision makers in jobs that involve interpreting meaningful patterns based on large data volumes derived from diverse sources.

■ Microsoft releases warnings of critical Internet Explorer, MDAC flaws ■ Dell cuts prices of notebooks, desktops, servers and peripherals as well

DVD disparity

Hello sir,

Thank you for the most useless thing I ever got. Not a single person I know has a DVD-ROM drive. Can you imagine the frustration? None the less, it was good thinking to give us poor readers such valuable programs and OS's that we cannot use!

Naved
Via e-mail

Hi Digit,

I have been reading Digit for a number of years, and compliment you for the excellent coverage. So, at first glance, I was very happy to see Linux software with your Aug 03 issue, but was disappointed and disheartened to find that these are on DVD, and not a CD. I am sure you know that most of us have CD-ROMs! Hence, you have disappointed us. Please carry the Linux distributions on future CDs.

Colonel JK Maindiratta
Via e-mail

Dear Sir,

What made you think that the majority of your readers have DVD drives?

Gopal Goswami
Via e-mail

ILLUSTRATIONS: Mahesh Benkar

Sumod,

Thanks for the Linux DVD. We hope that Digit will maintain its trendsetting ways by moving away from CDs, and bundling only DVDs with every issue. You are also helping the environment by bundling 4.7 GB worth of software on one disk, instead of many. I liked Vipul Shah's column on spam, and look forward to more. Also, please devote an article to GPRS, and tell us more about the handsets and services available.

Meeta P Doshi
Via e-mail
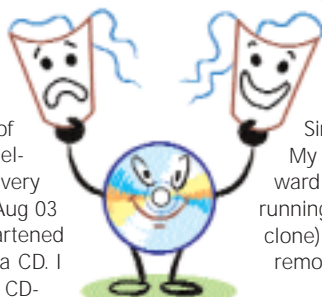
Sir,

My congratulations to you on the wonderful DVD, I was looking forward to the Linux issue for many months. I've installed Red Hat, and it's running perfectly. This e-mail is sent using Ximian Evolution (an Outlook clone) that I got from your DVD. You should have covered installing and removing applications a little more. Also, many applications that you gave in the software section of the DVD were already in the distributions—Evolution, for example. You could have used that space to give us some more goodies!

Hari Krishna P
Via e-mail

Hi,

I am a subscriber of Digit and a true fan. Keep it up! Please review DVD-Writers, as I am sure many of us are eagerly awaiting that.

Sarfaraz Khan
Via e-mail

digit
No, all our readers don't have DVD drives. Just as all our readers didn't have CD-ROM drives when this magazine was launched. We cannot do justice to the potential and diversity of Linux, by bundling a CD or two. For those of us who can remember the 40+ floppies required to install any significant software 10 years ago, this is a familiar situation. With DVD drives priced competitively, the time is ripe for a switch, and given the volume of e-mail we received, we sure seemed to have stirred up a lot of discussion on this issue. While we do not have any plans to replace the regular two free CDs with a DVD any time soon, we do look forward to when we can.

Linux know-how

Hi Digit,

Your DVD rockz... Red Hat and Mandrake in one DVD plus other distributions.

I just wanted to let readers know that it is possible to install some ISOs, without actually burning them to a CD. With Red Hat it's simple, just extract the 'dosutils' directory from the first ISO, and run autoboot.bat, or loadlin with params, in DOS. With Mandrake, you need to extract the whole ISO, create a bootable floppy with hd.img using rawwrite, boot from the floppy and point to the partition where you've extracted the ISO. With Peanut, I think you can use the ram.bat (I haven't tried this). You can use Winiso, or any similar utility to extract ISOs. This should be good for people with DVD drives, and large hard disks.

Rajesh Goli
Via e-mail

digit
Thanks for the pointer Rajesh. Though this method involves the dreaded 'command line', it does indeed eliminate the need to write CDs. We have a complete step-by-step workshop for doing this on *www.thinkdigit.com* for those of our readers who feel comfortable with a text mode Linux install process.

digit READERPOLLS

Your vote counts

Q. Your reason for not trying out Linux yet…

Don't know why I should try — 21.4%

Too hard to install/use — 30.5%

Linux rules my desk — 21.6%

My favourite application missing — 26.5%

Response: 1,940

This month's question:

Question: What is the your primary means of Internet access?

- Dial-up
- Broadband
- Mobile phone

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

Points to ponder...

Dear Sumod,

I have three points to make:

1. Set aside economics for a moment, and there's just one reason why the general user prefers Windows over Linux—'familiarity'. While we might consider having Linux as the 'second' OS, a central shift to Linux is unlikely anytime soon.

I suggest you have a column dedicated to it in Digit. After all, in real life, as in technology, familiarity is pretty much everything when it comes to mass acceptance and usage.

2. You've given imaging tips on Paint Shop Pro, Illustrator and Photoshop, but missed out on Ulead PhotoImpact 8, which, in my opinion, far exceeds the capabilities of Paint Shop Pro, and even gives Photoshop a run for its money. This software has never been featured, even in past reviews. You even included a PhotoImpact demo, in a recent issue, but ignored its potential—I say this as a long-term PhotoImpact user with a legal and registered license.

3. The August issue of Digit was being sold by 'agents' at CST station, Mumbai, on August 1 itself, and that too for only 50 bucks. As a subscriber, I got the same issue late the next day, and I think I pay a little more than that. Amusing, but true!

Natraj Jayaraman
Via e-mail

Dear Natraj,
We agree with your observation on Linux usage, and we do accordingly have a regular workshop showing how to perform everyday tasks in Linux, called Linux Works.

As for the Rs. 50 early edition at Mumbai CST station, the source is quite obvious. Mumbai CST is where we load our copies for distribution around the country every month. During this loading process, some bundles inevitably 'fall off' the trains, with some helping hands of course. These 'fallen' copies are the ones you see peddled at CST the day before you, and most of our country, get to see them. Just another fact of life that our distribution team has learned the hard way.

Suse Distro

Dear Sumod,

I am a subscriber of Digit, and await the arrival of your magazine eagerly every month. When I read the July issue, I was pretty excited to read about the August 2003 Linux DVD special. Unfortunately, I felt let down by the contents of the DVD. Though you did distribute popular Linux distros, including RedHat and Mandrake, I was shocked to see that you didn't include SuSE. This, after you adjudged SuSE to be the best Linux distribution in an earlier edition.

Vicky Jambhore
Via e-mail

Dear Vicky,
The reason why we have not been able to carry SuSE, despite our wish to do so, underlines the shift in the Linux marketplace to profiting from distribution. Until a couple of years ago, you could freely download and distribute any Linux distribution, and would only have to pay for it if you wanted support. Now, vendors are expecting to make money from the sale of copies of their distribution, much like any other paid software. SuSE and some other vendors declined to share their distribution for free on these grounds. If you want SuSE distributions, you will have to pay for them.

Graphics Drivers on CD

Hi Digit,

I may not be the first one to notice it, but you manage to include the same old versions of Windows Media Player, DirectX, Winzip, Acrobat Reader, etc., in the essentials section of the Mindware CD every month. I think you should do the same with your Playware CD by creating a section that will include the latest Detonator, Catalyst, audio, or video drivers. With nVidia promising a 30 per cent performance increase with the latest drivers, consider this as a gamer's plea for more FPS.

Saurabh Majumdar
Via e-mail

Hi Saurabh,
That's a great suggestion! However, there is little point in carrying these drivers every month. We will ensure that our readers have access to such critical drivers, as well as motherboard drivers from Via and Intel, as and when they are updated.

Goof Ups

■ Kaushal Pai has pointed out that 'Learn how to Install and uninstall Linux the easy way', should have pointed to page 92, instead of page 62, as said on the index page.

■ An unfortunate design error caused the capacity and spindle speed values on the hard disk tables to shift down, on pages 60 and 61.

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

A closer look at some of today's mobile power sources and a peek at what's just around the corner

So here you are, the snazzy bigshot—PDA in one hand, laptop in anoher, when all of a sudden, the battery dies. Blank, black screens both,—who you gonna call? Owners of such gadgets find themselves becoming less mobile than ever, and are always on the lookout for some place to plug-in and charge up.

The kind of battery that is required to run these devices all day, whilst utilising all their features, can only be found under the bonnet of a car. Unless we're willing to lug a monster of a battery around for our mobile devices, we're in desperate need of better power solutions.

Power storage technologies have advanced quickly over the last few years. But these advances have been outpaced by the requirements of newer, more feature-packed portable devices. All batteries used today rely on chemical reactions to produce current. The only difference is the chemicals used, and their construction. Engineers constantly struggle to extract the most out of batteries—tirelessly trying new materials and constructions to squeeze out maximum performance.

Batteries can be classified as primary or secondary cells—secondary cells can be recharged, whilst primary cells cannot. Most power hungry portable devices run on secondary cells.

The ideal battery should offer very high energy densities, have a long service life, and be really light and tiny. Good batteries today, have only some of these qualities. Hence we always settle for a compromise, with the choice of battery being determined by the device it is made for. A mobile phone would need a tiny battery, whereas a UPS system would need the maximum possible power, with less stress laid on its weight.

The most common battery types are:

Lead acid: The lead acid battery has been around for more than a hundred years. These are bulky, and only suitable for applications where weight is not a factor—car batteries are the best example. This type of battery is capable of delivering high power useful for starting your car, but it has a relatively low energy density and high self-discharge. This is why your car doesn't start after your long vacation. Lead acid is the most economical battery for larger power applications, and is the preferred choice for hospital equipment, wheelchairs, emergency lighting and UPS systems.

Nickel cadmium (NiCd): NiCd batteries have been around since the 1950s. They have matured over time, and continue to deliver good performance for situations where long service life is most important. These batteries perform well past a thousand cycles, but require proper maintenance to do so. The problem with NiCd batteries is their low energy density and the memory effect. NiCds also remain popular because they are cheap, but contain toxic chemicals that

ILLUSTRATION: Parag Joshi
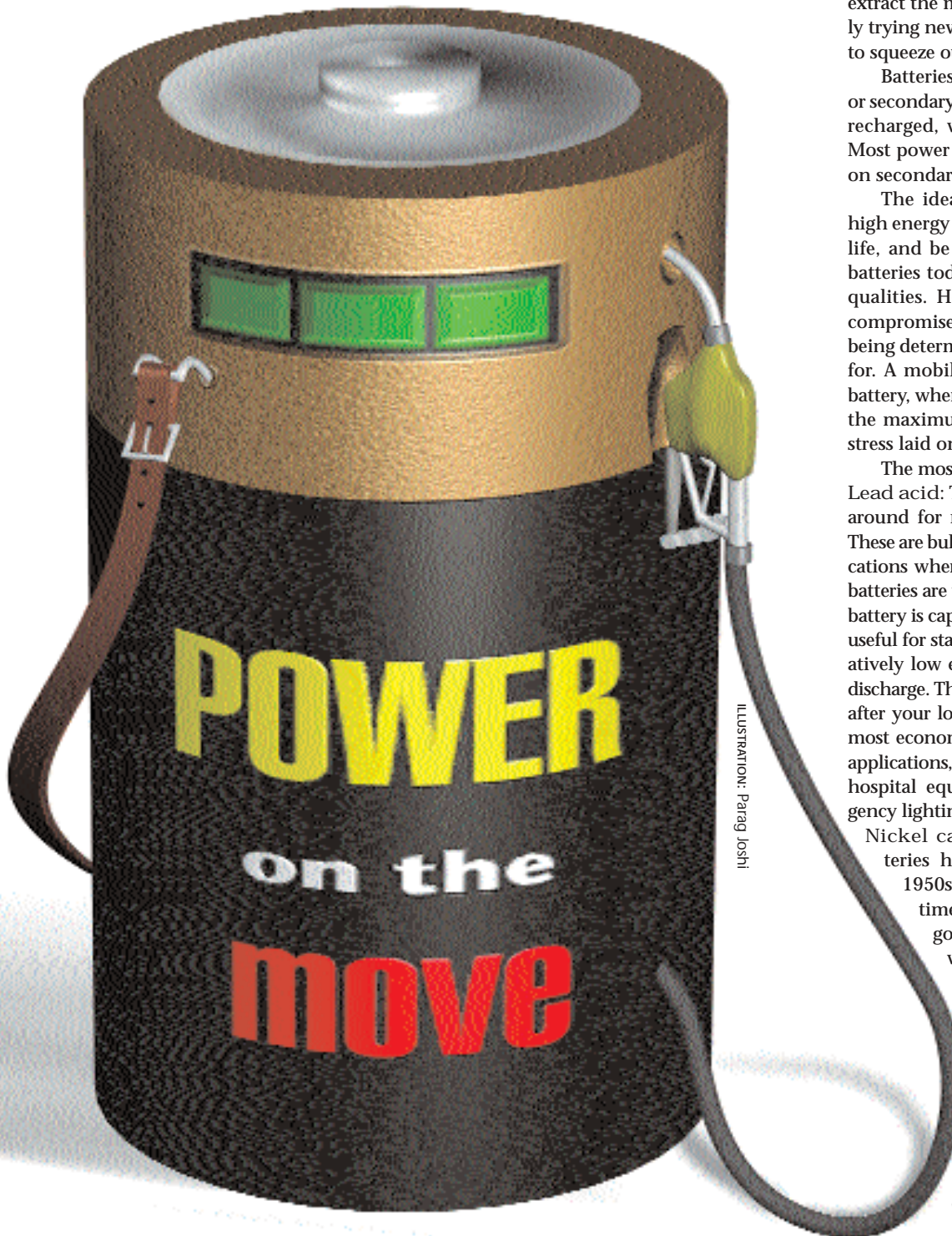
Handspring's new Treo 600 is the sign of things to come. It's a full PDA with a high-speed processor, integrated cell phone, colour display and a digital camera

are harmful for the environment.

Nickel-metal hydride (NiMH): The main advantage of NiMH over NiCd is the increased energy density, giving up to 30 per cent more power from the same size. They also do not suffer the same extent of memory effect as NiCd cells, but have a lower cycle life. They are preferred for cell phones and laptops due to their increased energy density and the absence of harmful toxic metals.

Lithium ion (Li-ion): Today's star performer, the Li-ion cell is fast replacing other technologies, especially as its cost price continues to fall. Lithium's light weight and excellent electro-chemical potential lets Li-ion batteries provide high voltage and excellent capacities with reduced weight. This is crucial for cell phones, where the battery makes up most of the weight of the device. Current Li-ion technology provides twice the energy densities of NiCd cells. Li-ion batteries are also the easiest to maintain, since they have no memory-effect problem and the self-discharge is much less than other chemistries. Li-ion is not without its drawbacks though. Li-ion batteries do not last very long—typically a year or two before performance starts to rapidly deteriorate. And this happens even if the battery is not in use. Another drawback is that the pack must have a protection circuit to regulate voltage during charge and use. They feature in higher-end cell phones, laptops, digital cameras and other expensive electronics.

Lithium ion polymer (Li-polymer): Li-polymer is a derivative of the standard Li-ion with huge potential. The difference here is the type of electrolyte used—a solid polymer electrolyte with a little electrolyte gel added to increase ion conductivity. This

means the battery is safer and more stable than the standard Li-ion ones, and more importantly, smaller. They can be flexible and incorporated into the device's protective casing, or even into your clothing, measuring as little as 1 mm in thickness.

Li-polymer batteries perform about as well as standard Li-ion batteries, with nearly the same capacities and no real cost advantage. The packaging and size are the promises that have led mobile phone manufacturers to adopt this technology—the packaging can be made of foil, like food wraps. In the future though, capacities should increase, as techniques to eliminate the gel electrolyte and maintain safe operating temperatures are being researched.

Fill 'er up
By far the most promising future power source for mobile devices is the fuel cell. Combustion engines use the pressure generated by igniting the fuel and convert it into mechanical energy, to move your car. Fuel cells do not burn fuel like a combustion engine. They convert hydrogen and oxygen into water, producing electricity and heat as a by-product. The process is silent, clean, and uses fuel very efficiently. The cells will continue to produce power, as long as hydrogen and oxygen are supplied.

How do they work?
Like batteries, fuel cells generate electricity through a chemical reaction. Hydrogen enters the cell at the anode where a chemical reaction separates the electrons. The positively charged hydrogen atoms travel through the electrolyte to the cathode. The electrons are carried through a wire to the

load (the device using the power), and back to the cathode to complete the circuit. Oxygen enters the cell through the cathode, and reacts with the positively charged hydrogen atoms and the electrons from the electrical circuit to form water. This water is drained from the cell. Some fuel cell designs incorporate extra equipment to extract hydrogen from commonly available fuels such as natural gas and methanol, for added convenience. These systems are far less polluting than the internal combustion engine.

The types of fuel cell differ basically in the type of electrolyte used. Each type has its own unique characteristics. For example, the efficient, high powered alkali fuel cells, which generated power for the Apollo spacecraft, used a solution of potassium hydroxide as an electrolyte. But these run at temperatures close to 200 degrees celsius, and risk electrolyte leakage.

Proton Exchange Membrane (PEM) cells use a thin permeable membrane of polymer as the electrolyte. The technology was invented by General Electric in the 1960s. They are less efficient than alkali cells but work at much more reasonable temperatures, making them more suited to consumer applications.

Micro Fuel Cells (MFC) will be used in most portable devices of the future, and the first prototypes generated 10 milliwatts of power. The US Department of Defence has funded the research through the Defence Advance Research Projects Agency (DARPA), to feed the mission critical devices of tomorrow's soldier. These troops will be carrying around a lot of fancy power-hungry gizmos that are currently

⚒ Maintenance

Nickle-based batteries: Nickel based batteries (NiCd or NiMh) suffer from memory-effect build-up which reduces the performance of the battery. This memory effect has been greatly reduced with newer technologies, but still remains an issue. This is caused due to excessive charging, or repeated charging without discharge. To avoid the problem, do not leave batteries in the charger for more than a few hours after the charger indicates full charge. Also, periodically discharge the batteries completely. If you do this at regular intervals, the usage patterns between discharges become less important. Using higher quality chargers also improves the service life of your battery.
Lithium-based batteries: Lithium batteries

do not suffer from memory-effect like NiCd and NiMh batteries do. In fact, they last better if they are not fully discharged every time they are used. Some engineers claim that batteries with the ability to indicate the level of charge do suffer from 'digital memory'—a term used to refer to the inaccurate indication of the level of charge. This indication becomes increasingly inaccurate over time. To resolve this you can perform a full discharge about once a month to recalibrate this indicator. Lithium batteries degrade when exposed to heat, so avoid exposure to heat and operate the batteries in a cooler environment whenever possible. Do not buy spare batteries if you don't plan to use them for a while.

ELECTRIC CIRCUIT
(40 % - 60 % Efficiency)

Fuel H2 (hydrogen)
O2 (oxygen) from air
Heat (85°C) Water or air cooled
Used fuel re circulates
Air + water vapour
Flow field plate
Gas diffusion electrode (anode)
Catalyst
Flow field plate
Gas diffusion electrode (cathode)
Catalyst
Proton exchange membrane

being tested with relatively heavy Li-ion packs which last up to 8 hours. MFCs could drastically reduce the weight carried, and give much longer run times with the added benefit of almost instant recharging.

Japan's NEC recently unveiled a laptop running on a methanol fuel cell instead of a standard battery. The device runs for about 5 hours in continuous operation, and is expected to rise to as much as 40 hours in 2 years time. Even when the cell does run down, it will only take a quick refill of fuel to get you up and running, instead of the long recharges associated with typical batteries. NEC's Japanese rival Toshiba has also announced a similar fuel cell powered laptop. Keep an eye out for both in 2004.

A company called Smart Fuel Cell has also developed a usable micro fuel cell for laptops and expects to produce 100,000 units by 2004. The prototype holds 120 ml of methanol and generates about 150 Wh—enough to power a 15 W notebook computer for 10 hours. Recharging simply means changing the cartrige.

NTT DoCoMo, who provide third generation (3G) mobile services in Japan, also have plans to commercialise fuel cell powered 3G phones, as early as 2004. With large colour screens, high-speed Internet access and video conferencing, current 3G

phones are plagued by low battery life. It is hoped that the new phone will at least match the battery life provided by their current 2G models. Users can carry around a cigarette lighter type container, that will recharge the phone's fuel cell.

Fuel cells unfortunately may be cumbersome to deal with, just like non-reusable batteries. Consumers don't like the idea of having to go out and buy replacement fuel packs. Smart Fuel Cell's laptop cell comes with tamper-proof methanol cartridges that snap into the device. But, this raises the issue of recurring cost to the user, where he has to go out and buy fuel. Methanol cartridges should cost about $5 (Rs 230). The only other alternative is to feed in fuel manualy, which isn't a tempting prospect either.

Availability of the right fuel will be another issue for initial adopters. It will probably be a while before you can go to a convenience store and ask for a refill can of methanol or hydrogen. The solution to this problem does not lie in making hydrogen widely available, but rather, in making fuel cells that use readily available fuel—beer, for example, or for that matter almost any type of alcohol served locally. Researchers at St Louis University have carried out development on a technology called the Biofuel cell. A Biofuel cell uses

enzymes to catalyse the reaction. This means you could theoretically take any type of alcohol and pour it into your device—and it would be cheap too. One of the researchers claims that once the system is fully optimised, one to three drops of alcohol could power your cell phone for a month. Fuel cells also require air (for the oxygen) and do emit minute amounts of carbon dioxide and water vapour. A micro fuel cell maker claims that the quanities of water vapour emitted are similar to the amount you have on your palm right now and should not be of concern.

One way or another, there is no stopping fuel cells. US President George Bush has asked congress for $1.2 billion to fund

Motorola's Freecharge. Charge on the go!

research into hydrogen fuel cells. Most of this research will look into larger applications such as replacing petrol engines in cars. Private companies are falling over themselves to develop fuel cells for portable devices as these would command a high premium in the relatively affluent mobile phone and laptop markets.

What else can be done?

One age-old solution to the failing battery is the solar panel idea. For years, calculators have had dual power sources—button batteries and a solar panel. The concept actually works very well for such low power devices, but today's high tech cell phones and laptops require a really large surface filled with solar cells to generate enough power to run them, defeating the idea of miniaturisation. A new type of solar cell tackles that problem. It is inexpensive and flexible, so that you can integrate it into your clothes which occupy a huge surface area. Scientists from the University of California at Berkeley have made a hybrid nanorod-polymer solar cell which is about one-thousandth as wide as a human hair. The cells could be spin-cast onto almost any material, including fabric, as they are plastic-based, but deliver only 2 per cent efficiency—as compared to 30 per cent by today's cutting edge solar cells. The nanorod-polymer cells can't power your devices but they can provide an auxiliary power source to charge batteries slowly.

Another way to make batteries better is to simply make them charge faster. American battery maker Rayovac has developed a method to fully charge NiMH batteries in just 15 minutes—and getting to 90 per cent of full charge in just 10 minutes. This is achieved by adding battery monitoring, called 'in-cell charge control,' which monitors the state of the chemical reaction during charging. The batteries will also give better performance than standard ones. They will have a capacity of 2,000 maH compared to the normal 1,600 maH for AA cells. While fast charging is definitely a plus, it's totally useless if you simply have no place at all to plug in.

Motorola addresses just that with its hand-cranked charger for cell phones. Known as FreeCharge, it retails for $50 (Rs 2,350) and is based on technology from a company called FreePlay. A handle drives a generator, which charges its own NiMH battery, which in turn charges your phone. The internal battery takes 35 minutes of winding to charge fully. Thankfully, you can wind for only as long as you want, not the full 35 minutes. The company reckons you can get 4 to 6 minutes of talk time out of a 45 second work out.

A bizarre idea thought up by an engineer at Compaq uses human power, but no extra effort. The idea is to use your keystrokes to provide recharging power for devices such as laptops. This could either reduce the size of battery required, or lengthen the device's running time. The design fits tiny magnets and wire coils onto keys. Each keystroke generates a small current that gets stored in a capacitor. The battery is slowly recharged from there According to the inventor, this could potentially extend the battery life of a laptop to 10 hours—albeit after a lot of typing. The magnets do add weight, but this weight is small enough to be offset by lighter displays and other components.

The prospects of certain future technologies reaching the market depend heavily on power storage technologies for them being co-developed. A flexible screen, based on electronic ink, will require a power source comparable to itself. An Israeli company called Power Paper has developed a battery that is paper-thin. The anode and cathode are literally inks that are printed onto paper or other flexible materials. Unlike conventional cells, the power paper design requires no metal casing. The cell will provide 1.5 volts and is 0.5mm thick. Smart cards, disposable cell phones, intelligent clothing and even medical devices are possible applications of the technology.

Making devices faster and increasing functionality is what manufacturers stress on. But some are taking notice of the limitations of current battery technology, and are trying to counteract with devices that are smarter. Intel's Centrino, for example, is optimised for limted power consumption. Optimisation of power usage is the simplest way to increase battery time. As batteries continue to advance and workable fuel cells are made, your portable devices will become truly portable, freeing us from the worry of that dreaded battery dying. d

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■ ■ SEPTEMBER 2003

SD-AV30 SD A/V ▶▶
One-stop digital solution

The SV-AV30 is a 4-in-1 that allows you to take your world of audio and video with you. You can record up to 90 minutes of smooth motion video in the MPEG4 format, at a resolution of 320 x 240. It holds up to 3 hours of MP3 or AAC-compressed audio files, and can be used to take photographs in the JPEG format.

Tempting
Toys

Powered by cutting-edge tech wizardry, here are a few toys to lust after

Nokia Fun Camera ▼
Click away in style ▼

The Fun Camera is compatible with Nokia MMS phones, via a Pop Port connection. It also has a built-in 1.5 m flash, and comes with 8 MB of internal memory. The images can be taken at three different resolutions—with a maximum resolution of 640 x 480.

▲ **Hitachi G1000**
SMS delight

The Hitachi G1000 uses the Pocket PC 2002 OS and has a 400 MHz processor with 32 MB of RAM. It has a rotating camera which can be used to take pictures at a resolution of 640 X 480 pixels. It also has a full text QWERTY-style keyboard.
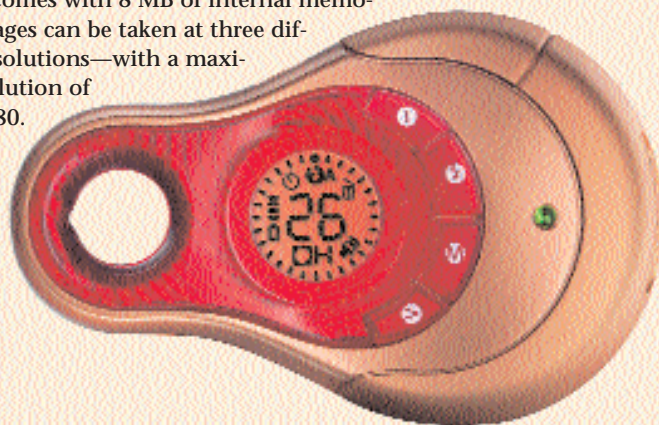
GU87 Mobile Photo Phone ▶▶
Cellular dream come true

GU87 has a TFT colour display supporting 65,536 colours. The device also supports 16 polyphonic ring tones. The design is sophisticated and the clamshell is sleek.

◀◀ Sony CLIÉ PEG-UX50
The CLIÉ factor

The CLIÉ PEG-UX50 handheld uses the Palm OS and supports all Palm software. The screen flips and rotates up to 180 degrees for easy viewing and working. The CLIÉ supports Bluetooth devices and uses the Sony handheld engine.

▼ I-Trigue 3450
▼ Speaking of perfection

The stylish I-Trigue speakers support bi-amplification and lateral firing transducers for top notch audio quality. The speaker system has two Titanium micro drivers. It outputs 9 W RMS per channel, with an inspiring 30 W RMS subwoofer!

How we Test

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

To ensure that our readers have all the information they need to make an informed buying decision, reviewers at the Digit Test Centre conduct comprehensive tests to evaluate the latest hardware, software and technology services in accordance with international standard evaluation processes and methodologies.

Our test results may be presented either as Comparison Tests, or as individual reviews in the Bazaar section. The representation of the results is different for each in the interests of clarity, but the test process for both is identical in all respects.

Of all the products we test, only the best make it to the A-List.

Comparison Tests

In the comparison tests, we compare the performance of products within a particular category. Each product is evaluated under different parameters such as performance, value for money, features, ergonomics, etc.

Weightages are then applied to the various test parameters according to their importance for that particular category of products. These weightages are then used to arrive at scores for features, ergonomics and performance for each individual product. A detailed test process is included with each comparison test, and explains the parameters that were taken into consideration, along with weightage allocation and reasons for the same.

In Bazaar

The evaluation of products in Bazaar also covers the same parameters such as performance, ease of use, value for money, build quality and features of the product.

Here, each of these parameters is rated on a scale of 5, which is represented by arrows (->).

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

The Awards

Digit awards outstanding products by selecting a Best Performance and Best Value winner in each comparison test. The winner of the Best Performance Award will be the product that scored the highest in the performance segment combined with rest of the package including features, ergonomics, bundled accessories etc. This award represents the best performing product in our tests in terms of the complete package that is offered to a customer. The winner of the Best Value Award will be the product that scores the highest in our value for money parameter which is derived taking into account the ratio of a product's ergonomics, performance and features to its price. The product winning this award offers a good combination of performance and features at a great price. Since value for money takes into account all scores for all parameters including the price, this score will be used to arrive at a grade (e.g. A+) for each product.

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

f=6.4-19.2mm 1:3.8 ø37

Hocus
Focus

31 cameras are all it takes for a perfect picture of the digital camera scenario in India

The traditional film-based Single Lens Reflex (SLR) camera has always enjoyed an upper hand over digital cameras. Be it an amateur or a seasoned professional, the learning curve always starts with an SLR camera, rather than a digital one. Quite obviously, the reason behind this is the price. But then why are the manufacturers still raving and ranting about the megapixel digital camera when the world seems to be happy, clicking away with the trusty, albeit bulkier, old SLRs. So is the world really ready to chuck them and adopt their digital conterparts?

The prime advantage of a digital camera (or a digicam, as it is popularly known), is the manner and efficiency in which it lets you get classy photos. You don't need to load blocky film rolls into dull dark compartments, dole out cash to have them developed, and some more cash to get them printed. All you have to do is focus, click and then transfer the images onto a PC, or get them printed right away! Furthermore, since the images are in the digital format, you can make copies of them as per your convenience, or send and share them across the world without spending a broken penny. It has to be granted that SLR cameras provide unmatched image quality that cannot be surpassed by electronic sensors, but with the recent advancements in CCD sensor technology and image processing algorithms, digicams are on their way to wiping out any differences in that aspect of photography. Already, high-end professional digicams offer image quality that is on par with their film-based counterparts.

And the weather isn't much different in the low-end and mid-range digicam country either. Though they aren't as abundant in advanced features, as their city cousins, the professional digicams, they still manage to cramp in an assortment of some of the best features boasted by the latter. But are they selling? Well, in the last couple of years, the acceptance of digital cameras has increased tremendously. Currently the digicam market is growing at a rate of 75 per cent per year—an evident enough testimony to the fact the popularity of these pocket rockets is growing, and that even seasoned professionals are slowly, but surely, going digital. And like the trend of every technology shows, such demand only means (or so we hope), that the prices will drop further, making it quite possible that we'll consider buying a digicam as often as we think of upgrading our PC configuration.

The Indian market seems to be gearing for such a scenario, with ample choice of models for every budget and function-oriented enthusiast. We tested 32 cameras, divided into the categories of Toycams, Mid-range and Low-end cameras. And to stress our point, we, also, consulted a leading professional in the stream of photo-journalism who shoots using only digicams.

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If you've heard that the prices of digital cameras are falling, you've heard correctly. Not only are they cheaper than ever before, manufacturers are also bringing out models that are so basic that they can hardly be called low-end. Instead, we chose to call them toy cam(era)s. Toy cams are basic, no-frills performers that strive to provide decent picture quality and features at the lowest possible price—most of them can be used as Web cameras as well. These cameras are meant for users who just want to take pictures and transfer them on to their PCs, and cost less than Rs 15,000.

Another breed of cameras are the pseudo full-size models, which look like full-sized digital cameras, but don't offer the advanced features mandatory to that kind. These are the gadgets that most folks have been heading towards, mainly for the consideration they show for the buyer's pocket.

So are these toy cams just playthings, as their name seems to suggest? Is their only allure their price? Exactly what we intend to find out!

The Olympus C150 is ergonomically well designed

Test Analysis

We tested these cameras on various parameters such as the features offered, size, weight, overall ergonomics of the camera and performance. *(See box, 'How We Tested').* For performance, we took into account the details captured in a photograph, the colour reproduction, and the brightness and contrast levels of the final output.

Features

Let's zoom into the various features that these cameras offered. The picture resolution is of vital importance to get a crystal clear image—the higher the resolution supported, the better the quality of photos. In this regard, the twin cameras from BenQ—the DC3410 and the DC2300, the PC-CAM 850 from Creative and the Olympus C150 support a resolution of 2,048 X 1,536—excellent for toycams.

Cameras with optical zoom are better for distant photography, say when trying to capture a distant house on the edge of a cliff. But none of these cameras come with optical zoom—instead they try to compensate for lost ground with digital zoom. Unfortunately, using digital zoom compromises picture quality, so one can only use it only when it is absolutely necessary. The BenQ siblings and the PC-CAM 850 were the only cameras with 4X digital zoom. All the others either had no zooming capabilities, or were limited to 2X.

Auto focus and macro focusing are other important parameters that you should keep in mind when buying a camera. Auto focus helps you focus on a subject automatically, but for a camera lacking it, you need to move either forward, or backward, to focus. The same applies to macro focusing, where your subject is extremely close to your lens, and you need to take a perfect picture without any blurring. The Olympus C150 has auto focus as well as a macro focus range of just 20 to 50 cms, thus helping you to take the perfect picture. The creative PC-CAM 850 was the only camera without focus features, making it a typical point and shoot camera. Only what's in the focus

will appear in the image, resulting in a very flat image with hardly any depth of field.

All the cameras had white balance settings, except for the Frontech Wondercam and Logitech Click smart 510. All came with four preset white balance options, and you can choose one depending on the environment you're shooting in. They are better for shooting indoors, where one has the option to switch from fluorescent to tungsten, depending on the lighting in the room.

All the cameras store images in the compressed JPEG format, thus saving on space while preserving image quality.

Physical features and ergonomics

Physical features play an important role in the ergonomics of any handheld device, even the camera—the placement of the flash, lenses and light sensors must be such that they are not obstructed by your fingers. Unlike other portable gadgets, cameras can be too light. The perfect camera has to have just the right balance of size and weight—heavy enough to keep your hand steady when shooting, and small enough to be pocketable.

The Olympus C150 Camedia was the best camera in this segment, as far as physical features and ergonomics are concerned. It fits perfectly in your palm, and the contoured front lens cover provides a good grip and stability, making up for the lack of a rubber grip. Another camera worth mentioning here is the PC-CAM 850. Its small size makes it ideal for one-handed operation, which makes it great companion for outdoor shooting. The cameras from BenQ were slim, long and pocketable, while the cam-

What is depth of field?

Depth of Field (DOF) determines the capturing of multiple subjects with the same lucidity, as the prime subject on which the focus is set. You can achieve a better DOF by tweaking the aperture, f-stop and zoom. These settings are not provided in a normal point-and-shoot camera. The lack of these setings make the pictures look flat.

Smaller the aperture (opening of the overlapping blade) size, greater will be the DOF. f-stop is an adjustment that controls the lens' diameter. The f-stop number increases with the decrease in aperture size. Many cameras allow you to manually set the f-stop to enhance the DOF.

A small aperture size allows less light to hit the CCD. Therefore, set a slower shutter speed, preferably to the factory settings for sufficient light to get in through the lens so that the image is not underexposed.

Since the aperture opening will be less, the amount of light hitting the CCD will also be less. The shutter speed will have to be kept slower (at the factory setting), so that enough light gets in through the lens and image is not left underexposed so as to appear dull.

How We Tested

We evaluated the cameras on the following parameters:

Features

We awarded points based on the various features and capabilities of the camera, such as CCD (Charged Couple Device) resolution, maximum image resolution supported, optical and digital zoom, focusing types, metering modes, white balance implementation, flash modes, shutter speed, storage, battery type and video-out capabilities.

Ergonomics

We noted various aspects of the camera's build, and looked for features that enhanced its user-friendliness—aspects such as how comfortable it was to hold, the ease with which the menu can be navigated, the size of the buttons, the placement of the flash and whether it avoids the finger-over-flash syndrome, and the inclusion of special menu-navigation buttons. The size and weight of a digital camera were also taken into consideration.

Performance

Image test: We created a target scene to test the camera's CCD ability to reproduce colour and capture details correctly. The lighting was kept constant. We shot this scene by mounting the camera on a tripod, and chose the highest possible resolution setting. We used the camera's flash and set other settings, such as the white balance, metering and flash modes to Auto mode.

The target scene consisted of a table with flowers that provided a wide tonal range. Gradations in shading and specular highlights were brought out through shiny metallic objects, such as the table clock and the metallic stand with the candle wrapped in plastic. The table also had objects such as curtain lace, a table-cloth, stack of books and the flower vase—all of which provided plenty of minute details. The cameras were graded on the level of accuracy with which each of these details was captured.

For the reference value, we shot the test scene with a professional film camera, and then scanned it on a very high-end scanner, the same one we use to scan all the images published in Digit. Next, we logged the values for each of the three components using the histogram function in Photoshop. The components had the following reference values: red = 147, green = 113, blue = 118

and luminosity= 124. These were compared with the values obtained from each camera to measure the deviation of the images from the optimal reference point.

Details test: To check for the accuracy with which details were reproduced, we divided the entire test scene into three basic zones that helped to analyse three characteristics of the camera. The first zone, comprising varying shades of colour, determined the camera's colour capturing and reproduction capability. The second zone comprised elements with details, such as wrinkles on the face of the doll, and the keyboard text. This allowed us to analyse the camera's focusing ability. The third zone consisted of objects with finer details such as the design of the curtain lace, etc. The exact reproduction of these details gave an indication of the camera's detail capturing ability.

RGB test: To measure colour reproduction, we took a close-up of an RGB circle, printed it on glossy paper, with the flash switched off. The test RGB circle image was created in QuarkXpress so as to get true red, green and blue colours, wherein the Histogram function in Photoshop shows the value as 255 for each colour.

Zoom test: To test the zooming capability of the digicams, we employed the 3X and 6X zoom cameras to take photographs of a stationary target placed at approximately 15 feet. Based on these photographs, we then analysed how close the cameras could zoom onto the subject to provide clean, non-granulated images.

Actual person test: In the actual person test, we shot the photograph of a person under uniform lighting conditions with the camera mode set to Auto. This yielded the real life performance of a camera under indoor lighting. In the final image, we looked for proper skin tone reproduction, white balance, uniform tonal reproduction under florescent lighting, etc.

Value for money

This is evaluated based on the performance and features offered by the camera as compared to its price. Therefore, greater the performance and features, and lower the price, higher will be the value for money offered by a camera. We computed this value by dividing the sum of the camera's performance and features by its price to obtain a value for money index.

1 Flowers, and the small ornament with variety of colours on it, was used in the test scene to test the colour reproduction of the digital cameras.

2 The Digit CDs, the keyboard and the wrinkles of the face of the doll tested the cameras ability to focus across the length of the frame uniformly.

3 For testing the cameras ability to pickup details, we introduced the metallic figure with shining thread around its neck and waist and the lace curtain as the background.

4 The metallic table pen stand, with clock and the glass filled with green liquid were used to check the camera capability in reproducing the specular effects (i.e the shiny effect created by the reflection of light on metallic and glass objects).

5 Here, we checked the camera's ability to pick up the variation from dark to light regions.

eras from Frontech and Vivitar simply lacked feel—they were too light and lived up to their intended 'toyness'.

Coming to menu navigation, some cameras offer easy icon-based menu navigation, while others have a linear navigation system controlled by one button. Samsung Digimax 210 had the best menu navigation of them all, with a superb tactile four-way button. All cameras, except for the Vivitar Vivicam 20, came with a memory upgrade slot, supporting an SD card, a Smart media, or an xD-picture card. Frontech was generous to offer 64 MB of internal memory with its Wonder CAM—a memory that not even higher-end cameras offer—followed by the Olympus C150 with 32 MB. All the rest of the cameras had a mere 8 MB to 16 MB internal memories. The Vivitar ViViCam 20 had 8 MB of internal memory, which is enough, considering its low 640 x

The Creative PC-Cam 850 has a high resolution of 2048 x 1536

480 resolution. The file sizes are small (about 780 KB), which means it can hold about 15 images—a decent enough capacity for a toycam.

Except for the Vivicam 20 and Wondercam, all the other cameras sported neat LCD screens. This comes in handy when previewing a frame in real time, before clicking the image. It also lets you preview the pictures you take, so that you can decide whether you need to do a retake.

On the power front, most cameras run on AA batteries—the Logitech Clicksmart 510 was the only camera that required four AAA batteries. Most cameras either use two AA batteries, or come with built-in chargeable batteries—such as the BenQ DC3410. This can be both, good or bad, depending on the scenario—good because you don't need to keep replacing bat-

SCORE BOARD

CATEGORY		TOYCAMS				
	Benq	Benq	Creative	Frontech	Frontech	Logitech
Model	DC3410	DC2300	PC-Cam 850	Wonder CAM	Regal Cam	ClickSmart 510
CAMERA FEATURES						
Max. Image resolution	2048 x 1536	2048 x 1536	2048 x 1536	1280 x 1024	1280 x 1024	1280 x 960
Digital Zoom	4x	4x	4x	NA	2x	✗
Autofocus	NA	✔	focus free	NA	✗	✗
Macro focus range (cm)	30 to 40	18 to 25	35	NA	20 to 25	40 to 91
White balance settings	Auto, 4 modes	Auto, 4 modes	Auto, 3 modes	NA	Auto, 3 modes	na
Red-eye reduction	✔	✔	✗	NA	✔	✗
Compressed image format	JPEG	JPEG	JPEG	JPEG	JPEG	BMP
PHYSICAL FEATURES						
Dimensions (l x w x d) cms	98 x 58 x 27	94 x 66x 40	NA	NA	9.3 x 5.6 x 3.8	NA
Weight (grams)	135	140	0	100	120	NA
Memory types supported	SD card	SD card	SD card	SmartMedia	SD Card	SmartMedia
Memory included (MB)	16, internal	8, internal	16, internal	64	8, built-in	8, SmartMedia
LCD Monitor	✔	✔	✔	✗	✔	✗
Battery form factor	Built-in	AA	AA	AA	AA	AAA
PERFORMANCE						
Image Test (Photoshop)	2.6	11.6	10.65	11.8	0.4	1.85
Details Test (0-2 each)	4.25	6	1.75	2	3.25	0
RGB Target Test	0	4.87	0	3.47	1.97	1.75
Zoom Test	2.5	2.5	2	1	1	0
W & S						
Period of warranty (Years)	1	1	1	1	1	1
Number of authorised service centres	18	18	NA	8	8	25
Number of cities where service centres are present	8	8	NA	8	8	8
OVERALL SCORE						
Camera feature (30%)	13	13	13	13	13	13
Physical feature (15%)	8	8	8	6	8	6
Performance (50%)	9.35	24.96	14.4	18.26	6.621	3.6
Ergonomics (5%)	3	3.2	3.5	1	2	2.9
Value for money	8.14	11	8.8	12.76	7.92	4.84
Grade	C+	B	C+	A	C+	C
CONTACT						
Contact	BenQ India Pvt Ltd	BenQ India Pvt Ltd	Creative Labs Asia	Jupiter International Ltd	Jupiter International Ltd	Logitech Far East Ltd
Phone	022-25705231	022-25705231	9820357713	022-22001211	022-22001211	022-24905149
Fax	022-25705235	022-25705235	NA	022-22001214	022-22001214	022-24904145
E-mail	salesenquiryin@benq.com	salesenquiryin@benq.com	rajshekhar_bhatt@ctl.creative.com	frontech@bom5.vsnl.net.in	frontech@bom5.vsnl.net.in	response@logitech.com
Web site	www.benq.co.in	www.benq.co.in	www.Creative.com	www.jil-jupiter.com	www.jil-jupiter.com	www.logitech.com
Price	9,899	9,799	9,599	6,500	8,200	11,250

* Not awarded the value for money since is too poor for us to reccomend buying it

teries and its only a one-time investment, but bad if you're outdoors, and run out of battery.

Performance

In the red spectrum deviation test, the Samsung Digimax 201 showed the least deviation—less than 10 per cent. Similarly, the BenQ DC2300 and Olympus C150 Camedia were the only cameras that were close to the Samsung 201's performance. The Logitech ClickSmart 510 performed the worst, with a deviation of greater than 25 per cent—essentially this means that if you shoot something that is red in colour, the photograph will show it as some other colour.

For the green spectrum deviation test, the Frontech Wonder CAM hit the bull's eye, with absolute zero deviation. The Samsung 210 showed its mettle again by recording a deviation of less than 5 per cent. Both the cameras from Vivitar performed pathetically, with a deviation of over 25 per cent. The Logitech 510 also yielded below average scores.

The Frontech Wonder CAM again showed excellent colour

depth in the blue spectrum deviation test, with a deviation of less than 5 per cent. The Samsung 201 showed a deviation of more than 10 per cent here. The BenQ DC3410, the Logitech 510 and the Vivitar cameras all performed badly with deviations as high as 30 per cent. Such deviations are unacceptable and will lead to darker images, even in sufficiently lit indoor settings.

In the luminosity test, the Samsung reclaimed its crown, with negligible deviation. The Frontech Wonder CAM was the only camera that gave the Samsung some competition here, deviating only a per cent more. The cameras from Vivitar, Logitech and BenQ were a total disappointment, with deviations as high as 30 per cent.

Samsung also topped the specular effects and gradation test, with the BenQ twins coming in a close second. Overall, the Samsung Digimax 201 emerges as an outright winner, with excellent colour response, bright luminous images and a capability to catch all effects perfectly.

In the details test, the BenQ DC2300, Olympus C150 Camedia and Samsung Digimax 201 were the only cameras that were able to produce vibrant-looking photographs. The Creative PC-CAM 850, Logitech Clicksmart 510 and Vivitar ViViCam 20 performed the worst in this test—the pictures taken by them were simply too dark to earn any marks. Similarly, none of the cameras were able to reproduce Zone 2 of the details test, where we were looking for the text on the keyboard and the wrinkles on the doll's face. Only the Olympus C150, BenQ DC3410 and Samsung Digimax 210 managed to give decent output. In Zone 3 of the details test, we were expecting to see finer details, such as the pattern on the curtain in the background, but the results were disappointingly poorer than Zone 2. Only the BenQ DC 2300, Creative PC-CAM 850 and Samsung Digimax 201 gave decent results. The rest of the cameras couldn't detect finer details, especially the Logitech Clicksmart 510, and both the Vivitar models.

The Logitech Clicksmart 510 yielded dark photographs

TOYCAMS

Olympus C150	Samsung Digimax201	ViVitar *ViViCam 20	Vivitar ViViCam 3625
2048 x 1536	1600 x 1200	640x480	1600 x 1200
3.3x	2x	✗	2x
✔	NA	✗	NA
20 to 50	18.06 to 25	23 to 31	30.48 to 76.2
Auto; 4 modes	Auto; 4 modes	Automatic	Auto; 4 modes
✔	✔	✗	✔
JPEG	JPEG	BMP	JPEG
6.7 x 11.2 x 4.0	9.39 x 6.6 x 4.06	9.8 x3.55 x6.02	NA
166	140	180	150
xD-Picture Card	SD/MMC	NA	SD card
32	8, internal	8, built-in	8, built-in
✔	✔	✗	✔
AA	AA	AA	AA
9.2	11.3	0.4	0.4
5.25	6.75	0	2
4.13	6.63	1.75	1.97
2.5	2	1	1
1	1	1	1
8	12	6	6
8	8	NA	NA
13	13	13	13
8	8	6	8
21.08	26.6	3.15	5.37
2.9	2.7	2	3.2
9.9	11	*15.18	6.82
🔴	🔴	🔴	🔴
Komal International	Matrix Agency	Anirox Technologies Ltd	Anirox Technologies Ltd
022-22611274	022-23004061	033-228282372	033-228282372
022-22610219	022-23054631	033-22823086	033-22823086
indiaolympus@vsnl.net	matrixmk@vsnl.com	vivek@anirox.com	vivek@anirox.com
www.olympus.com	www.samsungcamera.com	www.vivitar.com	www.vivitar.com
9,995	9,995	3,500	9,500

Jargon Buster

Artifacts: Artifacts are distortions in an image that are produced by either the image sensor (CCD/CMOS), or the optical system. Sometimes the image processing algorithms and the compression algorithm (JPEG) are also responsible for Artifacts.

Digital zoom: Digital zoom is the magnification of an image by the internal image processing algorithm. It is similar to the zoom function in Adobe Photoshop. Due to the interpolation in real-time, digital zoom can appear to be jerky.

DPOF: Digital Print Order Format is a system format that allows a digital camera, or any other image capturing device, to define how images are to be printed on DPOF compatible printers.

View-finder: A view-finder is the window that you use to bring a subject into the frame. The types of view finders are Optical, EVF and the TTL. The Optical view-finder lets you view the subject through a small glass opening in the camera. An EVF (Electronic View Finder), simply projects a live image onto a small LCD screen, as would be seen on an LCD monitor. The TTL (Through The Lens) view-finders are the best, and are often seen on high-end digital cameras. The image is relayed from the lens through a mirror system directly onto a focus screen. TTL and EVF view-finders are more accurate because they are not affected by parallax errors.

Aperture priority: Aperture priority is a digital camera mode in which you set the aperture range, and the camera automatically adjusts the shutter speed to expose an image correctly. This is useful to capture depth of field, or for special effects.

Shutter priority: In the Shutter priority mode, the shutter-speed of a camera is set to full range, and the camera calculates the best aperture to expose the image correctly. Shutter priority is used to creating blurry effects when you want to show a fast moving subject.

Manual focus: Manual focus allows you to disable the automatic focusing of the camera, and focus on the subject by moving the lens manually. Manual focus is used to take macro photographs, or when shooting in low-light conditions.

Macro: A macro is a magnified image of a small subject. Any image captured at a ratio higher than 1:1 is called a macro, whereas anything less than 1:2 is called a close-up.

ISO speeds: In film photography, the ISO value of a film represents the film's sensitivity. The lower the ISO speed, more the light required to create an image. In a digital camera, the CCD sensor takes care of this. A 200 ISO rated digital camera is recommended, as CCD is slower than film. Digital cameras also offer the advantage of on the fly ISO changing, but remember that higher ISO speeds tend to create noise in images.

Interpolation: Interpolation is an imaging method used to increase the size of a digital image. Digital cameras often use interpolation to produce digital zoom. Most image editing packages also support interpolation, to resize images. The trade off is the loss in image quality, which varies depending on the algorithm used.

Overall, the DC2300 from BenQ came out tops in the details test, with the Olympus C150 and Samsung Digimax 201 following with decent performances. The Logitech and the Vivicam 20 were major disappointments.

In the RGB target test, the Samsung Digimax 201 was the only camera that was able to realistically reproduce the RGB target, with only a slight deviation in the green spectrum, which, we found, was a tough spectrum to reproduce across the board. The BenQ DC2300 came in second, and the Olympus C150 Camedia came in third. The Creative PC-CAM 850 and the Frontech Regal CAM performed the worst—when we analysed the pictures, the RGB target contained more black than any other colour.

In the zoom test, the BenQ siblings and Olympus C150 were on par, taking the best looking close-up shots of the target, without loosing on either picture quality, or details. The Samsung Digimax 210 put up a brave fight, but lost on details. The Frontech Regal CAM, and Vivitar ViViCam 3625 were total disappointments, again.

And the winner is...

The market is flooded with these toycams, and their main appeal is their low prices. But, only after using these cameras in different conditions does one realise that the images are not at par with the point-and-shoot film cameras.

We suggest you invest Rs 10,000 in the Samsung Digimax, and get a proper digital camera with a few manual override set-

The Digimax 201 hit the RGB right on the target

Opt for the Frontech Wonder CAM if you are committed to a small budget

tings and a digital zoom, rather than getting stuck with a glorified Web cameras that just don't deliver. The Benq DC2300 is another camera which will not disappoint—it offers decent image quality, colour reproduction and the flash also helps. Logitech was a major disappointment, especially since it manufactures world-class input devices and Web cameras. The Frontech Wonder CAM was not impressive in the tests, but could be a popular choice for those with shoe string budgets, as it is priced at just Rs 6,500.

Canon PowerShot A300
Shot of power

The Canon PowerShot A300 is an entry-level 3.2 mega pixel camera, which is capable of delivering 2048 x 1536 resolutions. The camera has a 33 mm focal length equivalent to a 35 mm lens. Targeted at the price-conscious user, it does not feature optical zoom, which keeps its price under Rs 20,000. However, it does have 5.1X digital zoom—the highest in its class—that can only be used outdoors, since it leads to visible pixilation when the subject is brought too near after zooming. The camera supports an ISO setting of up to 400 that is needed when you have poor lighting, and while using a high-shutter speed of 1/2000. Also, bundled along is an external 16 MB Compact Flash memory, which can hold not more than 10 to 12 high-resolution images. Therefore, use the lower setting of 1024 x 768, or 1600 x 1200 for images that are not aimed for printing. Memory can be upgraded, since it's not built-in.

On the performance front, the camera did not disappoint us. The test image was clear and the colours were brilliant. The A300 also managed to reproduce the colour pink of the coloured pencil, which was difficult even for some of the more expensive cameras. The details that it picked up were not crystal clear, but decent enough given its lens. It also produced impressive specular effects on the metal clock and the liquid-filled glass, which was difficult to produce for most low-end cameras. It disappointed us a little when it was tested with the RGB target, as it failed to pick up green. Instead, the green pie on the test print was very dark. Hence, preview images involving greenery before uploading them on your PC. It also returned average results when tested for zoom. The zoomed subject appeared out of focus and washed out.

The A300 weighs 175 gms, and is powered by two AA batteries. The price of Rs 19,995 makes it the most affordable option in its class, considering the features such as shutter speed range and aperture adjustments that it comes with. It sure offers better value for money to those in need of a low cost, feature-rich camera.

+ Decent features, light weight
– A bit expensive for its features
Price: Rs 19,995

Canon PowerShot A300	B-
Performance	
Features	
Ergonomics	
Value for money	

Fuji FinePix A303
Good features, bad build

FinePix A303 has an impressive list of features such as the 3.24 megapixel CCD that can be used to capture high-resolution images. The 3X optical and the 3.2X digital zoom give you breathtaking landscape photographs. Different white balance settings, such as incandescent, fluorescent and sunny, let you adjust the camera to different lighting conditions. The shutter speed range of 1/2 to 1/2000, coupled with the metering mode and the Exposure Value compensation setting, can be adjusted depending upon the lighting conditions. The Finepix A303 is bundled with a 16 MB xD-Picture card, which is insufficient, if you click a picture using maximum settings—you are likely to run out of storage space after 12 to 15 pictures, since each would amount to 1.2 MB. It weighs 200 gms without the two AA batteries, which is a bit heavy.

It managed to reproduce the pink and yellow of the coloured pencil, but they were not as vibrant as they were in the reference image. This camera, like the FinePix F402, produced images that were dark at the corners. Hence you manually need to choose a different metering mode. The specular effect was produced perfectly, with the precise amount of light reflecting on the metal and glass. The camera also scored on focusing where the tiny arm of the clock was visible, along with the keyboard text. However, the image of the wall curtain (with the fine mesh), developed untidy light and dark colour bands. This could be due to the low colour-depth supported. It also returned a darker image when tested for actual person test.

Priced at Rs 27,000, it is a bit expensive as compared to other cameras with better features. The ergonomics are also average, making it inconvenient to carry it around for a long while.

> "A light-weight, simple aim-and-shoot digicam that could spell wonders for the I-don't-know-how-to-shoot amateur. Though the price is a little high. A good buy if priced between Rs 22,000 to Rs 24,000."
>
> —Sherwin Crasto

+ Good on features
– Flimsy build quality
Price: Rs 27,000

Fuji FinePix A303	C
Performance	
Features	
Ergonomics	
Value for money	
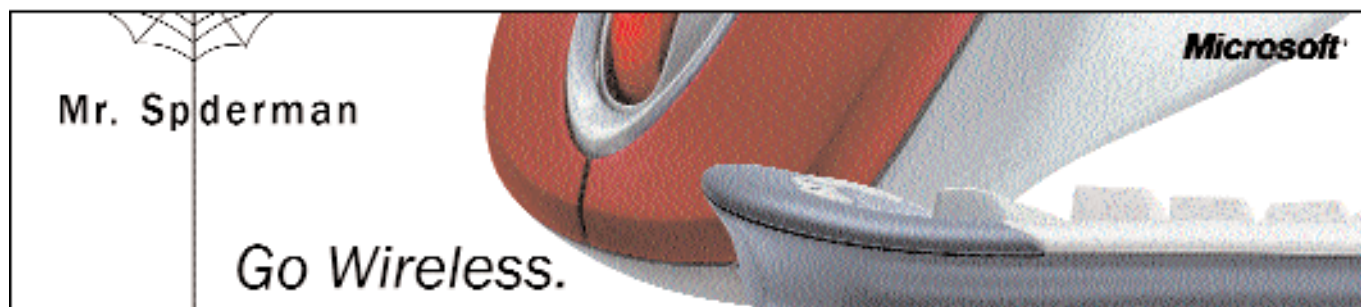
Canon PowerShot A60/A70
Sibling rivalry

Canon has introduced two cameras with very little difference between them, to cater to budget buyers and enthusiasts. The A60 and A70 have a long list of common feature—both support a shutter speed from 15 seconds to 1/2000th of a second, which is one of the widest ranges in their class. You get sufficiently bright pictures under poor light conditions. Both support 1600 x 1200 and 2048 x 1536 resolutions, but are bundled with 16 MB Compact Flash. Canon should have bundled at least 32 MB with the A70, as it supports higher resolution settings. Both these devices need four AA batteries to run. The camera provides manual overriding of many settings but tweaking the settings requires the LCD to be on, which consumes a lot of power. Therefore, it is advisable to use auto settings as far as possible, and an optical viewfinder, instead of an LCD, while shooting. Both these devices allow you to capture pictures in black and white, and sepia modes that can be used to make project reports and presentations that are pleasing to the eye. The cameras also allow you to set the exposure value from +2 to -2 EV. Use this setting if you understand the kind of output that will come out after setting the EV.

There was hardly any difference in their performance, with the A70 taking a 2 per cent lead over A60 because of a 3.2 mega pixel CCD. As far as luminosity goes, the test image quality of the A60 was better than the A70—the A60 came up with a more pleasing and brighter image. But when picking the colour blue, the A70 performed than the A60. On the other hand, the A70 shone in the details test where one could see each individual thread on the lace. This can be attributed to better focusing and higher resolution support. The A70 also generated a smooth specular effect, which was a little blunt in A60.

The A60 and A70 are available for Rs 24,995 and Rs 29,995, respectively. Both these cameras only differ in optical and digital zoom, and CCD size. The looks and button placement are also similar with the same body used. Given the quality they deliver and features set they carry, their price seems just right.

Sony DSC-P72 and DSC-P32 Digital cameras
Cute couple

Sony's Cyber-shot DSC-P72 and DSC-P32 are identical in all respect, except for the fact that the P72 comes equipped with a 3X optical zoom, whereas the P32 has a fixed focus lens.

The cameras don a silver finish on a plastic body that has one end rounded off. The back has a cluster of buttons that consists of a mode selector switch, four menu navigation buttons and an Enter button.

Three other buttons—used for menu activation and deleting the picture in the play mode—are lined along the LCD monitor that acts as a view-finder. The cameras do have rubber padding for a firm grip.

Both sport the a 3.2 megapixel CCD sensor, with a maximum resolution of 2048 X 1536. They have five white-balance modes, and shutter speeds ranging from 2 secs. to 1/1000 of a second. ISO speeds range from 100 to 400, thus allowing for improved CCD gain in poor lighting. They also have five flash modes for varying lighting conditions.

The cameras were nearly on par with each other in terms of performance. In the image test, the P32 reproduced images that had good tonal balance than the P72. Also in the luminosity test, the P32 turned up better photos than the P72. However, where the specular effect and gradation in shading is concerned, the P72 scored due to its optical zoom. Similarly, in the details test, the P72 scored over the P32, only by reproducing the finer details better. The P32 crushed the P72 in the RGB test by reproducing the target in its full vibrancy. In the zoom test, again the P72 armed with its superior optical zoom lens, performed better than the P32. So was the case in the actual person test, only the margin was wider. The DSC-P32 and DSC-P72 cost Rs 19,990 and Rs 24,990, respectively—too much to ask for with those features and performace.

> "Very, very, very, sharp images with a strong depth-of-field. Too many buttons. And thankfully is a Made-in-Japan. Is well priced, looks different in comparison with other digicams and is a Sony."
>
> —Sherwin Crasto

+ Good features
– Expensive
Price: Rs 24,995

Canon PowerShot A60	C+
Performance	
Features	
Ergonomics	
Value for money	

+ Good ergonomics with decent features
– Does not live up to the features.
Price: Rs 29,995

Canon PowerShot A70	C+
Performance	
Features	
Ergonomics	
Value for money	

+ Good features at an attractive price
– None
Price: Rs 19,990

Sony DSC-P32	B-
Performance	
Features	
Ergonomics	
Value for money	

+ Good features, form factor
– Small and cramped LCD monitor
Price: Rs 24,990

Sony DSC-P72	C+
Performance	
Features	
Ergonomics	
Value for money	

Full Page AD

CANON A300

CANON A60

CANON A70

CASIO EXILIM

CASIO QV-R3

FUJI A303

FUJI A303

KODAK CX6330

KODAK DX6340

MINOLTA DIMAGE XI

NIKON 3100

OLYMPUS C350

SAMSUNG 350SE

SONY P32

SONY P72

As is obvious, the image produced by the Kodak DX6340 has good tonal balance all across—all the colours are vibrant, and the details immaculately reproduced. Whereas, the image reproduced by the Samsung 350SE completely lacks luminosity and is quite dark and dull. The photograph taken with the Casio Exilim had similar results and the image lacked lustre. The images resulting from the Nikon 3100 shows good tonal balance and specular effects. Similarly, the Olympus C350 also reproduced the test scene with great detail, but lacked luminosity. The Sony images lacked details but had good colour balance.

Fuji FinePix F402
All looks, no juice

The F402 is yet another designer camera with a sleek square look. The best part about it is that it has no standard on or off button. Instead, the camera has a big flap on its front that slides open, and powers the camera. The blue LED on this flap is the indicator of its power mode. The camera is just 2.2 cms thick and weighs 125 gms, making it very pocketable. It is equipped with a 2.1 megapixel CCD, which churns out 2304 x 1728 resolution images. The camera supports ISO setting from 200 to 1600—a range normally found in more expensive cameras. It also supports shutter speeds from 1/2 to 1/2000 of a second, making sure that you capture fast moving objects and images in poor light conditions. The 6 cms to 65 cms macro focus range lets you get a good close-up on subjects such as petals and leaves to give you an excellent image. The camera stores the images in a 16 MB xD-Picture card that's bundled along. A custom Li-ion battery and an AC adapter also come along with the camera.

The F402 delivered very average-looking test images, as it could not focus even in the auto mode. Due to this, the keyboard text was not readable and the flower petals looked blurry. The camera reproduced colour well, but it was not on par with others. It was the same with specular effects; it created a very blunt reproduction of the liquid-filled glass and the metal table clock. The image was bright in the middle and dark in the corner, indicating that the camera metering mode in auto setting was not proper. It returned dark images when tested in a sufficiently-lit room. The 3.6X digital zoom does a decent job of getting a distant object nearer.

The F402 is priced at Rs 30,000, which makes it very costly, especially because it lacks optical zoom, and also has a limited manual override. This camera, like the Exilim EX-M1, is foppish eye-candy that will only appeal to a select few.

+ Slim form factor
− Very expensive
Price: Rs 30,000

Fuji FinePix F402				C
Performance				
Features				
Ergonomics				
Value for money				

Nikon CoolPix 3100
An outdoor's camera

If you are looking for a camera that takes great pictures, then meet the Nikon CoolPix 3100. This 3.2 mega pixel camera delivers 2048 x 1536 resolution images, which is enough for printing even on A4 size media. The 3x optical and the 4x digital zoom capture the finest details of the subject. The CoolPix 3100 is light and shaped such that it fits in your palm perfectly, and at the same time, offers an enhanced grip—even when you hold the camera with one hand. The macro focus range is as low as 4 cms. The camera is very compact, and weighs a little over 200 gms. Depending on the number of elements in the picture, you can store a minimum of 16 images and a maximum of 25 on the 16 MB Compact Flash memory—you can go up to 90 images, if taken at a resolution of 1024 x 768. The camera brings two AA Ni-MH rechargeable batteries, and a charger. The only problem is that it drains the normal alkaline batteries in no time.

The CoolPix delivered image quality equalled only by the Kodak DX 6340. The test image was completely focused and the alphabets on the CD and the keyboard text were readable. The specular effect was also impressive, with very lively reflections and a smooth effect on metal. It also reproduced the wrinkles on the cloth, something most cameras could not do. However, it disappointed us in the actual person test. The white wall appeared grainy, and the skin tones were darker than the actual colour. It yielded average results in the zoom test too. The camera is good for outdoor photography, and delivers excellent results with a little tweaking, such as manually setting the exposure setting, or using slower shutter speeds to get brighter images.

It's priced at Rs 25,500, which is a little on the higher side, taking into consideration that the camera consumes a lot of power when used with normal alkaline batteries.

> "Fits exactly in the palm and has a wonderful colour correction, even if kept on the auto white balance mode. A smart digicam, which is worth buying if priced about Rs 2000 less."
> —*Sherwin Crasto*

+ Great ergonomics, chic looks
− Super hungry for alkaline batteries
Price: Rs 25,500

Nikon CoolPix 3100				B-
Performance				
Features				
Ergonomics				
Value for money				

Kodak CX6330
Picture perfect, wallet-friendly

The CX6330, the younger sibling of the Kodak DX6340, is targeted at budget buyers. In fact, it is the cheapest offering in its class, and sports some features that are great for its price. For instance, it sports a 3.1 mega pixel CCD that can deliver 2032 x 1524 resolution images. The 3X optical and the 3.3X digital zoom take care of different types of photography. Be it in macro mode, or landscape mode—you are assured of capturing the subject flawlessly. The 13 to 70 cm macro mode allows you to take snaps of subjects as small as a needle, without losing focus or colour. It has all the features of a low-end camera, such as exposure compensation from +/- 2.0 EV, burst mode and colour mode (black and white, sepia and colour). The CX6330 runs on two AA batteries that are bundled with it. The camera weighs just 175 gms, which makes it light, and easy to carry around. It also offers better ergonomics, which means that you will not have to sit and spend hours learning how to navigate the menu, and finding you way around the buttons. The camera brings along an in-built memory of 16 MB memory, with support for SD/MMC card. The images are saved in the compressed JPEG format, meaning that you can easily store up to 15 images at maximum mode, and more than 25 images at lower settings.

When it came to performance, the device delivered acceptable image quality. The colour reproduction was much better than its more expensive counterparts. The specular effects were also very smooth and pleasing to the eye. The focus, however, was a little off target, and therefore not all parts of the frame were clear. This is one shortcoming that can be overlooked if the CX6330 is to be used for general purpose image capturing. The camera delivered disappointing results in the RGB test, where both the colours, green and blue, were not captured properly. These two regions appeared very dark, indicating that you can only shoot subjects standing within flash range.

The camera's 3X optical and 3.3X digital zoom is also commendable, as it will not disappoint those who usually like to capture distant objects, mostly outdoors. When tested for the actual person test, the camera gave a fairly decent image quality, with better white balance results and proper colour reproduction.

The CX6330 is priced at just Rs 16,900, which is quite reasonable for the kind of lens, feature and performance it packs into it. CX6330, like DX6340, is compatible with Printer dock EasyShare 6000. As far as features and performance goes, CX6330 is the best camera money can buy.

+ Good value for money
− Poor ergonomics
Price: Rs 16,900

Kodak CX6330				B
Performance				
Features				
Ergonomics				
Value for money				

Kodak DX6340
Snap 'n' save

The 3.1 megapixel Kodak DX6340 is great in performance, and intelligently priced. It can deliver a resolution of 2032 X 1524. It sports a Schneider 4X optical zoom and 3.5X digital zoom lens, which is more than enough for most types of photography. It also has a good list of features. The 10 to 60 cms macro mode range allows you to capture subjects with vivid colours and clear focusing. The camera has multiple picture modes such as shutter priority, aperture priority, sport, night, and so on. Novices can just select the mode according to their need and click, making it a simple point-and-shoot camera. At maximum settings, the image size is lower than 1 MB, unlike other cameras. This is particularly good for a camera that has a built-in memory of 16 MB, and no additional storage media bundled. However, it supports the SD/MMC card to increase the storage capacity.

The Kodak DX6340 is light and easy on the hand—the buttons are placed within reach. The camera's hot-button transfers the image directly to the PC, which speeds up the process. It is compatible with the EasyShare Printer Dock 6000, which can print images from the camera directly.

The Kodak DX6340 delivered some of the best results in its class. The test image was very clear with no dark or bright spots. The colours were reproduced accurately—especially the pink and yellow. The wrinkle on the cloth was also picked up in detail, displaying the lens' prowess. The image was well-focused, thus giving the much-needed depth. However, it failed to detect the fine lace of the curtain in the detail test. In the zoom test, it picked up the fine roots on the tree at a distance of 12 to 15 feet. It also managed to deliver much better pictures than the rest in the actual person test. The white colour of the background image was picked up accurately, hence proving that camera sets the white balance precisely. The same was the case with the overall luminance and colour reproduction.

Smartly priced at Rs 20,900, it is the cheapest model in its class. With so many features and a good image-quality, the Kodak DX6340 should be the choice of users across the board.

> "Is fast, cheap, with built-in memory, good features, but the flash, at close range, is a little heavy though the camera is very light. Bears excellent colour corrections and skin tones. Sports a dependable Li-ion battery for longer life. But what scares me most is the Made-in-China tag. That is what makes it cheap, I guess"
>
> —Sherwin Crasto

+ Good features at a better price
− Too much of zoom jars the picture.
Price: Rs 20,900

Kodak DX6340				B
Performance				
Features				
Ergonomics				
Value for money				

Full Page AD

Olympus C350
Low on price, high on features

The C350 belongs to the Camedia series of digital cameras from Olympus. Similar in size and shape to its younger sibling, the C150, this camera packs in quite a number of features at a very attractive price. It runs on two normal AA alkaline batteries, and features a nice LCD display to preview your subject before you actually shoot it. The menu navigation is not as intuitive as the others in this category, such as the ones from Canon and Fuji.

As far as physical features and ergonomics are concerned, the C350 was the best in this segment. It fits perfectly in your palm, with the contoured front lens cover providing a good grip. Its design is pretty plane devoid of unnecessary lines jarring its usability.

On the features front, the C350 does not disappoint either; it has a 2 megapixel CCD sensor, with a 3X optical zoom and 3.3X of digital zoom, giving it a 9X zooming capability. The C-350 also comes with four preset white balance modes along with the default Auto mode. Shutter speeds vary from 2 seconds to 1/1000th of a second, allowing photographs to be taken in all sorts of lighting conditions. A choice of seven different flash modes lets you click away in any sort of lighting. The C350 comes with a huge 32 MB xD memory card.

Coming to performance, the C-350 is on par with the Kodak DX6340. In the Image test, it produced images with good tonal balance across the entire frame. The deviation of all the colours from the reference points was not more than 10 per cent. The photograph was sufficiently bright, with no dark spots at the corner of the frame. In the specular test, the C350 produced mild effects, thus losing some points. However, the gradation in shading test saw the C350 performing much better, picking up all the shading effects properly.

The C350 put up a mediocre performance in the details test, and wasn't able to reproduce all the required details very well. In the RGB target test, the camera showed good response to red and blue. However, the same wasn't true in the case of green. In the zoom and actual person test, the C350 yielded more than decent photographs—it actually did better in this test than our eventual winner—the Kodak DX6340.

Priced at Rs 19,995, the C-350 offers good value for money, with a decent enough performance and good features. An added benefit is the JPEG Exif version 2.2 image compression format that allows you to add data to the picture that can be used by a printer to accurately perform image adjustment before printing.

+ Great features at attractive price
− Average performance
Price: Rs 19,995

Olympus C350					B
Performance	▶	▶	▶	▶	
Features	▶	▶	▶	▶	
Ergonomics	▶	▶	▶	▶	
Value for money	▶	▶	▶	▶	▶

Casio QV-R3
Rugged digicam seeks memory

The Casio QV-R3 is a 3.2-megapixel digital camera that can capture stills, as well as video. It supports a resolution of 2048 x 1536, and features a 3X optical and a 3.2X digital zoom. It is small and compact owing to Casio's Multi-Chip Module (MCM) technology that integrates the CPU, ASIC and the memory chip into a single unit.

ISO selection is set to auto by default, but users can select ISO 125 or 250, manually. The metering can be configured to multi, centre-weighted, or spot. It also has filters with such tones as black and white, sepia, red, green, blue, yellow, pink and purple. The camera comes with a Li-ion battery and a charger, both of which add to its convenience and portability. You save substantially on the running cost of the camera, which is a cause for concern for most, and the Li-ion battery ensures long battery-life. The 11 MB internal memory, and the SD/MMC card support provides for additional memory expansions. The QV-R3 has very rugged looks, owing to the steel body and is really light. The menu navigation is also easy and icon-based, so that even a novice can understand the different settings without much head-scratching.

The specular effect was high, causing images to be too bright—the excessive light caused the numerals on the clock to disppear. However, it didn't disappoint in the actual person test, where it delivered a proper contrast, and set the white balance to provide near-real environment images. It also picked up colours without any loss under natural lighting conditions. Hence, the camera can provide good indoor shoots.

The zoom test returned acceptable results with the object being very clear. This camera failed to pick up green, and scored as low as 55.51 out of 255, which is worrying. It needs a bit of tweaking that involves selecting a lower shutter speeds to let maximum light enter the camera, for better colour reproduction.

Priced at Rs 29,995, it is a bit expensive, considering that the built-in memory is just 11 MB. It has no additional memory card either. However, if you are looking for a rugged camera that has re-chargeable batteries and a charger, then look no further.

"Virtually similar to the IXUS4000 and easier on the pocket too. Isn't very fast between frames but is still faster than the standard aim-and-shoot conventional cameras. Worth the price, but nothing like a few thousand rupees less to attract the serious amateur."

—Sherwin Crasto

+ Rugged build-quality
− Low internal memory
Price: Rs 29,995

Casio QV-R3					C
Performance	▶	▶	▶	▶	
Features	▶	▶	▶	▶	
Ergonomics	▶	▶	▶	▶	▶
Value for money	▶	▶	▶	▶	▶

Minolta DiMage Xi
Slim body, no grip

The Minolta DiMage Xi is a slim form factor, which makes it very portable, and its square body makes it look completely different from the rest. The finish is very smooth, which may add to its allure, but gives no place for the user to get a firm grip. The camera is just 2 cm thick and weighs little over 150 grams.

It sports a 3.2 mega pixels CCD that generates 2048 x 1536 resolution images. The DiMage Xi is very thin and therefore, slight jerking is inevitable when shooting. Hence the pictures tend to turn out blurred. There is no optical zoom. However, the 4X digital zoom gives you some space to play around with the settings. The camera runs on a customised Li-ion battery, or an AC adapter that comes along with the camera. It also has a 16 MB Secure Digital card included as the storage media, which can be upgraded, as and when required.

On the performance front, the device delivered very focused images, and also managed to reproduce colour precisely. The camera was particularly good in picking up the colours yellow and pink. It also reproduced the green liquid in the glass brilliantly. The specular effect was one of the best amongst the cameras of its class, with the reflection in liquid and metal looking very natural. It also managed to show gradation in shading very nicely, with the shadow dying out gradually. However, the quality of the image was very average when tested for the actual person reproduction. Though the image was dull, there was no colour loss, resulting in a warmer look. The camera averaged in the zoom test as it was all digital, and therefore when viewing the image at actual pixels in Photoshop, the image appears to be little pixelated. Hence, use the zoom, but don't blow up the image to print a particular portion, as the final output will not be satisfactory.

The DiMage Xi is priced at Rs 23,500, which is the right price for the quality it delivers, and its features. The camera is very portable and slim, making it a good travel companion.

+ Individualistic looks, light-weight
– Takes too long to save a picture in TIFF format
Price: Rs 23,500

Minolta DiMage Xi	B-
Performance	▶ ▶ ▶ ▶ ▶
Features	▶ ▶ ▶ ▶
Ergonomics	▶ ▶ ▶ ▶
Value for money	▶ ▶ ▶ ▶

Casio Exilim EX-M1
All looks, no performance

Casio Exilim EX-M1 is targeted at the class of people who strive to be noticed. It weighs only 56 gms, is just 3.9 cms thick, and undoubtedly is the wearable camera that Casio says it is. It sports a 4X digital zoom and 1600 x 1200 resolutions. This is just one of the cameras that supports a shutter speed of 1/4th to 1/8000th of a second. However, you cannot set the shutter speed manually. It runs on a special Li-ion battery, which is much thinner than the normal Li-ion batteries. The Exilim is charged using the docking station that is bundled along. The docking station can also be used to download the images to a PC, since a USB port is absent.

The Exilim EX-M1 is very thin, which makes it a bit difficult to operate. You also need a firm grip on the body when photographing, lest the images appear hazy. The quality of the images produced matched our expectations. The image was a little brighter (the fixed lens was to blame), and the keyboard text and the clock's hands were not clearly visible. This caused the image to look very flat. It was the same with the colour reproduction—the colours looked washed out due to high luminosity levels. The Exilim EX-M1 also failed to reproduce details, as the pattern on the curtain appeared very flat with foggy edges. In the RGB target test too, it failed to detect the colour green, causing it to appear very dark on the screen. However, the Exilim EX-M1 did well in the actual person test and reproduced image was of acceptable quality, assuring us that it could be used indoors in auto mode.

The Casio Exilim EX-M1 costs a cool Rs 20,995, almost Rs 4,000 more than other cameras that produce similiar-quality pictures. There are other cameras in the market that sport higher specifications and boast of much better features than the Exilim EX-M1. Hence, this device is only recommended to those who have deep pockets and are looking for something radically different, even at the cost of ergonomics and zoom capabilities.

+ Slim form factor
– Mediocre performance
Price: Rs 20,995

Casio Exilim EX-M1	C+
Performance	▶ ▶ ▶ ▶
Features	▶ ▶ ▶ ▶
Ergonomics	▶ ▶ ▶ ▶
Value for money	▶ ▶ ▶ ▶

Samsung Digimax 350SE
Made for the mob

The 350SE sports the best build quality of all the cameras we tested, with a solid rugged body shell that can take a beating. Four AA batteries power the camera. The 240 gms weight has its own advantages and disadvantages—it makes it stable when shooting, but cumbersome on a trip. There were just two disadvantages we faced—one that the lens takes an unusually long time to extend, and the second being the five-way menu navigation switch, which is ultra smooth and doesn't feel tactile.

The Digimax 350SE has a 3.2 megapixel CCD sensor, coupled with a 3X optical zoom lens and 2X digital zoom. It supports ISO speed, ranging from 100 to 400, which is useful when taking pictures in poor light, to increase the CCD sensitivity. The shutter speed ranges from 4 seconds to 1/2000th of a second—again a boon, since you can use it in any lighting conditions. Similarly, it has five flash modes for different lighting conditions.

It did not reproduce the test image as crisply as it should have—the quality of the colours deviated as much as 25 per cent, so did the luminance. Specular effects and gradation shading effects were also affected by the low brightness. Surprisingly, in the zoom test, the photograph was quite vibrant, indicating that it requires a good amount of light.

Priced at Rs 24,995, the 350SE seems a bit expensive with many other cameras retailing for around the same price, but giving much better results.

> "Is just the right camera for the serious, but very, very low budget tourist. Good image quality, but isn't very quick in the aim-and-shoot category. Also, it is just a little expensive for the price. Samsung should sell it at about 21,000, if it plans to eat into the established digicam companies whose products are far superior."
>
> —*Sherwin Crasto*

+ Very good zoom quality
− Bulky, mediocre performance performance.
Price: Rs 24,995

Samsung Digimax 350SE	C
Performance	▶ ▶ ▶ ▶
Features	▶ ▶ ▶ ▶
Ergonomics	▶ ▶ ▶ ▶ ▶
Value for money	▶ ▶ ▶ ▶ ▶

Expert Opinion Sherwin Crasto

Mr Sherwin Crasto, who is currently working with Reutersas a senior news photographer, has been using a professional digital camera right from the time they were introduced. Sherwin has been a photographer since 1983, and has been associated with many newspapers—The Indian Post and with Associated Press for the South Asian region, to name a few, working mostly as a senior photographer. He was also the chief photographer for The Independent.

In the year 2000, he received specialised training in war coverage, handling hostile environments, driving skills and first aid at Heckfield, England. Recently, he had a close shave while covering the Afghanistan war, when an Afghan rebel opened fire on his car. He has also spent a day on the American aircraft carrier, Carl Vinson, from which American fighter planes took off to bomb key Al Qaeda locations. He covered the hijacking episode of the Indian Airlines plane at Kandahar. During the Kargil war, he jumped to save himself from an oncoming mortar and in the process broke his digital camera.

The mid-air collision between a Saudia Boeing and a Khazakhistan plane at Charki Dadri near Delhi, Pope John Paul II's visit to India and Sri Lanka, former US president, Bill Clinton's visit to India, the last solar eclipse of the millennium at the Rann of Kutch, are some examples of his long list of prestigious assigments.

In the year 2001, Sherwin was awarded the Commonwealth Photographic Award on Environment for his picture on the burning of a tiger pelt seized from poachers.

He was also the Photo-Journalist of the year 1997-98, an award given by the Mahanagar Newspaper.

PHOTOGRAPH: Jiten Gandhi

Capturing Images Outdoors

Digital cameras are great for shooting out doors. Since this will involve capturing moving moving objects on film, a few things need to be attended to.

The first, and foremost is the shutter speed. Most digital cameras have a shutter speed ranging from 1 second to 1/500th of a second. You can set the shutter speed to its slowest while capturing the sunset to allow maximum amount of light to enter, thereby yielding a vibrant and lively image.

The shutter speed should be as high as around 1/200th of a second, when capturing fast moving objects, such as a speeding car.

Digital cameras also offer white balance settings such as incandescent, tangent, sunlight, etc. Use these settings to improve the image quality, and make it look as close to reality as possible. You can either select pre-defined settings, depending upon the backdrop, or set them manually.

Full Page AD

SCORE BOARD

CATEGORY		LOW-END DIGITAL CAMERAS				
	Canon	**Canon**	**Canon**	**Casio**	**Casio**	**Fuji**
Model	PowerShot A300	PowerShot A60	PowerShot A70	QV-R3	Exilim EX-M1	FinePix F402

CAMERA FEATURES

	Canon PowerShot A300	Canon PowerShot A60	Canon PowerShot A70	Casio QV-R3	Casio Exilim EX-M1	Fuji FinePix F402
Max. Image resolution	2048 x 1536	1600 x 1200	2048 x 1536	2048x1536	1600 x 1200	2304 x 1728
CCD (megapixel)	3.2	2	3.2	3.2	1.2	2.1
Focal length (35mm equivalent)	33 mm	35 - 105	35 - 105	37.5 to 112.5	37	39
Optical Zoom	NA	3x	3x	3x	NA	NA
Digital Zoom	5.1x	2.5x	3.2x	3.2x	4x	3.6x
Macro focus range (cm)	5 to 20	26 to 46	5 to 46	14 to 50	100	6 to 65
ISO setting	50, 100, 200, 400	50, 100, 200, 400	50, 100, 200, 400	125, 250	na	200, 400, 800, 1600
White balance settings	Auto, custom, Cloudy, Fluorescent, Fluorescent H, Daylight, tungsten	Auto, custom, Cloudy, Fluorescent, Fluorescent H, Daylight, tungsten	Auto, custom, Cloudy, Fluorescent, Fluorescent H, Daylight, tungsten	Automatic/fixed (4 modes), manual	Auto, Fluorescent, Daylight, tungsten, sunlight	Auto, Sunny (Fine Weather), Shady, Fluorescent (Daylight, Warm, Cool), Incandescent
Shutter speed range	1 to 1/2000	15 to 1/2000	15 to 1/2000	2 to 1/2000	1/4 to 1/8000	1/2 to 1/2000
Metering modes	Equivalent metering, Center-weighted, averaging/Spot metering	Equivalent metering, Center-weighted, averaging/Spot metering	Equivalent metering, Center-weighted, averaging/Spot metering	Multi, Centre wieghted, Spot	Multi-pattern	64-zone TTL metering, Program AE, exposure compensation in manual mode
Number of flash modes	Auto, Red-Eye Reduction, auto-on, auto-off	Auto, Red-Eye Reduction, auto-on, auto-off	Auto, Red-Eye Reduction, auto-on, auto-off	AUTO, ON, OFF, Red eye reduction	Auto, Red-Eye Reduction, fill flash, flash off	Auto, Red-Eye Reduction, Forced, Suppressed, Slow Synchro
Compressed image format	JPEG	JPEG	JPEG	JPEG	JPEG	JPEG

PHYSICAL FEATURES

	Canon PowerShot A300	Canon PowerShot A60	Canon PowerShot A70	Casio QV-R3	Casio Exilim EX-M1	Fuji FinePix F402
Dimensions (l x w x d) cms	110 x 58 x 36.6	101 x 64 x 31.5	101 x 64 x 31.5	5.9 x 9 x3.1	95 x 55.5 x 39.5	77 x 69 x 22
Weight (grams)	175	215	215	200	56	125
Memory types supported	Compact Flash	Compact Flash	Compact Flash	SD Memory/MMC	SD-MMC	xD-Picture Card
Memory included (MB)	16	16	16	11 (internal)	12 (built-in)	16
Battery form factor	AA	AA	AA	Li-ion-Custom	Li-ion-Custom	Li-ion-Custom

ERGONOMICS

	Canon PowerShot A300	Canon PowerShot A60	Canon PowerShot A70	Casio QV-R3	Casio Exilim EX-M1	Fuji FinePix F402
Comfortable to hold (0-5)	3	4	4	4	2	2
Rubber grip	✘	✘	✘	✘	✔	✘
Menu navigation ease (0-5)	3.5	3.5	3.5	3.5	3	3.5
Comfortably sized buttons (0-2)	1.5	1.5	1.5	1	4	0.5
Special menu navigation buttons	Four-way button	✘	✘	Four-way	Joystick	Two-way button
Build quality of flaps (memory, video/USB door)	average	average	average	good	good	Average

PERFORMANCE

	Canon PowerShot A300	Canon PowerShot A60	Canon PowerShot A70	Casio QV-R3	Casio Exilim EX-M1	Fuji FinePix F402
Image Test (Photoshop)						
Red (mean)	141.81	135.84	138.36	187.48	143.59	137.76
Green (mean)	96.11	96.86	85.45	106.86	90.15	92.61
Blue (mean)	91.25	96	75.95	88.7	75.69	82.91
Luminosity (mean)	109.23	108.43	100.21	128.99	104.52	105.02
Specular Effect (scale of 5)	3.5	4	3.5	2.5	1	1
Gradation in shading (scale of 5)	1	1	3	2	3	3
Details Test (0-2 each)						
Zone 1 Colour reproduction	1.5	1	1	0.5	0.5	0.5
Zone 2 text and wrinkles	1.5	1.5	1	0.5	0.5	0.5
Zone 3 Details	0.5	0.5	1.5	1	0.5	1
RGB Target						
Red (mean)	123	134.25	255	156.55	131.22	197.98
Green (mean)	41.75	44.25	141.03	55.51	54.68	78.47
Blue (mean)	119.43	113.93	228.86	168.68	137.57	176.37
Zoom Test						
Quality (Scale of 5)	2.5	3	2.5	2.5	1	1
Actual Person Image Test						
Quality (Scale of 5)	2	2.5	2.5	2	3	1.5

W & S

	Canon PowerShot A300	Canon PowerShot A60	Canon PowerShot A70	Casio QV-R3	Casio Exilim EX-M1	Fuji FinePix F402
Period of warranty (Years)	1	1	1	1	1	1
Number of authorised service centres	NA	NA	NA	25	25	1
Number of cities with service centres	8	8	8	8	8	1

OVERALL SCORE

	Canon PowerShot A300	Canon PowerShot A60	Canon PowerShot A70	Casio QV-R3	Casio Exilim EX-M1	Fuji FinePix F402
Camera Features (30%)	16	15	19	13	8	14
Physical Features (15%)	4	4	3	4	6	7
Performance (50%)	20.22	20.74	22.45	18.53	13.93	15.2
Ergonomics (5%)	3.3	3.7	3.7	3.7	2.6	2.9
Value for Money	10.88	8.68	8.02	6.53	7.27	6.51
Grade	B	C+	C+	C	C+	C

CONTACT

	Canon PowerShot A300	Canon PowerShot A60	Canon PowerShot A70	Casio QV-R3	Casio Exilim EX-M1	Fuji FinePix F402
Contact	Canon India Pvt Ltd	Canon India Pvt Ltd	Canon India Pvt Ltd	Casio India Company Pvt ltd	Casio India Company Pvt ltd	Jindal Photo Films Ltd
Phone	011-26806572 / 7317	011-26806572 / 7318	011-26806572 / 7319	011-26534537 / 41	011-26534537 / 41	022-28504949
Fax	011-26807180	011-26807181	011-26807182	011-26534542	011-26534542	022-28504044
E-mail	Shyam@canon.co.in	Shyam@canon.co.in	Shyam@canon.co.in	kseth@ casioindiacompany.com	kseth@ casioindiacompany.com	k_mohan/jpl@ jindals.com
Web site	www.canon.co.in	www.canon.co.in	www.canon.co.in	www.casio.co.in	www.casio.co.in	www.fujifilm.com
Price (Rs)	19,995	24,995	29,995	29,995	20,995	30,000

LOW-END DIGITAL CAMERAS

	Fuji	Kodak	Kodak	Minolta	Nikon	Olympus	Samsung	Sony	Sony
	FinePix A303	DX6340	CX6330	DiMage Xi	COOLPIX 3100	C350	Digimax 350SE	P72	P32
	2048 x 1536	2032 x 1524	2032 x 1524	2048 x 1536	2048 x 1536	2048x1536	2048 x 1536	2048 x 1536	2048 x 1536
	3.24	3.1	3.1	3.2	3.2	2	3.2	3.2	3.2
	38-114	36 to 144	37 to 111	NA	38 to 115	NA	34 to 102	39 to 117	33
	3x	4x	3x	NA	3x	3x	3x	3x	NA
	3.2x	3.5x	3.3x	4x	4x	3.3x	2x	3x	3.2x
	10 to 80	10 to 60	13 to 70	25	4cm	20-50	20 to 80	10 to 50	10
	100	100, 200, 400	100, 200	50, 100, 200, 400	50, 100	Auto 60-400	100, 200, 400	100, 200, 400	100, 200, 400
	Auto, Sunny (Fine Weather), Shady, Fluorescent (Daylight, Warm, Cool), Incandescent	Auto, Daylight, Tungsten, Fluroscent	Auto	Auto, Daylight, Warm, Cool), Incandescent	Auto, Daylight, Tungsten, Fluroscent, Cloudy/Speedlight	iESP Auto; Pre-set manual settings: Daylight, Overcast, Tungsten & Fluorescent	Auto,3 modes	Auto,4 modes	Auto, Daylight, incandescent, Fluroscent, Cloudy/
	1/2 to 1/2000	4 to 1/2000	1/2 to 1/1400	2 to 1/1000	4 to 1/3000	2 to 1/1000 sec	4 to 1/2000	2 to 1/1000	2 to 1/1000
	64-zone TTL metering, Program AE, exposure compensation in manual mode	Auto exposure, matrix	Multi Zone AF	Multi segment	256-segment Matrix linked to AF area	iESP multi-pattern; Center Weighted Meter; AE Lock w/1R shutter release position	Program AE	Multi-pattern or Spot	Multi-pattern, spot
	Auto, Red-Eye Reduction, Forced, Suppressed, Slow Synchro, Red Eye+Slow Synchro	Auto, Red-Eye Reduction, fill flash, flash off	Auto, Red-Eye Reduction, fill flash, flash off	Auto, Red-Eye Reduction, fill flash, flash off	Auto, Red-Eye Reduction, fill flash, flash off	Auto, and 5 modes	Auto, Red-Eye Reduction, fill flash, flash off, Slow Synchro	Auto, Red-Eye Reduction, fill flash, flash off, Slow Synchro	Auto, Red-Eye Reduction, fill flash, flash off, Slow Synchro
	JPEG	JPEG	JPEG	TIFF	JPEG	JPEG	JPEG	JPEG	JPEG
	97 x 63.9 x 34.3	10.9 x 6.45 x 3.82	10.2 x 6.5 x 3.8	89 x 71 x 20	8.75 x 6.5 x 3.8	6.7 x 11.2 x 4.0	11.4 x 7.0 x 4.99	11.95 x 5.77 x 3.26	10.13 x 5.77 x 5.2
	200	220	175	143	212	166	240	259	217
	xD-Picture Card	MMC/SD	MMC/SD	SD	CF	xD-Picture Card	CF	Memory Stick	Memory Stick
	16	16 built-in	16 (internal)	16	16	32	16	16	16
	AA	AA	AA	Li-ion, Custom	AA Ni-Mh rechargeable	AA	AA	AA	AA
	2	3.5	3.5	2	4	3	2.5	3.5	4
	✘	✔	✘	✘	✘	✘	✘	✔	✔
	3	3.5	4	3	3.5	2.5	3	2.5	2.5
	1	1.5	1.5	1.5	1.5	1.5	1	1.5	1.5
	Two-way	Joystick	Four-way	Two-way	Four-way	✘	Four-way	✘	
	Average	average	average	average	average	good	average	average	average
	158.24	146.2	149.84	161.75	146.02	132.5	108.18	135.82	145.8
	84.95	108.79	112.91	117.2	99.86	103	59.41	75.05	96.84
	65.11	108.12	111.37	113.32	102.51	103.47	49.87	71.12	80.51
	104.65	119.91	123.78	130.09	113.96	111.88	72.94	92.79	109.66
	2	4	4	3.5	3.5	2	1.5	3.5	3.5
	3	4	3.5	3.5	3.5	3	1	3.5	3
	0.5	1.5	1.5	1.5	1.5	1	1	1.5	1
	0.5	1	1	1	1.5	1.5	1	0.5	1
	0.5	1.5	1	1	1	1	0.5	1	0.5
	201.02	129.52	106.74	188.73	235.43	180.13	159.47	118.08	183.8
	85.24	51.64	33.26	103.14	141.15	63.12	61.09	46.91	105.31
	81.42	132.79	91.42	185.92	255	209.11	168.16	146.95	180.1
	2	2.5	2.5	1	2	2	3	3	2.5
	1.5	2	2	2	1.5	2.5	3	3.5	1.5
	1	1	1	1	1	1	1	1	1
	1	8	8	2	4	8	12	103	103
	1	8	8	NA	NA	NA	8	8	8
	16	20	9	10	18	15	12	14	12
	3	3	4	8	8	5	4	2	3
	14.58	27.06	25.46	25.69	25.5	23.54	13.29	17.89	20.63
	2.6	3.5	3.8	2.6	3.7	2.7	2.8	2.9	3.1
	6.7	12.81	12.5	9.84	11.01	11.56	6.41	7.36	9.68
	🅒	🅑	🅑	🅑	🅑	🅑	🅒	🅒+	🅑

Fuji Finepix M603

Hard to hold, hurts to pay

The M603, with its silver finished plastic body, looks more like a tiffin box than a camera! The most noticeable difference is the absence of an optical viewfinder, replaced by a large 2.5-inch LCD. Due to the new upright design, the shutter release and the zoom controls are placed on the sides of the camera, which takes a toll on usability. Fuji has provided a grip handle that screws into the tripod mount, stabilising the camera when the controls are used.

The M603 has a 3.1 mega pixel CCD, a 3X optical zoom and a 4.4X digital zoom. Shutter speeds range from 1/4 of a second, to 1/2000 of a second with 64 zone TTL metering, using which one can take photographs even in low light conditions. Seven white balance modes have been provided. Apart from the auto mode, the camera has four flash modes. The ISO speed varies from a minimum of 160 to 1600, which is excellent, in case you want to increase the gain of the CCD for night shoots. The M603 has provisions to read both, xD memory cards and Compact Flash Type II cards, and is also microdrive compatible, thus providing you enough memory options to choose from.

In the image test, the average colour deviation was 3 per cent for red, and a little less than 10 per cent for green and blue. The images were sufficiently bright with no dark corners. In the Specular effects and gradation test, the images were strictly average.

The M603 was able to pick out most details, but fared poorly at colour reproduction—it lost all its points due to a dull reproduction in the RGB target test. The F601 was comparatively better than the M603 in this respect. While testing for zoom, and in the actual person test, it showed a decent performance.

The camera is priced at Rs 46,500, which does not justify its so-so performance at all. Chip in a bit more, and you get the IXus 400, which fares much better.

+ Support higher resolutions and various memory formats
– Shoddy ergonomics
Price: Rs 46,500

Fuji Finepix M603	C+
Performance	
Features	
Ergonomics	
Value for money	

Fuji Finepix S304

Can't afford to miss

The S304 looks like a SLR with its huge 6X optical zoom lens, and the new xD memory card. The plastic body has a silver finish, and dark-grey rubber grips are thrown around to produce a stark contrast. The back sports a big viewfinder, with the anti-reflective LCD screen. The buttons are placed within your thumb's reach. The ones pertaining to the LCD are placed just above it.

Ergonomically, the S304 was the best camera in the entire test—the grip on the right side is perfect, and even the batteries are placed cleverly to balance out the weight of the lenses.

The camera features an effective CCD count of 3.2 megapixels, and 6X optical zoom and a 3.2X digital zoom. The shutter speed varies from 3 seconds to 1/2000th of a second. There are five different white balance settings, apart from the auto mode. The only gripe that we found was the 16 MB xD memory card—the camera deserves at least 32 MB.

In the image test, the S304 had no problems detecting red, with an average deviation of just over 3 per cent. Unfortunately, the average deviation with green and blue, was more than 20 per cent. Overall, the image looked a bit dull and saturated. In the specular effect and gradation effect test, nothing quite beats the S304. It lost some critical points while picking up finer details. In the RGB target test, the S304 responded well to red and blue, but failed to pick up green very well. In the zoom test and the actual person test, the scores were average.

At Rs 35,000, it is an absolute must for those looking for a high-end camera on a shoestring budget. It also comes with frills such as a conversion lens adapter. Good features, great performance and most importantly, a terrific price makes it an absolute winner.

> "Is very fast. Does not have the 2-3 seconds wait to fire. Image quality is excellent too. Has a good grip, a digital viewer and is equipped with a hood to block flare. At 40,000 it may sound expensive but makes up on quality. Will get lots of buyers if priced at about 35-38,000. I could be one. "
>
> —*Sherwin Crasto*

+ Excellent ergonomics, good features and value for money
– Quite bulky
Price: Rs 35,000

Fuji Finepix S304	B
Performance	
Features	
Ergonomics	
Value for money	

CANON IXUS 400

CANON S50

FUJI F410

FUJI F601

FUJI M603

FUJI S304

The Canon IXUS 400 gave good colour reproduction, followed by the Fuji FinePix S304. These were the two cameras that reproduced colours better than the others. Canon IXUS produced very decent and smooth-looking specular effects. The Fuji M603's reproduction was a little too harsh and shiny. All the cameras were closely competitive at picking up details and focusing, but Fuji S304 manged to capture every detail, as is apparent from picture where the individual thread in the curtains are visible. The wrinkles on the doll are clearly visible in the images taken by the IXUS, which was nearly on par with the Fuji S304.

The Canon S50, which is 5 mega pixel camera disappointed us in the luminosity test as the image was little dark. The pictures from both, the Fuji F601 and M603, are bright but not as focused and detailed as the IXUS 400 and the S304.

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Full Page AD

CATEGORY	MID RANGE DIGITAL CAMERAS					
	Canon	Canon	Fuji	Fuji	Fuji	Fuji
Model	Digital IXUS 400	PowerShot S50	FinePix S304	FinePix M603	FinePix F601	FinePix F410

CAMERA FEATURES

Max. Image resolution	2272 x 1704	2592 x 1944	2048 x 1536	2832 x 2128	2832 x 2128	2304 x 1728
CCD sensor (Megapixel)	4	5	3.2	3.1	3.1	3.1
Focal length (35 mm equivalent)	36 to 108	35 to 105	38 to 228	38 to 76	36 to 108	39 mm
Optical Zoom	3x	3x	6x	2x	3x	3x
Digital Zoom	3.6x	4.1x	3.2x	4.4x	4.4x	4.4x
Macro focus range (cm)	30 to 46	10 to 50	10 to 80	20 - 80	20 - 80	6 to 65
ISO setting	50, 100, 200, 400	50, 100, 200, 400	equivalent to 100	160, 200, 400, 800, 1600	160, 200, 400, 800, 1600	200 ,400, 800, 1600
White balance settings	Auto, 5 modes	Auto	Auto, 5 modes	Auto, 7 modes	Auto, 7 modes	Auto, 7 modes
Shutter speed range	15 to 1/2000	15 to 1/1500	3 to 1/1500	1/4 to 1/2000	1/2 to1/2000	1/2 to 1/2000
Metering modes	Equivalent metering, Center-weighted, averaging/Spot metering	Equivalent metering, Center-weighted, averaging/Spot metering	64-zone TTL metering, Program AE	64-zone TTL metering	64-zone TTL metering	64-zone TTL metering, Program AE, exposure compensation in manual mode
Number of flash modes	Auto, Red-Eye Reduction, auto-on, auto-off, Slow Synchro	Auto, Red-Eye Reduction, auto-on, auto-off	Auto, Red-Eye Reduction, Forced, Suppressed, Slow Synchro, Red Eye+Slow Synchro	Auto, Red-Eye Reduction, On, Off, Slow Synchro	Auto, Forced, Suppressed, Slow Synchro	Auto, Red-Eye Reduction, Forced, Suppressed, Slow Synchro

PHYSICAL FEATURES

Dimensions (l x w x d) cms	87 x 57 x 27.8	112 x 58 x 42	99.7 x77.3 x 69.3	64.5 x 93.3 x 31.6	72 x 93 x 34	77 x 69 x 22
Weight (grams)	185	260	295	240	220	125
Electronic viewfinder	✗	✗	✔	✗	✗	✗
Compressed image format	JPEG	JPEG	JPEG	JPEG	JPEG	JPEG Exif ver 2.2
Memory types supported	Compact Flash	Compact Flash	xD-Picture Card	xD-Picture Card, CF, MicroDrive	SmartMedia	xD-Picture Card
Memory included (MB)	32	32	16	16	16	16
Power Functions (scale of 5)	3	3	2	3	2	3
Battery form factor	Li-Ion, Custom	Li-Ion, Custom	AA	Li-Ion, Custom	Li-Ion, Custom	Li-Ion, Custom

ERGONOMICS

Comfortable to hold (0-5)	3.5	3	4	2	2	2
Rubber grip	✗	✗	✔	✔	✗	✗
Menu navigation ease (0-5)	3	3.5	4	3.5	3.5	3.5
Comfortably sized buttons (0-2)	1.5	1.5	1.5	1	1	0.5
Special menu navigation buttons	NA	Four-way	NA	Four-way	Joystick	Two-way
Build quality of flaps (memory, video/USB door)	Average	Average	Average	Average	Average	Average

PERFORMANCE

Image Test (Photoshop)						
Red (mean)	133.08	145.97	148	141.53	151.08	127.23
Green (mean)	99.43	86.03	97.28	90.81	96.21	69.07
Blue (mean)	100.97	71.4	81.44	70.5	86.28	66.49
Luminosity (mean)	109.68	102.32	110.67	103.69	111.51	86.17
Specular Effect (scale of 5)	4	4	4.5	3.5	3	2
Gradation in shading (scale of 5)	3.5	4	4.5	3	3.5	1
Details Test (0-2 each)						
Zone 1 Colour reproduction	1.5	1.5	1.5	1	1	1.5
Zone 2 Text and wrinkles	1.5	1.5	1.5	1.5	0.5	1
Zone 3 Details	1.5	1.5	1	1.5	1	1
RGB Target Test						
Red (mean)	154.11	164.51	184	120.81	173.49	174.44
Green (mean)	120.18	70.41	66.97	43.75	74.84	72.34
Blue (mean)	56.18	169.5	169.04	119.65	165.05	151.96
Zoom Test						
Quality (Scale of 5)	3.75	2.5	3.5	3	3.5	2.5
Actual Person Image Test						
Quality (Scale of 5)	3.5	4	3	2	3	2

W & S

Period of warranty (Years)	1	1	1	1	1	1
Number of authorised service centres	NA	NA	1	1	1	1
Number of cities where service centres are present	8	8	1	1	1	1

OVERALL SCORE

Camera Features (30%)	15	16	16	15	16	17
Physical Features (15%)	7	5	3	5	4	7
Performance (50%)	26.64	23.67	25.24	21.77	22.44	13.87
Ergonomics (5%)	3.2	3.3	4	2.5	2.9	2.9
Value for Money	8.16	6.4	10.76	7.62	7.64	9.32
Grade	C+	C	A	C+	C+	D

CONTACT

Contact	Canon India Pvt Ltd	Canon India Pvt Ltd	Jindal Photo films Ltd	Jindal Photo films Ltd	Jindal Photo films Ltd	Jindal Photo films Ltd
Phone	011-26806572 / 7317	011-26806572 / 7317	022-28504949	022-28504949	022-28504949	022-28504949
Fax	011-26807180	011-26807180	022-28504044	022-28504044	022-28504044	022-28504044
E-mail	Shyam@canon.co.in	Shyam@canon.co.in	k_mohan/jpl@jindals.com	k_mohan/jpl@jindals.com	k_mohan/jpl@jindals.com	k_mohan/jpl@jindals.com
Web site	www.canon.co.in	www.canon.co.in	www.fujifilm.com	www.fujifilm.com	www.fujifilm.com	www.fujifilm.com
Price	49,995	59,995	35,500	46,500	47,500	35,000

Fuji FinePix F410
Much glitter, no gold

Fujifilm's FinePix F410 is equipped with a 3.1 megapixel Super CCD. It can pack in a 3 megapixel image size that can be boosted to 6 megapixels using the fourth-generation Super CCD.

The F410 sports a complete metallic body, with clean running lines. Sliding a raised panel on the front switches the camera on, lighting the three blue neon lights. The back of the camera has a neat and clean design, with a good thumb grip. The buttons for menu selection and other settings are placed near the LCD monitor. Due to its metallic body, the F410 does not provide a firm confident grip, and is likely to slip.

Despite its small size, it has no dearth of features. You can select from seven pre-defined white balance settings, or set it to shoot in auto mode. The camera's shutter speeds range from 1/2 a second, to 1/2000 of a second—enough to take photographs under any conditions. The F410 supports ISO speeds ranging from 200 to 1600—sufficient enough to increase the CCD gain, in case you want to shoot at night.

In performance, the F410 could not live up to the reputations built by other Fuji cameras—especially the S304. The F410 took a severe beating in colour reproduction, where the deviation was more than 10 per cent for all the three colours. The camera wasn't able to pick up variations properly, leading to a poor score in the specular effect and gradation test.

Similarly, in the details test, the camera just could not pick up any sort of fine details. The only saving grace was the RGB target test, where the F410 clawed back to its feet by reproducing the colours decently. In the zoom test and the actual person test, the results were worse. Despite the 3X optical zoom, the F410 seems to be quite ineffective in capturing targets that are some distance off. In the actual person test, the photograph turned out quite dark, and showed varying shades of white, indicating poor white balance response.

Priced at Rs 35,000, one does not expect such a poor performance. For the same price range, you should consider the S304.

Fuji F601
Expensive mediocrity

The Fuji F601 has good looks but is hard to operate. Operating the zoom and shutter buttons puts the thumb and forefinger at awkward angles—uncomfortable while taking a photograph.

The F601 has a 3.1 megapixel Super CCD sensor, with a 3X optical zoom and 4.4X digital zoom. Eight white balance settings, and a shutter speed ranging from 1/2 a second to 1/2000 of a second, help snap in all lighting conditions.

In the standard image test, the F601 was able to reproduce the test scene well, without saturating colours. The average colour deviation was not good—less than 7 per cent for red, and more than 10 per cent for blue and green. The images were vibrant, with uniform luminance across the entire frame. The F601 reproduced mild specular effects, but was able to reproduce the gradations perfectly well.

In the details test, it was good at colour reproduction, but lost ground when it came to picking up finer details such as the wrinkles, etc.

In the RGB target test, the camera was better than all its Fuji and Canon counterparts. This was the only test where the F601 excelled, and perfectly reproduced the RGB target with great precision. In the zoom test too, the F601 gave fine results, losing only to the Canon IXUS 400. However, in the actual person test, the F601 performed badly, yielding photographs that looked quite dark.

Overall, it's a good camera, marred by a shoddy design, but is inexcusably over priced.

"Excellent quality of images, but am still trying to figure out how to hold the camera. Looks nice on the table, yet feels funny in the hand with it's ergonomics. But thankfully one can switch off the display even when shooting and conserve precious battery power. At 47,500, for most Indians it will be a back bencher. And yes!, will make excellent pictures for the super-sleuth Bond photographer better known as the Paparazzi. "

—*Sherwin Crasto*

+ Compact form factor
– Extremely over priced
Price: Rs 35,000

Fuji FinePix F410					B-
Performance	▶	▶	▶		
Features	▶	▶	▶	▶	
Ergonomics	▶	▶	▶	▶	
Value for money	▶	▶	▶	▶	

+ High resolutions and ISO speeds
– Over priced
Price: Rs 47,500

Fuji F601					C+
Performance	▶	▶	▶	▶	
Features	▶	▶	▶	▶	
Ergonomics	▶	▶	▶	▶	
Value for money	▶	▶	▶	▶	

Pocket
your Music

Now you can carry your music wherever you go, with the help of portable MP3 players. We look at the latest offerings by various manufacturers to help you select the one for you

Connoisseurs of music are always in search of the perfect portable player. MP3 players have come close with their small form factor and the sheer amount of music you can carry. Though some of them are still expensive, they are a common sight. Here we compare the best of the lot to help you choose one that is best suited to your needs.

MP3 players come in three main categories, depending upon the storage medium used—solid-state, hard drive-based and CD MP3 players. While solid-state memory MP3 players are tiny and extremely portable, they can store a maximum of 256 MB of data. On the other hand, hard drive-based players, such as the Apple iPod offer up to 30 GB of storage space and more features, but they are bigger and much more expensive. CD MP3 players are cheap and use inexpensive media, but do not look as cool as the others. We looked at the solid-state MP3 players available today to help you make the right choice. Solid state MP3 players are tiny memory-based players. The absence of moving parts ensures that you get good quality music regardless of who's rocking the boat.

Apacer Audio Steno BP300
Battery guzzling fashion accessory

This funky and futuristic looking player from Apacer moonlights as a USB portable storage device, a MP3 and WMA player, and also a voice recorder. It has a small rectangular backlit LCD, two volume control buttons and a Play or Pause button that also doubles as a power switch. The record, lock and menu jog switch are located on the underbelly. The LCD displays the track title from the ID3 tag, battery status, and indicates any other chosen settings. Removing the coloured cap at the top of the device reveals a USB connector that plugs directly into the USB port of your computer. The cap can be secured to the device with the cord provided, so that you don't lose it—even if you do, you can use one of the two different coloured spares that are thoughtfully provided, or just choose a colour to match your wardrobe! The player can be worn around your neck, using the provided strap—a good thing too, as it seems fragile.

Connecting the device to your PC is as easy as plugging it into the USB port, either directly or by using the USB extension cord that is provided. It is recognised as a removable drive, and you can use Windows Explorer to copy music or data to it—though the manufacturer strongly recommends using the bundled transfer software, which also includes a format utility. One goof-up here is that when you install the Audio Update application, a window pops up telling you to switch the MP3 device to 'Recovery mode'—there is no information on how to do this, neither in the user guide, nor on the manufacturers Web site.

The 128 MB storage is enough to store 24 MP3s encoded at 160 Kbps with an average size of 5 MB. You cannot create a

Apple iPod 30GB

Hard drive-based MP3 players are the most expensive type, but they also provide the maximum storage space and a plethora of features.

Weighing 176 gms, the Apple iPod sports a plain white front panel, with a stainless steel finished back. It has a 2-inch backlit LCD on the front panel. The front panel also features a rotary wheel and five buttons to control the player—all touch-sensitive. Apart from the 30 GB model we tested, the Apple iPod is also available in 10 GB and 15 GB storage capacities. The 25-minute skip protection ensures that the iPod is the perfect jogging companion. A FireWire (IEEE1394) cable connects directly to the iPod or to the included docking cradle. iTunes and MusicMatch software are provided on a CD for both Mac and Windows users.

The 30 GB hard drive can store approximately 7,500 songs, at 4 minutes per song encoded at 128 Kbps MP3 or AAC formats. You can browse by playlist, album, artist, composer, genre or song. The main menu can be customised, and so can the backlight time and the screen contrast.

You can also use the device as a portable hard drive to transfer any kind of data between different computers. There is also a Line-Out socket that lets you connect your iPod to a stereo system.

The iPod supports MP3, MP3 Variable Bit Rate, AAC, WAV, AA, and AIFF audio file formats. The provided earphones produce crystal clear music at 30 mW per channel for an immersive experience.

We transfered 1 GB of songs, using USB 2.0 from a PC running Windows XP and MusicMatch software, in just about 6 minutes and 25 seconds. The internal lithium-ion battery takes about an hour to charge up to 80 per cent and about 3 to 4 hours to charge fully, it lasts for about 6 hours.

Contact: Apple Computer International Private Limited
Phone: 080-5550575
Fax: 080-5586107
E-mail: indiainfo@asia.apple.com
Web site: www.apple.com/ipod
Price: Rs 45,000 for 30 GB,
Rs 36,000 for 15 GB and
Rs 28,000 for 10 GB

Apple iPod 30 GB	B
Performance	▶ ▶ ▶ ▶ ▶
Features	▶ ▶ ▶ ▶ ▶
Value for money	▶ ▶ ▶ ▶ ▶
Ease of use	▶ ▶ ▶ ▶ ▶

playlist, but can create folders in the removable drive. Note that all the songs inside the folders are listed along with those stored in the root. Though the manufacturer claims that the single AAA battery will last 12 hours, it gave us only 4.5 hours of continuous playback.

The jog switch lets you switch between music and voice modes, and customise other settings. You can choose between five equaliser modes, but there is no user defined equaliser setting possible. You can repeat and shuffle tracks in playback mode, and customise the backlight and power off timings. You can also choose between 16 KHz and 44.1 KHz bit rates for voice recording.

1/2 page V AD

The menu navigation is easy enough. However, the device exits the menu as soon as you view or change an option—very irritating if you need to change two or more options. Operating the device is simple if you are carrying it around your neck, but if it's inside your pocket, you'll have to remove it to access the controls.

The supplied headphones are comfortable, but with below average audio output—there was no difference in sound quality using our reference headphones either. The bass and treble levels of the Hindi track were distorted—the vocals were too sharp and not up to the mark. The data transfer was very fast, taking 1 minute 35 seconds for the 50 MB set of MP3 files.

Its sub Rs 9,000 price and funky looks will make it an attractive buy for teenagers, but it is not a product for serious music buffs. Its average audio quality, poor battery life, bad build quality and poor software need to be considered before buying the BP300.

+ Good set of headphones
+ Fast data transfer
– Poor application support
– No playlist and folder support
– Average audio quality
– Poor battery life
Price: Rs 8,990

Apacer Audio Steno BP300					**B**
Performance					
Features					
Value for money					
Ease of use					

Creative Digital MP3 Player LX100
Top of the charts

The LX100 plays MP3 and WMA audio, has voice recording as well as FM radio. A small and lightweight device, it is extremely portable and can be carried inside your pocket or around your neck. It sports a metallic silver finish and a large backlit LCD. The screen displays song file-names, folders, menu settings, battery status, audio format, playing mode, chosen equalizer mode and even a visualiser. A jog switch controls playback functions and menu settings. Other buttons on the device include a volume and record, play, hold, repeat, and other mode buttons. The play button doubles as an on and off switch.

When connected to the PC running Windows 98 SE and above via the USB port, it is recognised as a removable drive. You can use Windows Explorer to copy files to and from the device. The 128 MB flash memory is non-upgradeable. The internal lithium-ion battery is automatically recharged when connected to a USB port. The battery lasts for 10 hours of continuous play, just as the manufacturer claims.

The 128 MB (or 24 MP3s encoded at 160 Kbps) capacity may not be enough to last over the weekend, but will easily last through your daily commute or morning jogging sessions. You can create a playlist and organise songs inside appropriately named folders. There's no ID3 support, which results in just the file-name scrolling across the LCD display.

Apart from standard repeat and playback functions, you can choose from five equaliser modes, as well as adjust bass and treble as per your choice. FM reception is average, and you can scan for available channels—you can store ten

channels as favourites. You can record voice or radio for up to 8 hours. This is useful if you are interviewing someone, as the clarity is good and you can transfer the recording to your PC. There is no software bundled, the accompanying CD only contains drivers for Windows 98 SE, and warranty and support information.

The LX100's menu is well designed, but the haphazard button placement leaves much to be desired. The bundled headphones are a little too sharp, but the quality of sound we heard with our reference headset was very good. The audio output has good treble, mids and vocals, but the bass is a tad weak. It took almost 2 minutes (1 minute 56 seconds) to transfer the 50 MB set of MP3s.

Overall, the LX100 is a portable, light-weight and feature-rich device with good quality audio output. Considering its features, a price of Rs 9,799 is very good. Thus, it scored well in both the features, as well as the value for money sections, which paved the way to its crown as the winner of our test.

+ Decent set of features
+ Easy installation
+ Large LCD
– No bundled software
Price: Rs 9,799

Creative Digital MP3 Player LX100					**A-**
Performance					
Features					
Value for money					
Ease of use					

Creative Nomad MuVo 64MB
Back to the basics

With a two-piece design, the Nomad MuVo is similar to the Apacer Audio Steno—it can be directly plugged into a USB port. The device features a white removable USB memory stick that slides into a blue-coloured module with the battery compartment. The memory module has playback buttons and a two-colour LED on the front, with volume controls and a repeat button on one side. The unit is lightweight and about the size of a cigarette lighter. The device supports MP3 and WMA formats, and also doubles up as a removable storage device offering up to 64 MB of storage space. However, other features such as voice recording, FM tuner or an LCD screen are conspicuously absent.

To transfer music to the player, all you need to do is remove the memory stick from the unit and plug it into the USB port of your computer. No cables or drivers are required for Win Me, 2000, or XP, and it is automatically recognised as a removable drive. You can use Windows Explorer to transfer files to and from the device. Bundled software includes drivers for Windows 98 SE and a formatting utility. The device only plays MP3 and WMA files stored in the root, and not those stored in folders.

The controls allow you to scroll through the stored tracks, play, pause, control volume and repeat whole tracks, or a particular section of a track. There are no equaliser modes or any other playback features. You cannot view track information, as there is no LCD display. When the battery is low, the LED blinks red. Powered by a single AAA battery, the MuVo gave us almost 11 hours of continuous playback. Most people will find the 64 MB memory capacity insufficient.

Controlling the device is literally child's play, due to good ➔

full page AD

How we Tested

The test bed was a Pentium 4, 3.2 GHz system with an Intel 875 motherboard, 512 MB 333 MHz DDR RAM, a GeForce4 Ti4600 graphics card and a 40 GB Seagate 7200 rpm Serial ATA hard drive, running Windows XP Professional.

We rated all the MP3 players according to their features, performance, ease of use, ergonomics, and their value for money.

Features

Features are what make a device more desirable. They make usability and operability of the device easier. We took note of all the features supported by the MP3 players such as battery life, memory size, its interface, backlight, etc. Some important features are explained below:

Memory size: The higher the memory capacity, the more songs you can store on it.

Battery type and number of batteries: MP3 players, especially those with backlit LCD screens, are power hogs. Those with internal rechargeable batteries are preferred. Also, those that require only a single battery to operate are preferred over those that require two or more.

LCD screen and backlight: An LCD is an obvious advantage as it displays the track, artist and audio format being played. Browsing the menu is also a lot easier.

Remote control: A remote control brings obvious benefits and conveniences.

PC interface: Transferring music onto the player is an important aspect of owning a portable MP3 player. Parallel and serial interfaces are outdated, so those with the faster USB 1.1, USB 2.0 and FireWire interfaces got more points.

Audio formats supported: MP3 isn't the only compressed music format anymore. We awarded points according to the number of formats supported—MP3, WMA, OGG, etc.

Firmware upgrade: Firmware is the software that sits on the chip, and is comparable to an OS. If a player's firmware can be upgraded, it can be relatively future-proofed by adding more features with newer versions of its firmware.

Voice recording: Voice recording capability can make your player double as a dicta-phone. This is obviously desirable.

AM and FM Tuner: An in-built radio tuner offers more variety, and you will not have to make do with only what's on your player— especially when you haven't had the time to load new songs.

ID3 tag: An ID3 tag is basically 128 bytes of track information stored at the beginning of a song—track name, artist, genre, etc. Devices that can read and display this information were awarded more points.

Track Browsing: Track browsing is a much needed feature which lets you jump to any song, and does not limit you to countless clicking of the forward or rewind buttons.

Data Storage: Certain MP3 players can double as portable storage devices. This is an added advantage.

Line-Out: A Line-Out connection allows you to plug your player to other devices, such as your home or car audio system.

Bundled software and accessories: Free software is always welcome! We noted the software bundled and its usefulness, and also made a note of the accessories provided, such as a carry pouch, arm band etc.

Equaliser: An equaliser lets you tweak the playback to suite your tastes. We noted the number of presets available, and whether you can customise the bass and treble levels.

Playlist feature: A playlist lets you choose which tracks you want to listen to, and in the order you want to hear them—obviously a boon.

Repeat: The repeat feature lets you hear your favourite song again and again and again and again and again...

Shuffle: This lets you play songs in random order, for those of you who love surprises.

Performance

What's the use of a player with tons of features, but performs badly. Here's a list of things we kept an eye out for.

Audio quality: We tested the MP3 players by playing five tracks-one with high bass, one with high treble, one English track and two Hindi tracks. Though we used a reference headphone set to test all the players, we also used the earphones supplied with each player to test the quality of both the player and its earphones.

Data transfer speed: We noted the time taken to transfer 50 MB set of MP3 files from the test PC to the player using the bundled software, where applicable. The faster the transfer, the more points a player earned.

Playtime or battery-life: The playtime was tested by fully recharging batteries, or inserting new batteries (as applicable), and playing music continuously at full volume until the battery was drained. The players were then awarded points in order of battery performance.

Ease of use and ergonomics

It is very important for portable devices to be user-friendly. The buttons should be easily reachable and simple to press. Preference was given to players with simple yet functional buttons, so that once you're used to the player you will not need to remove it from your pocket to control it. An easy-to-use menu structure is a must, where you will not need more than three clicks to access any function. We also looked for players with a backlit LCD, for easier operation in the dark.

Value for money

This is calculated by dividing the feature and performance offered with the price that the player is available for. This is especially important, as it gives you a clearer picture about whether a player is priced correctly as per the features and performance it offers—the all-important buying decision depends greatly on this.

button placement. However, as there is no hold-button, if you carry the player in your pocket you are likely to press some buttons inadvertently.

The bundled earphones were extremely clear. However, its treble was sharp and using the player for long periods is a painful experience. The time taken to transfer 50 MB of music to the device over the USB 1.1 interface was a slow 3 minutes and 38 seconds.

Overall, the portability, user-friendliness and good audio output are the definite plus points of this player. At Rs 5,999, the

MuVo 64MB provides good value for those who want a no-frills MP3 player with good audio quality. However, the lack of an LCD screen and poor features will push music enthusiasts towards other, more recent, devices.

+ Good audio quality
+ User-friendly
+ Long battery life
– No LCD
– No voice recording or FM tuner
– No playlist or folder support
Price: Rs 5,999

Creative Nomad MuVo 64MB	Ⓐ
Performance	▶ ▶ ▶ ▶▷ ▶▷
Features	▶ ▶ ▶▷ ▶▷ ▶
Value for money	▶ ▶ ▶ ▶▷ ▶
Ease of use	▶ ▶ ▶ ▶▷ ▶▷

Philips Nike psa[64 Portable Sport Audio
Your workout partner

Boasting of a splash-resistant egg-shaped design, the psa[64 MP3 player from Philips Nike is sports oriented. The buttons are covered with rubber, and an arm band lets you wear the device on your arm. The cord on the bundled earphones loops around the back of your head—the whole idea being to minimise obstruction in sporting activities. The device comes with a magnetic butterfly clip that can be used to secure the earphone cord to your clothes, as well as a wired remote with a magnet that can be stuck to the same clip.

The rubber-coated keypad has a three-way button for controlling next, previous, play and pause functions, apart from two small keys for controlling volume. The play and pause button also serves as a power switch. A button for hold, and another for selecting equalizer modes are located at the top, on either sides of the earphone socket. You can also control playback and volume using the rubber-covered remote.

You need to remove a lid at the rear to access the battery compartment and the USB connection. With its rugged feel and splash-proof design, this device does seem to be the best in the list as far as build quality is concerned. However, the magnetic butterfly clip obviously tends to stick to anything metal that comes close, even the earphone buds—that are covered by a metallic mesh. Secondly, the earphone cord feels short when you do not use the wired remote.

To connect the psa[64 to your PC, you have to install the bundled drivers before it is recognised as a removable drive. Now you can use Windows Explorer or the bundled MusicMatch JukeBox application to transfer your music files. MusicMatch also allows you to convert CD music tracks to MP3 and WMA files. The Resample Rate feature in this application allows you to reformat the tracks transferred to a lower bit rate. This enables you to fit more tracks onto the player by creating smaller files during the transfer, and does not affect the files stored on the computer. The 64 MB memory accommodates just enough tracks for your daily workouts or commutes—about 12 MP3s encoded at 160 Kbps.

There is no playlist support, and though you can create folders, the device will only play tracks stored in the root. Also, you cannot use it as portable storage as it doesn't allow you to store any other file types. You can choose from five equalizer

Sony ATRAC CD Walkman D-NF611

CD MP3 players do not cost a bomb, and use easily available inexpensive media, most play MP3 and audio CDs, and some can also play VCDs. Apart from being a little bulky and not as portable as their solid-state counterparts, the main issue to consider is skipping. Most new CD MP3 players do come with electronic skip protection that takes care of this problem. Here is our take on the Sony ATRAC CD Walkman D-NF611.

The Sony D-NF611 is encased in a plastic silver body and the front panel features a dot-matrix LCD, a four-way navigation and playback key, a jog dial and five other keys. The LCD displays the track ID3 information, battery status, file number, playing time, etc. A hold button at the rear prevents accidental button pressing.

Apart from the standard MP3 and audio-CD formats, the Sony D-NF611 supports ATRAC3plus and ATRAC3. ATRAC3 (Adaptive Transform Acoustic Coding3) is a proprietary compression format that satisfies the need for high sound quality and compression rates. Available transfer bit rates for ATRAC3 are 132, 105 and 66 Kbps, while ATRAC3plus supports 64 and 48 Kbps. However, these formats are not playable on a computer. Since the player supports both CD-R and CD-RW disks, you can use the bundled SonicStage Simple Burner Software to convert your existing audio CDs or MP3 tracks to ATRAC3plus or ATRAC3 formats and burn them onto a CD-RW to maximise the playtime. We were able to accommodate about 275 tracks on a standard 700 MB CD-RW using ATRAC3plus at 64 Kbps.

As far as playback options are concerned, you can play tracks at random, repeat a single track, play tracks within a selected group, play bookmarks of tracks, or selected playlists. The device supports m3u playlists burnt onto MP3 CDs. Depending upon the format of the CD, you can add bookmarks for a fixed number of tracks for up to 10 CDs. A button at the side of the device allows you to increase bass by two levels, and also activate the automatic volume limiter system.

The D-NF611 also features an FM and AM tuner, and you can preset up to 30 stations for FM and 10 for AM. To ensure a skip-free operation, the player has a two-level G-Protection function—one for normal use, and the other enhanced level for use while jogging and exercising. This can be controlled from a small switch found under the lid of the player.

You can power the device using two AA batteries, or the bundled AC adaptor for tethered playback. Measuring 136 x 25.4 x 156 mm and weighing 215 gms, the player is a hefty bundle to carry around, especially as there is no carry case provided. There is provision to attach a strap though.

Audio quality is excellent and the bundled stereo earphones reproduce sound with great clarity. However, even considering its impressive features, this baby may seem a tad overpriced at close to Rs 10,000.

Price: Rs 9,990
Contact: Sony India Pvt Ltd
Phone: 011 – 26959990
Fax: 011 – 26959141
E-mail: mktginfo@sid.in.sony.com.sg
Web site: www.sony.net/walkman

Sony ATRAC D-NF611					Ⓐ
Performance	▶	▶	▶	▶	▶
Features	▶	▶	▶	▶	▶
Value for money	▶	▶	▶	▶	▶
Ease of use	▶	▶	▶	▶	▶

modes, but since there is no LCD, you have to rely on your ears to know what mode you chose. No LCD also means that neither song information, nor battery status is available. A few beeps and a red indicator light warn you that its time to change the single AAA battery. On the other hand, no battery-guzzling LCD also means longer battery life, and we logged a whopping 14 hours of continuous music—much higher than the rated 10 hours.

Audio output using the bundled earphones was extremely good, and with the reference headphones, even better. Output was extremely clear, though a tad sharp using the bundled earphones. However, the psa[64 lost out in data transfer speed. It took us 3 minutes and 39 seconds to transfer 50 MB of music using Windows Explorer.

To sum it up, the ruggedness, good audio quality, long battery life and made-for-sport design of the psa[64 is suitable for all athletes and fitness freaks who love music while working out. However, the lack of an LCD screen and portable storage mode may not make it appealing to a wider audience.

+ Good audio quality
+ Rugged and innovative design
+ Long battery life
− No LCD
− No portable storage option
− No playlist or folder support
Price: Rs 8,500

Philips Nike psa[64					Ⓑ
Performance	▶	▶	▶	▶	▶
Features	▶	▶	▶	▶	▶
Value for money	▶	▶	▶	▶	▶
Ease of use	▶	▶	▶	▶	▶

Samsung Digital Audio Player yepp YP-90S
Yepp, it's expensive!

The mango-shaped Samsung yepp YP-90S is tiny and light, and sports a silver finish. The feature set is very similar to the LX100, boasting MP3 and WMA playback, voice recording and an FM radio. A circular backlit display on the front shows you the name of the audio-file playing, or the mode selected. Volume controls and a record button are also located on the front panel. A jog switch and a mode button are placed on the side, along with the USB connection. The jog switch is used for playing functions and scrolling, while the mode button gives access to the menu.

To connect the YP-90S to your computer, you need to install the bundled yepp explorer. You also get the yepp CD Ripper that can be used to convert audio CDs into MP3 and WMA. The device does not show up as a removable drive, and yepp Explorer is the only way to access the internal memory. Although you can transfer other file types onto the device, it's a little pointless as the other PC should also have yepp Explorer loaded to be able to read the memory.

There is no folder or playlist support, which isn't really needed for a 64 MB device that can only store 12 MP3s encoded at 160 Kbps. It requires two AAA batteries, and a new set lasted just over 11 hours—as opposed to the 15 hours suggested by the vendor.

Apart from shuffle and repeat, an intro mode is also available. You can choose between four preset equalizer modes, or customise bass and treble. The FM tuner comes with 10 presets, but struggles with less powerful stations. Voice recording is done in WAV format

and is reasonably clear. The player switches off automatically, if left idle for about 5 seconds, and there's no way to customise this.

Menu navigation is also fairly simple, but the button placement was disappointing. Not only is it difficult to control the player when it is in your pocket, you need to dig deep into the menu to activate the hold mode. The clip-on carry pouch can be hooked on to your belt, but you still need to remove the device from the pouch to access the controls.

As far as audio quality goes, the bundled earphones provided above average quality output, but with noticeable vibration while playing heavy bass and treble tracks. It took us 1 minute and 36 seconds to transfer the 50 MB of music to the player over the USB 1.1 connection.

The yepp YP-90S offers a decent set of features in an extremely small package, but its dependency on its bundled software and absence of playlist and folder support may warrant a second thought. Also, the price tag of close to Rs 10,000 is too high.

+ Decent set of features
+ Fast data transfer
– Bundled application required to access memory
– No playlist & folder support
– Average quality earphones
Price: Rs 9,990

Samsung yepp YP-90S	B				
Performance	⚑	⚑	⚑	⚑	⚑
Features	⚑	⚑	⚑	⚑	⚑
Value for money	⚑	⚑	⚑	⚑	⚑
Ease of use	⚑	⚑	⚑	⚑	⚑

And the winner is...

Even though there were only five contenders for the top slot in this comparison, we saw a fair bit of variation in features, user-friendliness and performance. The Philips Nike psa[64 was the only player that came with a remote control, but was also the only one that can't be used as portable storage. The Creative LX100 was the only one with an internal rechargeable battery. The Creative LX100 and the Samsung yepp YP-90S both feature FM radio and customisable bass and treble settings. The Creative LX100 is the most feature-rich player amongst the lot, and is also the winner of our Best Performance award.

Both the Creative players were extremely easy to connect to a PC, since they do not require any drivers or software. All the players were small and lightweight, but Samsung was the only vendor to supply a carry pouch, while Philips Nike came with an arm band. The latter was the best in terms of intuitive button placement. The Apacer Audio Steno BP300 is good for comfort because it comes with lightweight clip-on headphones, in contrast to earphones supplied by other vendors.

In pure audio performance, it was a close contest between both the Creative models and the Philips Nike psa[64. However, the former impressed us enough with its great sound reproduction to take the top slot.

For our value for money award, it was a photo-finish between the two Creative siblings, but the Creative MuVo 64MB won because of its audio quality, extreme ease of use and a price tag of just about Rs 6,000.∎

DEEPAK DHINGRA
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SCORE BOARD

CATEGORY		MP3 PLAYERS			
Model	**Apacer**	**Creative**	**Creative**	**Philips Nike**	**Samsung**
	Audio Steno BP300	Digital MP3 Player LX100	Nomad MuVo 64MB	psa[64 Portable Sport Audio	Digital Audio Player yepp YP-90S

FEATURES (50%)

Storage Type	Solid-State	Solid-State	Solid-State	Solid-State	Solid-State
Storage Capacity	128 MB	128 MB	64 MB	64 MB	64 MB
Battery Type, No. of Batteries	AAA, 1	Li-on, internal	AAA, 1	AAA, 1	AAA, 2
Rechargeable Batterie(s) (Y/N)	✘	✔	✘	✘	✘
Separate Power Adaptor (Y/N)	✘	✘	✘	✘	✘
Inbuilt Display (Y/N)	✔	✔	✘	✘	✔
Remote Control (Y/N)	✘	✘	✘	✔	✘
PC Interface	USB 1.1	USB 1.1	USB 1.1	USB 1.1	USB 1.1
Audio Formats Supported	MP3, WMA	MP3, WMA	MP3, WMA	MP3, WMA	MP3, WMA
Firmware Upgradeable (Y/N)	✔	✔	✔	✔	✔
Voice Recording (Y/N)	✔	✔	✘	✘	✔
AM/FM Tuner (Y/N)	✘	✔	✘	✘	✔
ID3 Tag Support (Y/N)	✔	✘	✘	✘	✘
Power Saving Mode (Y/N)	✔	✔	✔	✔	✔
Customisable Equalizers (Y/N)	✘	✔	✘	✘	✔
Preset Equalizer Modes	Normal, Classic, Jazz, Pop, Rock	Normal, Classic, Jazz, Pop, Rock	Nil	Funk, Rock, Normal, Techno, Hip Hop	Normal, Classic, Jazz, Rock
Portable Data Storage (Y/N)	✔	✔	✔	✘	✘
Folder Support (Y/N)	✘	✔	✘	✘	✘
Bundled Software	Audio Update, Audio Format, Drivers	Win 98 Drivers	Format Utility, Drivers	MusicMatch Jukebox, Drivers & Utilities	yepp Explorer, CD Ripper, Win 98 Drivers
Bundled Accessories	Headphones, AAA battery, Neck Strap, USB Cable	Earphones, Neck Strap, USB cable	Earphones, AAA battery, Neck Strap, USB Cable	Earphones, AAA Battery, Arm Band, Cord Clip, USB Cable	Earphones, AAA batteries, Carry Pouch, USB cable
Playback Features					
Custom Playlists (Y/N)	✘	✔	✘	✘	✘
Track Repeat (Y/N)	✔	✔	✔	✘	✔
Track Browser (Y/N)	✔	✔	✘	✘	✔
Shuffle Tracks (Y/N)	✔	✔	✘	✘	✔
Intro Mode (Y/N)	✘	✘	✘	✘	✔

ERGONOMICS

Dimensions (mm) W X H X D	93 x 31 x 28 (approx)	80 x 45 x 17.5	73 x 35 x 16	60 x 68 x 27	50 x 78 x 21.9
Weight (Gms)	32	51	28	50	36
Intuitive Button Placement (Scale of 5)	2.5	2	3	3.5	2
Interface/Menu Navigation (Scale of 5)	3	3.5	4	4	3.5
Earphone Comfort Factor (Scale of 5)	4	3	3	3.5	3
Portability (Scale of 5)	4	4	4	4.5	4.5
Backlit Display (Y/N)	✔	✔	✘	✘	✔
Screen Contrast Adjustable (Y/N)	✘	✔	✘	✘	✔

PERFORMANCE

50 MB Data Transfer (secs)	95	116	218	219	96
Battery Life (Hrs)	4.5	10	11	14	11
Audio Quality (Scale of 5)					
Heavy Treble & Flange Track	3	4	4	4	2.5
Heavy Bass Track	2	3.5	4	4	2.5
English Track	2.5	4	4	4	3.5
Hindi Track #1	3	4	3.5	3.5	3.5
Hindi Track #2	2	4	4	4	3.5

W & S

Warranty Period (Years)	1	1	1	1	1
No. of Authorised Service Centres	7	16	16	200	710

OVERALL SCORE

Features (50%)	26.00	34.50	16.00	15.50	26.50
Ease of Use (15%)	9.90	10.30	9.20	10.20	10.70
Performance (35%)	15.00	22.60	22.10	23.10	20.40
Value for Money	56.62	68.78	78.85	57.41	57.66
Grade	🏅	🏅	🏅	🏅	🏅

CONTACT

Vendor Name	Xserve India Pvt. Ltd.	Creative Labs Asia	Creative Labs Asia	Philips India Ltd	Samsung India Electronics Ltd
Phone	080-5572601	91-98203-57713	91-98203-57713	022-56912334	011-51511234
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E-Mail	info@xserves.com	rajshekhar_bhatt@ ctl.creative.com	rajshekhar_bhatt@ ctl.creative.com	richa.singh@philips.com	sanjay.gajamer@ samsung.com
Price (in Rs)	8,990	9,799	5,999	8,500	9,990

*Disclaimers: All prices are subject to variation, * Lower scores indicate better performance*

Use the word 'write' in a conversation today, and you'll have everyone thinking you're talking about burning a CD. That's how commonplace CD-Writers are today. All and sundry ran out and bought one when their prices plummetted, because everyone wanted a cheap backup solution. From a backup of all your office documents, accounts sheets and e-mails to your favourite songs, movies and family pictures, all can be frozen in time on a little cheap disc. That's the beauty of a CD-Writer, its just so darn useful, and so darn cheap!

CD-Writers are commonplace now—who needs a CD-ROM drive when a CD-RW drive can read, write and rewrite, and only costs a little more! But wait, DVDs are popular too, and almost everyone wants one. So, *Viola!,* manufacturers come up with another Jack-of-all-trades drive—the combination drive. This drive can not only read, write and rewrite CDs, but also play DVDs. What else could one ask for? Confused? Don't worry, we plan on helping you decide on a drive, and make the drives sweat it out in our tests. After all, we're talking performance and money here!

Features

We received 11 CD-RW drives for the comparison tests. Since the number was quite considerable and the brands various, we checked out the features and package contents of each drive that came in.

The Asus CD-RW drive was packed to its gills—you name it, they gave it, from an extra data cable, to an audio cable to connect to legacy sound cards. All the other drives provided at least a CD-R and the CD-writing software. Plextor and Krypton disappointed us; Plextor provided only the Nero writing software and their proprietary PlexTools, with a quick installation guide and warranty card. Krypton

Speed, quality and deeds—all put to test in the battle of drives

The Write Fight
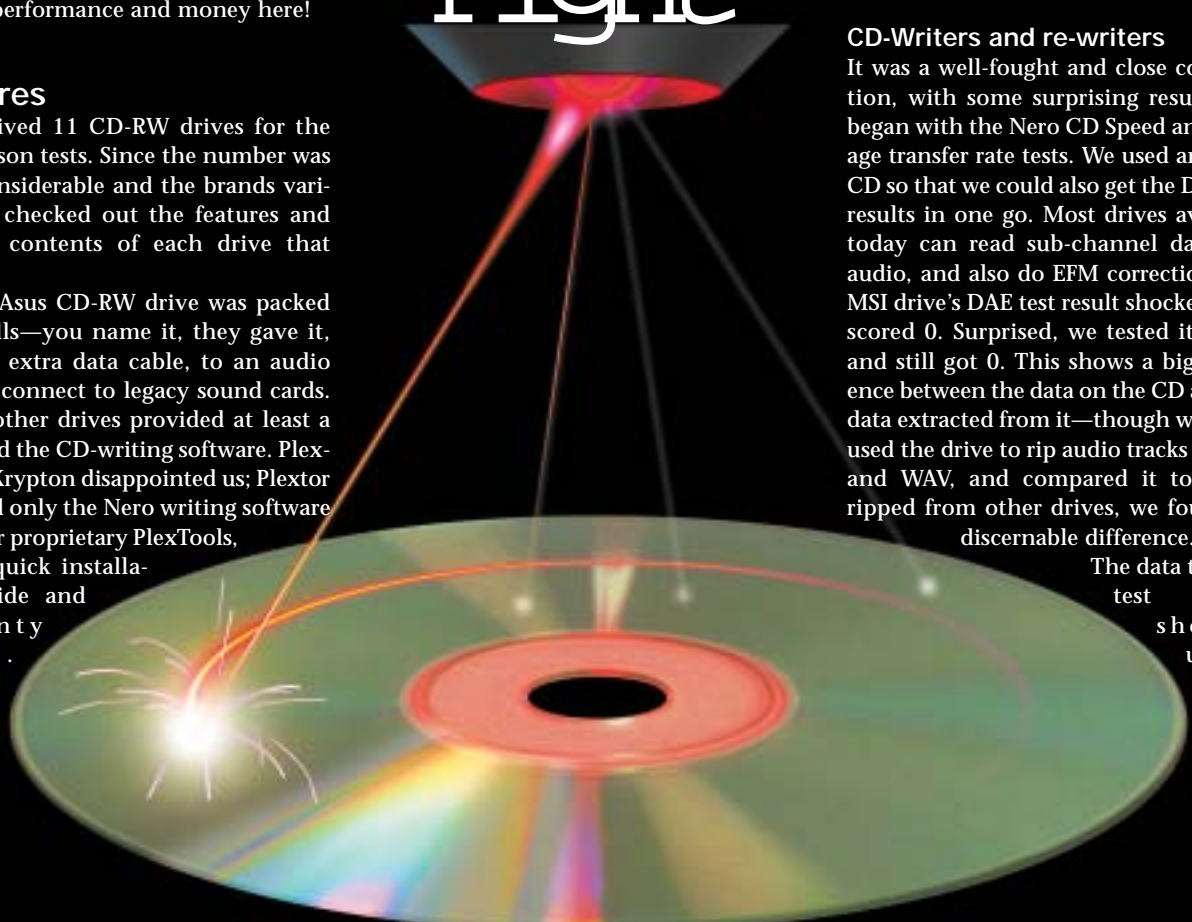
only provided an audio cable and the Nero CD burning software. Other manufacturers provided a CD-R and in some cases, a data cable and CD-RW as well. This made Plextor look bad, considering that it's a premium drive manufacturer.

Asus and MSI were the only drives that had two separate LEDs to indicate read and write. The MSI drive was a real looker, with a black front bezel and transparent buttons which also function as LEDs. Some drives had only a single-coloured LED to indicate both read and write, which is very misleading. If you're burning something and your sibling opens the drive or presses a button, instead of a CD with a back up of your valuable data, you end up with a coaster for your coffee mug.

We also checked the features that some of the drives provided while the other's missed out on, such as Mount Rainier (*see box 'Jargon Buster'*). All the drives were vertically mountable and thus the real meat of the competition lay in the performance tests, to which we move on next.

Performance

CD-Writers and re-writers

It was a well-fought and close competition, with some surprising results. We began with the Nero CD Speed and average transfer rate tests. We used an audio CD so that we could also get the DAE test results in one go. Most drives available today can read sub-channel data and audio, and also do EFM correction. The MSI drive's DAE test result shocked us. It scored 0. Surprised, we tested it again, and still got 0. This shows a big difference between the data on the CD and the data extracted from it—though when we used the drive to rip audio tracks to MP3 and WAV, and compared it to tracks ripped from other drives, we found no discernable difference.

The data transfer test also shocked us. The worst

of the lot turned out to be Plextor. We were shocked to see its abysmal data transfer rate of 8X. Next in line was the Liteon 48X drive, with a poor transfer rate of 18.9X. The best of the lot was Asus, with a transfer rate of 39.04X. It was followed closely by the BenQ with 37.59X and the Liteon 52X, which scored 36.44X. Transfer times are most important for transferring data to a hard disk.

Next up were the access or seek time tests. Plextor disappointed us again, with an access time of 126 ms while BenQ came up tops with 82 ms. In real world performance, this translates into faster reading of a disc. The spin-down time was also noted.

The Asus drive comes with a great bundle of goodies

Remember that for higher drive speeds, more spin-down time is required. Since all the drives had comparable speeds, it shouldn't have mattered here. Again we were in for a surprise—Asus was the worst with 10.56 seconds, BenQ was close behind with 6.82 seconds and Plextor made up for its former poor performances by topping this test with 0.01 seconds.

SiSoft Sandra was used to gauge the sequential and random read speeds. The sequential read speeds remained stagnant between 3.5 and 4 MBps for most drives. However, in the random read speeds, Krypton topped the tests with a speed of 1,186 KBps. Samsung had the lowest score with 787 KBps, which was surprising considering its 8 MB buffer. Samsung also did badly in the access time test, with 254 ms. The honours for the fastest access time went to the Krypton 52X, followed by the Liteon 52X and the Plextor respectively.

Finally, we ran the extraction tests, in which the drives had to extract the first, middle and last track from a pressed audio CD. The AOpen drive was the fastest and the Asus drive came in last.

In order to test the drives for writing and re-writing, we did many tests involving the burning and ripping of audio and data CDs. The first test was the sequential write test, in which we used a 700 MB movie file and timed the burning process. The Sony 52X proved to be the fastest, burning the file in 155 seconds, the Asus 52X was the slowest, taking 174 seconds.

The assorted CD burning test was a neck to neck competition. The LG 52X took the crown with 153 seconds, surpassing even its own sequential write time. Samsung timed a very poor 207 seconds, leaving us wondering where its 8 MB buffer went.

The CD-to-CD copy test proved to be the Liteon 52X's undoing, which took a

Copy-Protection

Copy-protection is the technology devised to protect media content, be it streaming or static, from being copied. Although, it is okay to make one personal backup copy of any media for archival purposes, media companies are taking no chances and are aggressively using different copy protection techniques to protect their content. Some very popular techniques in use by game publishers are SafeDisc from Macrovision and SecuROM from Sony. Audio CDs use Cactus Data Shield by MidBar Technologies.

SafeDisc: SafeDisc 2 is the latest incarnation, and comprises three main features—an authenticating digital signature, encryption that protects the content and anti-hacking software.

SecuROM: SecuROM is a copy-protection technique made by Sony and is employed by game publishers. The process involves adding a unique electronic SecuROM key to the CD-ROM using special glass-mastering equipment also manufactured by Sony DADC. The catch lies in the electronic key, which is difficult to copy to a CD-R.

These protection techniques can be worked around using certain copying software. CloneCD is one such one-to-one backup CD software that is commonly used. We tried copying a few copy protected discs using CloneCD, to get around Safedisc and Securom protection for all the drives we tested. All the drives were able to circumvent both Safedisc and Securom—except for the twins from BenQ, which failed both the tests, and the LG GCE-8523B which failed the Securom test.

How We Tested

The system we tested the drives on was a Pentium 4, 2.8 GHz on an Intel D850MV motherboard with integrated sound card and 512 MB RD RAM, a GeForce3 display card, a 40 GB Seagate Barracuda as primary master and a Samsung 52X CD-ROM as primary slave, running Windows XP Professional. All drives were then connected as secondary masters, and their performance in the various test categories was noted. Performance accounted for 90 per cent of the drives score, while the remaining 10 per cent was based on less important details such as packaging, half-height, etc. The value for money was calculated as a scaled ratio of the scores, obtained in the features and performance tests, divided by the price of the drive. To make things easier, we divided the drives into two categories—CD-Writers and combination drives (CD read, write, rewrite and DVD read).

CD read, write and re-write tests

These tests are common for both categories. We used Nero CD Speed and SiSoft Sandra for the read speed test.

Nero CD Speed: This software is used to test the data transfer rate, access or seek time, CPU usage time, the burst rate of the drive, drive motor spin up and spin down, and finally, the DVD eject and load time. Tests that are related to time are measured in milliseconds; data transfer is either measured in KBps or MBps while drive speeds are measured in terms of X. We used the same data CD on all the drives.

We also did a Digital Audio Extraction

(DAE) quality test of the drives. In this test, the software extracts audio sectors from three different locations on the CD and stores it on the hard drive. The CD is then read again, and compared to the extracted audio on the hard drive. A pressed audio CD was used to get the DAE quality results. Nero CD Speed assigns scores ranging from 0 to 10 for the DAE test, with 10 given for no difference in the files.

SiSoft Sandra: Here, we measure the Sequential and Random Read speeds of the drive, as well as the average access time. The media used here is the same data CD that was used for the Nero test. Higher results in the Sequential and Random read speed tests, and lower access times, attracted more points.

Audio Extraction Speed Test: We used a pressed audio CD and extracted the first, middle and last tracks from it audio CD. The criteria considered here were the time taken by the drive to rip the tracks and convert them to .wav format. The audio CD used was the same for all the drives. The quality of the track is not given much importance; however, the presence of audible hisses, clicks and pops was noted, and subtracted from its score.

CD writing tests: This is a complete battery of tests which was common for both categories of drives. The tests comprised writing data sequentially (single file test), random writing (assorted write test), burning an image file, a CD-to-CD copy test and writing an audio CD. The time taken for each is measured and the points are awarded accordingly. The Samsung 52X CD-ROM on our test bed was used in the

CD-to-CD copy test for all drives. We also used the fastest media available—48X.

CD re-writing tests: We did two tests here—the assorted write speed test and the CD-RW full erase test, and the time taken for each was noted. We had to make do with 24X re-writable media, as this is the fastest available.

Copy Protection Tests: This is a new category of tests, which comprises of making a back up of a game or data CD that is copy protected. This is important as it is a very gruelling task for the drives, and helps us test the lens quality. Points were awarded to the drives which were able to perform this test without any hitches.

DVD read tests

For the DVD performance test, we used three different software; each covering a particular aspect of the drive's read performance.

Nero DVD Speed: This test was the same as the CD tests, except we used a pressed DVD. The same DVD was used to test all the drives. Also, the maximum number of DVD formats supported was also considered—and scores were awarded accordingly. Points were given for access time, burst rate, spin-down time and disc recognition times.

SiSoft Sandra: This test was performed twice for the combo drives, to measure both CD and DVD read speeds.

DVD Decrypter: This software is used to extract a .vob file from the DVD to the hard drive, and the time taken is measured. This test was only applicable for combination drives. Lower extraction times were given higher scores.

Plextor Premium

Does the thought of fitting 1 GB of data on a 700 MB CD interest you? Well, this Plextor drive lets you do just that. Not only can you fit 1 GB of data on a normal 80 minute, 700 MB CD-R, you can password-protect your data as well. If you try playing this password-protected CD on any other computer, you will get a disc-read error. This can be controlled by downloading the SecuView software and running it on the system where you want to view the CD.

Plextor calls this feature GigaRec, and the password-protection feature is called SecuRec. The maximum capacity of a disc is dependent on the type of disc and the GigaRec rate. All this looks rosy, but there are a few catches—the discs burned, using the Gigarec feature are not read correctly in some drives.

whopping 509 seconds. The MSI finished the fastest, with 448 seconds. Moving to the assorted data CD re-writing test, the BenQ drive took the top spot with a speed of 217 seconds. The MSI drive was the first to erase the re-writable disc, finishing in just 218 seconds. The AOpen finished last, taking 312 seconds for both the writing and erasing.

The AOpen CRW 5224 is a slow re-writer

In the EFM test, the drives were supposed to make an exact copy of an EFM encoded, copy-protected disc. The BenQ failed this test, while all the others passed with flying colours.

There were a few annoying things that we came across while testing. The AOpen, Sony and MSI drives are set to run at a fixed speed of 40X, with 48X for Sony. You need to press and hold the eject button to make the drive write at faster speeds. Also, the BenQ drive was temperamental and

refused to work on any system that had BlindWrite installed. The Patin-Couffin layer that installs with the default installation of the software was found to be the culprit.

The Samsung SW-352's 8 MB buffer does not seem to help it

Combination drives

With the advent of DVD-ROM drives and the spread of CD-R and RW drives, it was just a matter of time before drives that combined the two began popping up in the market. Combination drives are now very affordable and also space saving. International brands such as Toshiba, TEAC and Hitachi are still not available in the Indian market, and we tested the five available brands—BenQ, LG, LITEON, Samsung and Sony.

The packaging and contents of all the drives were similar. Liteon and Sony were the only drives that had a half-height form-factor. This is useful for people who have micro-ATX boards and small cabinets. Also, another advantage was the support for the Mount Rainier standard. Most drives featured a standard single eject button and multi-coloured LED on the front bezel. Samsung was the only drive that had a 52X CD write and 16X DVD read speeds. BenQ was the slowest with 32X CD write and 12X DVD read speeds.

We used a non-encrypted data DVD-ROM for our Nero DVD Speed tests. The test results were quite surprising, to say the least. Especially the burst rate tests,

Decision Maker

You want	You need	Look for	The models	Price range
To backup a lot of data	A high performing CD-Writer	A 52X CD-Writer with more buffer size	Krypton 52X/32X/52X or Liteon LTR-52327S	Rs 2,900 to Rs 3,500
A multi-purpose drive	A good combination drive	A combination drive that gives good performance	Sony CRX 300 A or Liteon LTC-48161H	Rs 4,200 to Rs 6,300

DVD Regions and Its Intricacies

Soon after the DVD format was standardised world-wide, the movie industry divided the world into six regions. These are:

Region 1: USA and Canada
Region 2: Europe, Near East, South Africa and Japan
Region 3: South East Asia
Region 4: Australia, Middle and South America
Region 5: Africa, Asia and Eastern Europe.
Region 6: The People's Republic of China.

This was done mainly to stop the movement of movies across boundaries. Earlier, PC DVD-ROM manufacturers earlier used to manufacture region-free DVD drives that could play DVD's from any region. Such drives were called RPC-1 drives. But after January 1, 2000, this changed; The new RPC 2 drives were region locked. You can only change the region five times, after which your drive is locked to the last selected region.

For the region protection to work, the disc itself must be set to a specific region code (which most discs are), and then either the DVD drive or the playback software must match the disc's code to

their own code for playback to work. If the drive itself is locked, the software or hardware decoder will rely on the drive to confirm the region match. If the drive is region free, then the decoders try to enforce the region protection.

If your drive is set to a specific region, you will be unable to play a disc from a different region. This can not be bypassed without replacing the checking mechanism within the drive itself. This can only be done with a firmware update.

However, there is software that help the drive bypass this protection. One such software is DVD Region Free, which we used to test the drives and see if it could bypass the region-coding protection. We used a Region 1 DVD to test the drives. None of the drives were set to any specific region and with DVD Region Free disabled; the dialog box to set the drive to a specific region popped up when we tried playing the DVD in PowerDVD XP. Once the software was enabled, the DVD automatically started to play. The software side-stepped the code and successfully played the DVD on all the drives.

SCORE BOARD

CATEGORY	COMBINATION DRIVES				
	BenQ	**LG**	**Lite-On**	**Samsung**	**Sony**
Model	1232C	4480B	LTC-48161H	SW-352	CRX 300A
Drive Specifications					
Speed	32X/ 10X/ 40X/ 12X	48X/ 24X/ 48X/ 16X	48X/ 24X/ 48X/ 16X	52X/ 24X/ 52X/ 16X	48X/ 24X/ 48X/ 16X
Interface Type	E-IDE	E-IDE	E-IDE	E-IDE	E-IDE
Data Buffer Size (MB)	2	2	2	8	2
Tray build quality	3	3.5	4	3	3
Controls on the drive front bezel	Single eject button	Single eject button	Single eject button	Single eject button	Single eject button; dual purpose
Indicator LED's	Single, Multi-colour	Single, Multi-colour	Single, Multi-colour	Single, Same Colour	Single, Same Colour
Vertically Mountable	✔	✔	✔	✔	✔
Half-height	✘	✘	✔	✘	✔
Silent Operation (scale of 5)	3.5	4	4	3	4
Mt.Rainier Support	✔	✔	✔	✔	✔
Package Contents					
Data Cable	✘	✔	✘	✔	✔
Audio Cable	✘	✔	✔	✔	✔
Manual	✘	✔	✔	✔	✔
CD-R	✔	✘	✔	✘	✘
CD-RW	✘	✘	✘	✘	✘
CD Writing Software/ DVD software	✔	✔	✔	✔	✔
DVD Read Performance : Nero DVD Speed					
Average Transfer Rate (X)	5.59	2.83	6.27	2.79	6.39
Random Access/ Seek Time (millisecs)	83	81	70	61	60
CPU Usage (1X)	32	31	36	34	33
Burst Rate (MBps)	0.6	1	20.3	0.8	20.2
Spin Up/ Down Test (spin down time) (sec)	1.49	3.2	1.74	0	1.78
Eject/ Load Test (recognition time) (sec)	9.07	5.23	4.85	3.16	5.3
SiSoft Sandra 2003					
Sequential Read MBps	7	3.5	5	8	4
Random Read KBps	752	697	675	1088	673
Access Time (recognition time) (fullstroke, ms)	305	297	324	205	324
VOB file extraction test (DVD Decrypter)					
Extraction time required (sec)	161	104	52	41	53
CD Read Performance: Nero CD Speed					
Transfer Rate (average) measured in X	21.31	30.98	37.3	34.73	31.86
Access/ Seek Time (random) (millisec)	88	96	91	116	91
CPU Utilisation (8X) %	12	5	15	84	16
Burst Rate (MBps)	364 KBps	1	16	1	16
Spin Up/ Down Test (spin down time) (sec)	2.29	4.09	3	0	3.03
Eject/ Load Test (recognition time) (sec)	6.21	5.64	6.52	7.7	6.62
DAE Quality	5	10	10	10	10
SiSoft Sandra 2003					
Sequential Read (MBps)	2.9	3.5	4	3.5	3.5
Random Read (KBps)	455	868	998	756	998
Access Time (recognition time) (fullstroke, ms)	482	225	195	268	186
Extraction Test (dbPowerAmp)					
Track 1 (sec)	13	7	5	7	9
Track 8 (sec)	9	10	5	6	10
Track 15 (sec)	11	4	8	27	5
CD Write Performance: CD-R					
Single data file write (sec)	347	171	167	173	188
CDR assorted data write (sec)	350	172	189	171	163
iso write (sec)	257	131	131	152	131
CD Copy (sec)	355	240	487	218	219
Audio CD write (sec)	313	158	157	189	154
CD-RW					
Assorted Write (sec)	486	221	295	225	292
RW Erase (sec)	518	223	290	227	283
Warranty & Support(Years)	1, Carry in	1, Carry in	1, Carry in	15 months from the date of manufacture	1, Carry in
Features (10%)	4.63	6.15	6.54	7.70	6.28
Performance (90%)	41.68	65.05	66.99	67.08	68.97
Value for Money	9.26	14.83	17.30	14.24	12.04
Grade	C	C+	B-	C+	C
Vendor name	BenQ India Pvt ltd	LG Electronics India Pvt Ltd	Mediatech India	Samsung Electronics India Information & Telecommunication Ltd	Rashi Peripherals
Phone	022-25705231	0120-2560900/ 940	022-22014083	011-51511234	022-28260258
E-mail	salesenquiryin@benq.com	response@lgezbuy.com	sales@mediatechindia.com	marketing@samsungindia.com	ho@rptechindia.com
Price (In Rs)	5,000	4,800	4,250	5,250	6,250

*Disclaimers: All prices are subject to variation, * Lower scores indicate better performance*

Jargon Buster

Access Time: The total time a device requires to find and retrieve a piece of information.

Absolute Time In Pre-groove (ATIP): Address and recording information encoded in the wobble groove on CD-R and CD-RW media. Based on this information, a burner can determine the absolute position in Pregroove.

Buffer Under RuN (BURN)-Proof: For a CD-RW drive to support the BURN-Proof feature, it must make use of a special LSI (Large Scale Integration) chipset. These chips contain proprietary microcode developed by Sanyo. In order for BURN-Proof to work, the CDR Software used for recording must also be BURN-Proof compatible.

Eight bit to Fourteen bit Modulation code (EFM): EFM is the modulation code used in all CD recording. This low-level and very critical channel coding technique maximizes pit sizes on the disc by reducing frequent transitions from 0 to 1, or 1 to 0.

Error Correction Code (ECC): A system of scrambling and recording redundant data onto the disc as it is recorded. During playback, this redundant information helps to detect and correct errors that may arise during data transmission.

Firmware: Firmware is the programming instructions contained on a ROM chip within the CD recorder, which tells the recorder how to respond to commands issued by software. Some firmware is flash-upgradeable—you can upgrade the firmware by running a piece of software. Other firmware is coded into a non-rewriteable chip, so the entire chip must be changed in order to upgrade firmware.

ISO 9660 Format: The most common international standard for the logical format for files and directories on a CD-ROM. Some other common logical formats such as Joliet and Rock Ridge are extensions of ISO 9660.

Joliet: Joliet is an extension of the ISO 9660 standard developed by Microsoft to allow CDs to be recorded using long filenames, and using the Unicode international character set. Joliet allows you to use filenames up to 64 characters in length, including spaces.

Lead-In: An area at the beginning of each session on a recordable compact disc which is left blank for the session's Table of Contents (ToC). The lead-in is written when a session is closed, and takes up 4,500 sectors on disc (1 minute, or roughly 9 MB).

Lead-out: An area at the end of a session which indicates the end of the data. The first lead-out on a disc is 6750 sectors (1.5 minutes, about 13 MB) long. Any subsequent lead-outs are 2250 sectors (.5 minute, about 4 MB). Writing the lead-out closes the session.

Mount Rainier: This is a standard for high speed CD-RW drives that enables native OS support for data storage on a CD-RW disc. It makes data storage easier by including features such as defect management, drive 2K addressing, background formatting and standardisation of both the command set and physical layout of the drives.

One of the biggest advantages of having a Mount Rainier supported drive is that you don't need to wait for the drive to format a CD-RW before putting some data onto it. This is the background formatting feature at work.

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where we got extreme highs and lows of data transfer. Liteon and Sony were neck-to-neck in competition with 20.3 MBps and 20.2 MBps respectively, while the other three drives languished below the 1 MBps mark. The Samsung drive took the crown in the disc recognition tests with a time of 3.16 seconds; BenQ came in last with 9.07 seconds. Sony won the transfer rate tests, with a speed of 6.2X; Samsung came in last with 2.79X—the increase in buffer size did not seem to help much.

In the SiSoft Sandra tests, it was the Samsung which shone in the sequential read tests with a transfer rate of 8 MBps, while the BenQ surprised us with a good 7 MBps, leaving the other three drives eating its dust. The same trend was repeated in the random read tests. The access time scores were a completely different story with the Liteon and Sony drives finishing last. Samsung again took the top honours with 205 seconds followed by LG with 297 seconds.

In the VOB file extraction test, the Samsung 52X finished the extraction in just 41 seconds, 11 seconds earlier than

SCORE BOARD

CATEGORY	CD-WRITERS						
	Aopen	Asus	BenQ	Krypton	LG	LITEON	LITEON
Model	CRW 5224	CRW-5224A	CRW5224W	52X32X52X	GCE-8523B	LTR-48246K	LTR-52327S
Drive Specifications							
Speed	52X/ 24X/ 52X	52X/ 24X/ 52X	52X/ 24X/ 52X	52X/ 32X/ 52X	52X/ 24X/ 52X	48X/ 24X/ 48X	52X/ 32X/ 52X
Interface Type	E-IDE	E-IDE	E-IDE	E-IDE	E-IDE	E-IDE	E-IDE
Data Buffer Size (MB)	2	2	2	2	2	2	2
Tray build quality (Scale of 5)	3.5	4.5	3	3.5	4	4	4
Controls on the drive front bezel	Play, Next Track & Stop, Eject	Play, Next Track, and Stop, Eject	Play, Next Track, Stop, Eject	Play, Next Track, Stop, Eject	Single eject button	Single eject button	Single eject button
Indicator LED's	Single, Multi-colour	2	Single, Multi-colour	Single, Multi-colour	Single, Same Colour	Single, Multi-colour	Single, Multi-colour
Vertically Mountable	✔	✔	✔	✔	✔	✔	✔
Half-height	✘	✘	✘	✘	✘	✔	✔
Silent Operation (scale of 5)	3.5	4	4	3	4	4	4
Mt.Rainier Support	✔	✔	✘	✘	✔	✔	✔
Package Contents							
Data Cable	✘	✔	✘	✘	✔	✘	✘
Audio Cable	✔	✔	✔	✔	✔	✔	✔
Manual	✘	✔	✔	✘	✔	✘	✘
CD-R	✔	✔	✔	✘	✘	✔	✔
CD-RW	✘	✔	✔	✘	✘	✔	✘
CD Writing Software	✔	✔	✔	✔	✔	✔	✔
CD Read Performance: Nero CD Speed							
Average Transfer Rate (X)	31.16	39.04	37.59	31.36	31.54	18.9	36.44
Random Access/Seek Time (millisecs)	90	109	82	83	106	84	85
CPU Utilisation (8X) %	8	7	6	6	100	49	22
Burst Rate (MB/s)	1	17	18	17	17	3	17
Spin Up/Down Test (Spin down time) (sec)	3.79	4.71	6.82	2.39	2.13	4.19	4.69
Eject/Load Test (Recognition time) (sec)	3.35	10.56	3.63	7.81	4.36	5.62	5.44
DAE Quality	10	10	10	10	10	10	10
SiSoft Sandra 2003							
Sequential Read (MBps)	3.4	3.7	4	4	3.5	4	4
Random Read (KBps)	905	910	993	1186	998	980	1162
Access Time (Recognition time) (Fullstroke, ms)	211	215	200	155	185	209	164
Extraction Test (dbPowerAmp)							
Track 1 (sec)	4	10	10	6	6	9	7
Track 8 (sec)	7	12	6	6	9	15	7
Track 15 (sec)	4	15	8	5	7	18	4
CD Write Performance: CD-R							
Single data file write (sec)	174	175	168	157	156	159	156
CD-R assorted data write (sec)	180	183	172	173	153	161	156
ISO write (sec)	126	139	121	130	123	130	125
CD Copy (sec)	452	466	459	454	451	483	509
Audio CD write (sec)	145	155	142	161	166	164	147
CD-RW							
Assorted Write (sec)	312	231	217	219	233	298	220
RW Erase (sec)	312	227	224	230	231	295	225
Warranty & Support (Years)	1, Carry in	1, Carry in	1, Carry in	2, Carry in warranty	1, Carry in	1, Carry in	1, Carry in
Features (10%)	5.58	7.52	6.29	4.94	6.38	6.08	6.46
Performance (90%)	71.81	69.16	76.64	82.62	73.26	61.26	80.67
Value for Money	29.20	21.91	29.62	29.28	28.44	26.67	29.09
Grade	A	B	A	A	A	A	A
Vendor name	Xserve India Pvt Ltd	Asus - India	BenQ India Pvt Ltd	Priya India Ltd	LG Electronics India Pvt Ltd	Mediatech India	Mediatech India
Phone	080-5572601	9820213336	022-25705231	022-56663100	0120-2560900-940	022-56396696	022-56396696
E-mail	bhavna_gupta@ xserves.com	info_india@ asus.com.tw	salesenquiryin@ benq.com	priyabom@ priyagroup.com	response@ lgezbuy.com	sales@ mediatechindia.com	sales@ mediatechindia.com
Price (In Rs)	2,650	3,500	2,800	2,990	2,800	2,525	2,995

Left axis labels: FEATURES (10%), PERFORMANCE (90%), OVERALL SCORE, CONTACT

CD-WRITERS			
MSI	Plextor	Samsung	Sony
CR52-M	W5224TA	SW 252	CRX220E1
52X/ 32X/ 52X	52X/ 24X/ 52X	52X/ 24X/ 52X	52X/ 24X/ 52X
E-IDE	E-IDE	E-IDE	E-IDE
2	2	8	2
4	4	3	4
Play, Next Track, Stop, Eject	Single eject button	Single eject button	Single eject button
2	Single, Multi-colour	Single, Multi-colour	Single, Multi-colour
✔	✔	✔	✔
✔	✗	✗	✗
4	4	3	4
✔	✔	✗	✗
✗	✗	✔	✔
✔	✗	✔	✗
✔	✗ (Quick installation guide)	On CD-RW	✗
✗	✗	✗	✔
✗	✗	✔	✔
✔	✔	✔	✔
31.88	8	31.42	31.51
78	126	91	86
6	97	9	14
1	17	1	17
0	4.16	1.39	4.24
8.96	0.01	4.07	5.43
0	10	10	10
3.3	3.5	3.5	3.5
902	1100	787	933
208	161	254	204
12	9	7	9
6	24	6	6
9	17	6	5
163	172	158	155
164	183	207	157
125	139	126	129
448	477	457	491
149	159	152	144
223	238	279	294
218	231	284	296
1, Carry in	1, Carry in	15 months from the date of manufacture	1, Carry in
6.46	4.88	7.25	6.08
71.72	65.68	67.80	71.12
25.22	10.09	21.44	14.99
Cyberstar	Zeta Technologies	Samsung Electronics India Information & Telecommunication Ltd	Rashi Peripherals
080-2276986	022-24102288	011-51511234	022-28260258
narend@ cyberstarin.net	tejas@ zetaindia.com	marketing@ samsungindia.com	ho@rptechindia.com
3,100	6,990 + taxes	3,500	5,150

its nearest competitors Liteon and Sony, who finished with 52 and 53 seconds each. This bodes well for the Samsung drive, as faster data transfer rates is good for users who are always copying data to and from the hard drive.

The Nero CD Speed tests also saw some very tough competition. All the drives gave a DAE quality of 10 with an accurate stream, except BenQ, which logged in a DAE quality score of 5 without an accurate stream. The LG 52X had the fastest disc recognition time, while the Samsung came in last. The LG drive stood first in the CPU utilisation tests, needing only 5 per cent CPU power at an 8X read speed, while the Samsung logged in the highest with 84 per cent—not good news if you intend to multi-task. All the drives successfully backed up the copy-protected data discs-except the BenQ drive, which failed both the copy-protection tests.

And the winner is...
CD-R/RW drives
The Krypton 52X/32X/52X was the unanimous winner in terms of performance. It beat all the big brands and came out tops in the performance tests, earning our Best Performance award. Although the manufacturers still need to take care of the packaging and at least provide a CD-R with the drive.

The BenQ CRW5224W was the winner of the Best Value award. The packaging of this drive is among the best and it

The only thing the Krypton lacks is packaging frills

also packs in a 2 MB buffer, costs less than Rs 3,000 and a 1 year warranty.

The BenQ has all it takes to please your wallet

Combination Drives
The Sony CRX 300A drive showed extremely good performance results, and took our

Sony is the best performer, speed limit not withstanding

Best Performance award. The build quality of this drive is quite good and ti has a 2 MB buffer which takes care of the buffer under-run risks. If only the speed limit feature could be turned off somehow!

The Liteon LTC-4161H is a valued performer

The Liteon LTC-48161H takes the best value award. It is the lowest priced drive among all the entrants, and also does a pretty good job in all fields.

BHASKAR BANIK
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With the arrival of digital cameras, we don't think twice before clicking away to glory. Unlike their film-based counterparts, digital cameras have no costs associated with each photo clicked. Due to the sheer number of images stored on the computer, we end up with file names such as '000_0121.jpg'. Now, renaming all these images is a nightmare, and searching for a particular image becomes downright exasperating.

For those who occasionally snap images and have only about a hundred images to manage, the image management in Windows XP is sufficient. It also comes with Camera Wizard that helps you transfer images from the camera to the hard drive. Most cameras come bundled with basic image management soft-

ware, but these are just like the Windows Explorer—they will let you browse through your pictures and let you arrange them in different folders, but not much more.

The digital camera, and the problems of management that it brought along with it, has spawned a new market for software developers. Most imaging software companies such as Adobe and Jasc, have released products in this segment, and existing players such as ACD and Ulead, have greatly improved theirs.

Although these software don't have any precise requirements, their target audience is very clear—the home segment. Considering this, it is imperative that the software be user friendly. The majority of the target users are novices, and so user-friendliness has

been given precedence over features in the tests we did.

ACD See 5.0

ACD See is one of the more popular photo management software. Sadly, it still carries the dated interface, even in version 5. Compared to other software, it has a cluttered interface that is difficult to navigate. Removing some menus and the side pane would help, but that brings down usability. Browsing a large database of images might be difficult for new users.

Clicking away all the time, but no album to show for any of it? We give you the superpowers needed to organise, clean, edit and send all your photographs

Who's afraid
Of Photo Clutter?
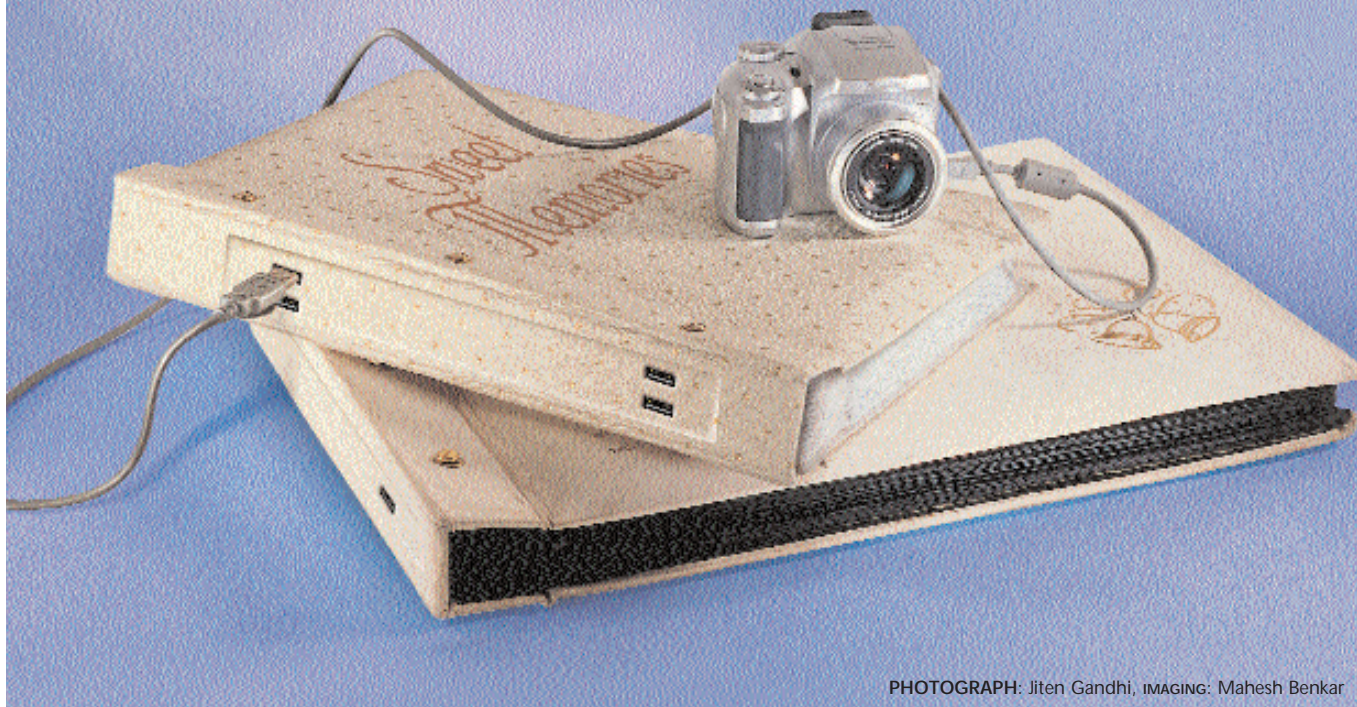
PHOTOGRAPH: Jiten Gandhi, IMAGING: Mahesh Benkar
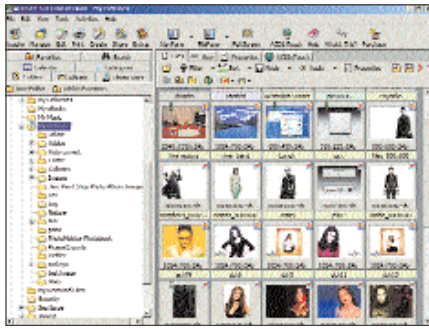
The cluttered interface lets ACD See down

A calendar view lets you view images by the year, month or date they were created. Although this is an improvement, it's nothing compared to the timeline feature provided by other software. ACD See has a comprehensive search feature, allowing you to search by varied criteria such as colour depth. But this gift has become a curse; there is not a single field where the user can enter keywords.

The slideshow is another area where ACD See shows signs of aging. Creating a custom slideshow using images from multiple directories is difficult. An important area that ACD See has completely left out, is that there is no tool for creating calendars, albums, or e-cards.

On the brighter side, the software provides a decent image editor—apart from basic image editing features, it allows you to use various easy-to-use filters such as pencil drawing and oil paint.

Moreover, the software can be used as the default viewer for all image files. However, in the end, the software doesn't serve its basic purpose, and is a product you can do without.

Adobe Photoshop Album 1.0

Adobe has entered this segment with Photoshop Album. It has all the traits of an Adobe product, from the friendly interface to the long boot up time that lets you memorise the names of the programmers that appear on the splash screen. Nevertheless, Photoshop Album is a comprehensive image management software.

User-friendliness is a characteristic that can be seen everywhere in the software. There are a few features that help this software beat the crowd—the time-
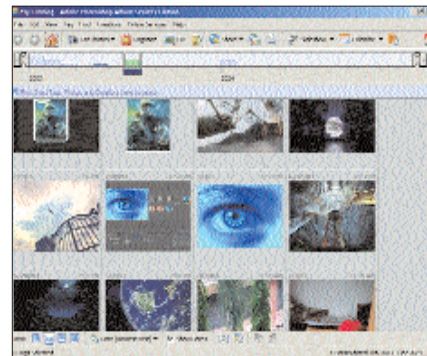
Photoshop Album has a very useful Timeline feature

line shows the dates at which images were taken, and small bars indicate how many images were clicked in that month or on that date.

The second feature that makes Photoshop Album stand tall is its various ways of using images. One can create greeting cards, calendars and photo books, and even embed audio. The Creation Wizard makes the whole process a breeze, but all these creations can only be saved only as PDF files.

Another unique feature lets you search for an image that is visually similar to another. Select the images to be used for reference, and select *Find > By color similarity with selected photo(s)* to get all the similar images on your hard drive. You can also create 3D virtual rooms with your images on the walls, and take a 3D tour of a room.

Photoshop Album does have its share of woes. You cannot select multiple images by clicking and dragging the mouse over them, as in Windows Explorer. Also, the program only offers basic image editing features, and you cannot add any special effects to the images. In spite of these limitations, Photoshop Album's user-friendliness and features make it an attractive buy for home users.

Picasa 1.0

In direct contrast to ACD See, Picasa has an excellent interface. It is simple, with few but relevant buttons. The scroll bar position indicator always stays in the middle, and only needs to be dragged slightly to scroll. Another scroll bar at the bottom of the screen lets you adjust the number of thumbnails you see on the screen.

How We Tested

We tested the software on a Pentium III 500 MHz system with 128 MB RAM, running Windows XP. A total of 200 images consisting of a mixture of existing images and photos taken using a Kodak CX6330 were used. The software were rated on the following features:

Interface: Being targeted at the home segment, the interface should be user-friendly. It should not be cluttered with buttons and menus, and all the important features should be easily accessible.

Ease of browsing: This is the most important aspect of the software. One should be able to view all the images based on parameters such as date, captions, etc. The software should have good searching abilities, based on more than one search criteria. You should be able to view the images by creating custom slideshows.

Image Editing: Apart for basic features such as cropping, size reduction, rotation and resizing, the software should be able correct some common errors in the images, such as red eye effect, glare, etc. The ability to add some effects to the image is a bonus.

Printing support: The layout of the print should be controllable, such as the number of images on a side. The program should also offer features such as index print. The software should provide features to use the images in the form of greeting cards, calendars, and albums. It should support archiving of images.

Extra features: Most software have unique features such as creating Panaromic images, PDA support, etc. These features may be appealing to certain people.

Picasa's interface is a pleasure to use

Folders are listed as separate albums, and you can import images from the camera or from albums—there is also an option to exclude duplicates that have same file name. Picasa has a picture tray in the bottom, to which you can drag images that you wish to club together—to view as a slideshow, print, e-mail, etc.

Picasa also has an innovative and original timeline. Unlike Photoshop Album, which has a static timeline, Picasa has a dynamic timeline—when you select 'Timeline,' the program goes into full-screen mode showing the time-line as an arc. The albums are arranged according to the date of the first image. So the timeline can be used more as a tool for general browsing, rather than for strict sequential viewing of images. In the full screen mode, however, the images are slightly blurred.

In the editing department, Picasa provides only three features—red eye removal, crop and single-click enhance. Another sore point is that it can't be used for viewing images. Double-clicking a thumbnail only gives a bigger view of the image, and you can't zoom. To view an image in full screen, you have to

PDA your Images

PDA users can use an application called PhotoMeister (*www.photomeister.com*). This image management software allows you to create photo albums that can be viewed on your PDA. The creation process is fairly simple. Select the images, and click a button at the bottom. The wizard will ask you a series of simple questions, such as which OS your PDA runs and the resolution to be used. It then creates a photo album file that you can copy to your PDA. There are many other applications that do a similar job, such as Hero E-Photo Album (*www.heroshare.com*).

enter the slideshow mode, which again shows blurry images.

This software is acceptable only for those who want an easy-to-use interface, and do not need even basic image editing features.

Paint Shop Photo Album 4

Jasc's After Shot is now re-christened Paint Shop Photo Album. Compared to its adversaries (Adobe Photoshop Album and Ulead Photo Explorer) it is toothless, with an average interface and Explorer-style browsing. Though it uses the con-ventional interface, the buttons on the top provide access to all the important tools such as e-mail, slideshow, and print.

On the left pane there are four tabs—Browse, Search, Keywords and Info. The Browse tab displays a folder tree. The keywords tab reveals a preset list of key-words that you can add or remove from images. The Info tab reveals complete details of the selected images. Similarly, the Search tab brings up the search menu, from where you can perform a search based on a maximum of three parameters. You can't mix the parame-ters, for example, you can't search for all images with the keyword 'Family' and
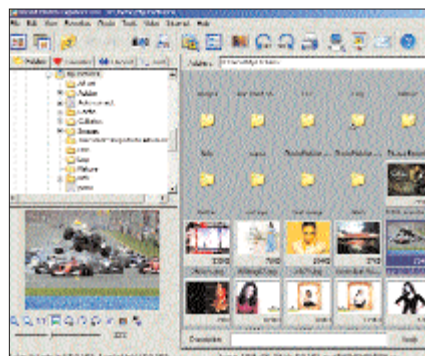
Photo Album has very easy-to-access controls

Remove the Duplicates

Over a period of time, you may have a lot of duplicate files on your hard disk. Some of them may be exact copies, while others may be resized, rotated or cropped versions of the original. If you have a large collection of images, finding them is very hard. Photoshop Album allows you to search for images based on a visual comparison, but it won't find all duplicate entries.

A nifty utility called Unique Filer lets you find all the duplicate files in your hard disk. It performs a pixel level comparison of the images to find duplicate entries. Just specify the folders, and it will scan for duplicate files. Similarly, it can scan for other documents based on content, and on other parameters such as filename, size and contents.

file names starting with 'h'.

Double-clicking a thumbnail gives you a larger view of the picture, and clicking Adjust brings up the adjust wiz-ard. This helps you adjust the image step-by-step, previewing the changes along the way. You can also add various effects such as adding frames, fisheye, ripples, etc. Although it has a tool for creating panoramic images (joining sev-eral images to get a larger image), we just could not make one, and ended up with just a collage of all the images we used.

Printing is another department where Photo Album excels. Click on Print to get a huge list of layout options in the right pane. You can use the Adjust tab to zoom, rotate or pan an individual image, or provide a caption for each image. Overall, Photo Album has a decent interface, excellent editing and ➜

A menu-less interface drives the Photo Organizer

Photoshop Your Album

Let's take a look at how Photoshop Album eases the task of managing images.

STEP 1 **Importing images**
The first thing you need to do is import images directly from a camera, a scanner or from your hard drive. To import images, click on Get Photos in the taskbar, and select the appropriate option from the drop-down box. You can import images as well as audio and video files. If you are importing from a camera or scanner, you will have to provide a destination folder and an image format. If you already have Adobe PhotoDeluxe or Activeshare albums, you can import from them as well. To import these albums, go to *File > Get Photos* and choose PhotoDeluxe Album or Activeshare Album. You can also customise the arrangement of images into Catalogs. Go to *File > Catalog > New Catalog*, to create a new catalogue. Thus, if your computer has many users, each user can catalogue their images separately.

STEP 2 **Tagging images**
Once you have imported your images, you have to organise them. Without image management, this is a cumbersome task, as you can't have an image in two groups without putting them in both group folders, thus wasting disk space. With image management software, each image can be associated with one or more tags.
To tag images, click on Organize in the taskbar—you will see a list of tags on the left. The tags also have sub-categories, for example, under People you will find Family and Friends. To add a tag to an image, click on an image, select the desired tag and click on Attach in the left pane. You can also drag and drop a tag onto an image. Do this for multiple images by selecting the images (using [Ctrl]) and dragging and dropping the tag, or by selecting Attach.

All tagged images are displayed as an icon on the bottom-right corner of the image. Hovering the mouse over this icon will show a tool tip with the tags added to that image. To remove tags, just right-click on an image and select Remove tag—you will see a list of tags assigned to that image. Select the ones you want to remove, and click OK. Two important tags are Favorites and Hidden. When you assign the Favorites tag, it is given precedence when searching. Similarly, when an image has the Hidden tag, it does not show up in the search results. To display hidden images, you have to select Hidden as well as your desired Search tag, when searching.

STEP 3 **Searching**
There are many ways to perform a search in Photoshop Album. Above the thumbnails, you will see a 'Find' bar. You can drag a tag to this bar to search for all files matching that tag. Dragging and dropping an image to this bar will search for all images similar to it. After a search is done, all images are sorted into two categories, viz, those that match and those that don't. To perform a search based on other parameters such as filename, media type, etc, you have to use the Find menu in the menu bar. From here, you can also search for images classified as 'Unknown date or time' and those with no associated tags.You can sort images based on fields such as date, folder location, and so on. The current field being used is displayed as the button name. Adjacent to that button, you can find buttons to change the layout of the screen, rotate the current image, show or hide the properties pane, etc.

STEP 4 **Image Editing**
Using Photoshop Album, you can edit general errors in images. Select an image and click Fix in the taskbar. This brings up the Fix Photo window. On the right, you'll see different tools—Single Click Fix, Crop, Red Eye Removal, Brightness and Contrast, Lighting and Color Saturation.
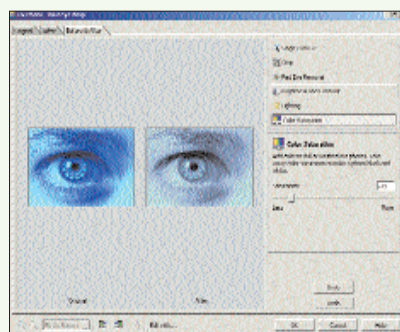
Photoshop Album offers basic editing features to improve on your images

On the top of the window is a tab called 'Before & After'; select that tab to see a comparison of the image after a change is made to the original file. If you want to make some general improvements to the image, try the Single Click Fix first. There are four controls for it—Auto Color, Auto Levels, Auto Contrast and Sharpen. Just click the button, and the program will adjust the image correspondingly. After you make the changes, the system will save the image in the format 'originalfilename_edited.filetype'—so 'digit.jpg' will be saved as 'digit_edited.jpg.'

STEP 5 **Archiving**
Photoshop Album provides both backup and archiving features. You can restore the program to exactly the way it was, before taking the backup. This offers protection against any data loss or other anomalies. To create a backup, go to *File > Backup*, and choose

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printing support, and is a good buy.

Preclick Photo Organizer 2.0

Preclick Photo Organizer has a pretty big list of features that it does not offer—it can't import images directly from a camera or scanner, and can't print images. The only editing you can do is 'Rotate', and you'll miss other features such as EXIF support, calendar, greeting card creation, etc.

To its credit, Photo Organizer has one of the best interfaces. At the bottom of the screen is a list of all the thumbnails and above it is a bigger view of the selected image. Below the thumbnails, is the timeline—if you let the mouse hover over a line, you get the dates of images corresponding to that portion of the timeline. When the thumbnails are sorted according to folder or title, the timeline gives the name of the folder or title.

On the right is the information pane, where additional information about images is displayed. Each image can be rated, with a maximum of four stars. Also, each image has an associated caption, subject, event and place tag. Below these are the Folder field, Find field, Rating field and Sort-by field. The Find field allows you to search for any detail about the image.

Photo Organizer is strongly recommended if you have a small collection of images, and need better features than what your OS offers. Its strength is its interface and ease of use, but it offers no additional features. The company also

between a Full backup or Incremental backup. The former does a complete backup, while the latter only saves all the data since the last backup. The data can be written onto a CD directly, or saved as a file. To restore the information go to *File > Restore*. Archiving is a feature whereby you can select images to be archived, and the system writes the images to CD. A low resolution version of the image will be maintained on your hard disk. When you try to use an archived image, you will be prompted to insert the CD.

STEP 6 **Creations**

Using the images in your collection you can create albums, slideshows, video CDs, greeting cards, e-cards, calendars and photo books. These are called Creations. Select all the images you want to use, and click on the button to the right of the Fix button. This will bring up the Creations wizard that will guide you step-by-step through the process of building the desired creation.

The 3D gallery is a unique way to share your images.

There is a creation called Adobe Atmosphere 3D Gallery that can be accessed through the Creations menu in the menu bar. It is a unique method of sharing your photos online with others— your photos are placed on the walls of a virtual gallery building, where users can go around in 3D space to view your images. There is even provision to allow multiple visitors to view the gallery at the same time. Select the images to be shared and start the Atmosphere 3D gallery. Then, in the pop-up menu that appears, select the style of the 3D room that you want—a preview of the room will also be shown. Then enter other details such as the size of the images and the title of the gallery.

The program will output a set of documents to a folder as in the menu, and will start the gallery automatically after exporting the files. But to view the gallery in a browser (only Internet Explorer is supported), you have to download the Adobe Atmosphere player from *www.adobe.com/ products/atmosphere/downloadplayer.html*. After installing the player, open the index.html file in Internet Explorer to start the 3D gallery. You can upload these documents to the Internet, and others with the player can view the gallery and can even interact with each other.

offers a shareware version called Lifetime Organizer.

Ulead Photo Explorer 8.0

A comprehensive package from Ulead, Photo Explorer performed consistently in all the sections. If not for its conventional interface, it could have made it to the top. Photo Explorer uses the Windows Explorer-style interface, with thumbnails listed in the main window, a preview pane below the folder tree and only relevant controls in the toolbar.

If you have a huge set of images, and searching and tagging is your priority, then keep away from Photo Explorer. You can't view the different search parameters together from the search menu. Not only do you have to shuffle between menus, you get
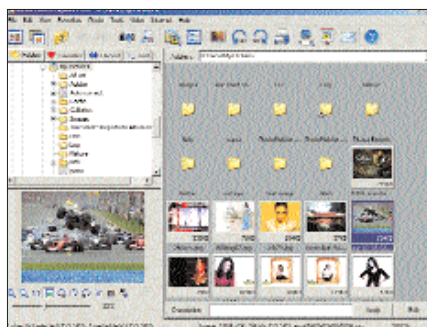
Ulead has a conventional Windows Explorer-style interface

Recover Lost Images

When you delete an image from a digital camera's memory, it isn't actually erased. Like a hard disk, it just deletes the reference to that image. Thus, using a low-level access to the camera's memory, you can recover lost images. There are utilities that allow you to recover the images, but since low level access depends on a lot of things such as the type of memory used and make of the camera, the utility may or may not be successful.

Zero Assumption Digital Image Recovery, a freeware, lets you recover images, in addition to other shareware tools such as PhotoRescue *www.datarescue.com/photorescue/*). The latter can even recover data from memory cards, USB sticks, etc.

We tested these utilities on various cameras and they worked with cameras manufactured by Minolta, Nikon, Fuji and Sony, and not with the ones manufactured by Kodak and Cannon.

incorrect results due to entries that you aren't aware of. It has the worst tagging feature of all, with no predefined tags, forcing you to enter tags separately. What's worse, you can only add descriptions to images individually, and can only rate them as A, B or C.

Apart from these drawbacks, the software has a good set of features. It comes with a standalone viewer—Ulead Instant Viewer, which can be used as the default viewer. The image editor is also quite impressive and has utilities such as histograms, focus changing, lens distortion, and so on. It also lets you preview

a change before applying the alterations.

The CD catalog feature automatically asks you if you wish to create a catalogue of a CD when you insert a CD with images on it. After you click Yes, the program will go through the entire CD and create a virtual folder. If you select this folder later, you will be asked to insert the corresponding CD. However, you can't view thumbnails of a virtual folder unless the corresponding CD is in the drive.

And the winner is.....

Photoshop Album, Picasa and Preclick Photo Organizer deserve credit for changing the conventional interface and bringing in better interfaces, suitable for home users. But traditional players such as ACD, Jasc and Ulead have backed their products with a good set of features.

In the end, Adobe comes out with the honours because it has the best combination of features and user-friend-

liness. Photoshop Album does not offer conventional features such as an image viewer, filters, special effects, and so on, but it lets you to use your images in various ways. Its excellent interface helped hammer in the nails in the coffins of the others.
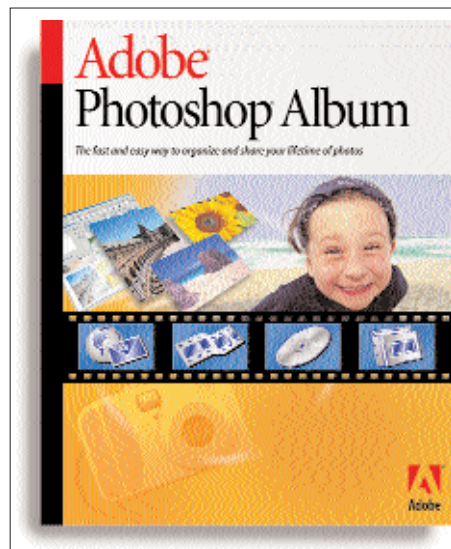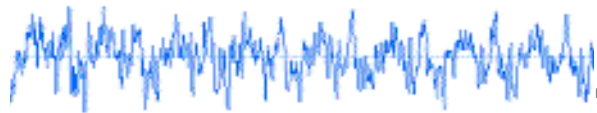
The other software also show flashes of brilliance; Photo Album has excellent printing support. Those who want to add a lot of effects to images should choose Photo Explorer. If you don't want to spend anything at all, opt for Photo Organizer. But, if you insist on the best, then there's nothing to beat Adobe Photoshop Album... yet. ◼

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Sound Advice

Maudlin about a number, and wish it never fades? Well, here's how you can sustain that oldie, and keep those sentiments alive…

Everyone has a favourite number, that sentimental oldie, which brings back sweet memories dear to you. Unfortunately, getting to play that song may involve a lot of effort—rummaging through old cassettes, or flipping through a dusty stack of records, reading them, label by label. Once that's done, and you find the song you're looking for,

you'll realise that the deck you've not used for years has a dirty head, or needs re-alignment, or maybe your record player has a broken belt. Ouch!

Got all that sorted out? Great! Now, the song that you remember so clearly in your head doesn't seem that clear to your ear. Dusty old tapes, having to repair your deck, the perpetual hissing sound—all

this is a bit too much for our ears that are accustomed to CD-quality audio, and our click-to-play minds. Abort! Abort!

Plan B?

It seems that the easiest thing to do would be to just download the song from the Internet. So, you fire up your file-sharing applications, and run a search—without much success. Next, you query your favourite search engine, and run through all the MP3 sites you've bookmarked—all in the hope that they may have your number. By now, you are wondering why is this so difficult-after all, it took just a few minutes to get that Enrique song the other day.

The problem is that you're more likely to find yet-to-be released songs by Madonna, than something Status Quo sang 15 years back. Defeated and dejected, you now consider (…gasp!) buying the CD. Seems logical enough, but just like the Internet, chances are that it will be

Find it on the Mindware CD
Advanced MP3 Catalog Pro
Cool Edit Pro 2.1
J. River Media Center 9

IMAGING: Parag Joshi

hard to find, with no one stocking it—and that's only if somebody actually came out with the CD in the first place.

Plan C. Do we have a plan C? Is there really another way? Yes! With a little effort, you could record your old favourites onto your own PC at home. With just a little more than the time it takes to listen to your tunes once, you can record them, and have instant access to them in the future—just like the rest of your collection.

So, what do I need?
Not much actually. At the bare minimum, you need a sound card, which you probably have already. Apart from that, some software and maybe a CD writer.

You start off by hooking up your cassette deck to your PC, and recording the music. Next, it is cleaned up, and made to sound better. Then you organise your music, and burn it onto CDs.

There are several software tools you

one file, or separate files), lay down markers for easy reference whilst editing, adjust the offset levels if the left or right channel is louder, view the recording time, and, quite thoughtfully, the time for which you can record before you run out of disk space. Recording quality is not an issue either. SoundForge is capable of handling higher bit depths and sample rates than your sound card can feed it.

Once you're done recording, it's time to edit. Here, SoundForge blesses you with every tool you need—fades, equalization, volume adjustment, normalisation. Trimming, deleting sections, inserting silence are all accomplished easily, thanks to the superb selection tool, which lets you be as quick, or as precise as required. However, it lacks multi-track editing that can come in handy while making re-mixes, or music CDs with songs mixing into each other.

Full-fledged noise reduction requires the Noise Reduction DirectX plug-in from

same Edit view. Switch to the Effects tab on the left, from where you can access most of the required functions. You can apply lots of cool effects such as pitch bending, delays and reverbs.

When it came to noise reduction, Cool Edit Pro performed very well. Most of the noise was removed without much change in the original audio. The cleaned up audio did have a tinny ring to it, but it was quite acceptable. Moving around is not as intuitive as SoundForge, but is never a major handicap to your productivity. The multi-track capabilities are a big boon when you want to mix tracks. Here, you can even use loops, and make your own songs with your own voice track.

Audacity 1.1.3
A simpler audio editing tool you will be hard pressed to find; and a better editing tool you will not find, at this price. It's free! Whilst the interface does not offer much in the way of eye-candy, it's very,
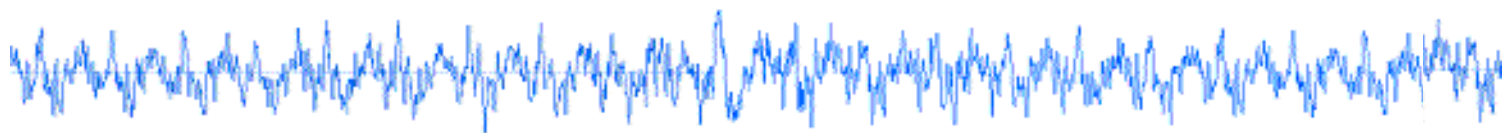
can use to accomplish each task. We'll review tools separated into two main categories—those that record sounds and clean them up by removing noise, equalizing and applying other filters or effects, and those that you can use to sort your collection, rename and play back your files easily.

The process used for your old songs can also be put to other uses, such as recording your voice to send it via e-mail, or to use in presentations. You can even use the same tools to clean up the audio in home movies.

SoundForge 6.0
SoundForge is an old favourite that is widely used to edit wav files on the PC. The program's interface is simple and straightforward—users of earlier versions will feel right at home, and novices won't take long to find their way around.

SoundForge is extremely stable, and responds to most commands quickly. Getting the recording to start takes only a couple of clicks. Pressing the Record button brings up a Recording window, where you can set the recording settings, select how repeated recordings will be saved (in

Sonic Foundry. You can download it at *http://www.sonicfoundry.com/download/step2.asp?DID=167.*
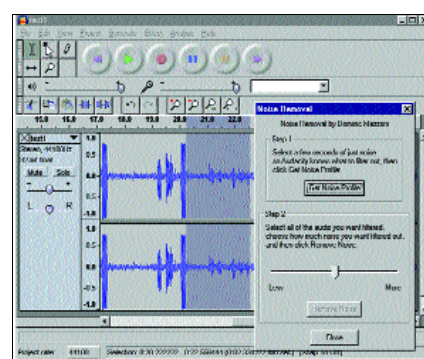
Cool Edit Pro 2.1
Cool Edit Pro looks way cooler than Sound Forge; Fortunately, that's not at the cost of usability. There are two editing modes—Multi Track and Edit. Multi Track is where you can lay down multiple files, mix them, etc. Edit view is the wave-file editor where you work with one file at a time. You can switch quickly between the modes by pressing [F12].

The Play/Pause, Record and other buttons sit at the bottom left, and are quite convenient to read. Zoom options include zooming into the selected area, and the start, or end of the selection.

Recording in Cool Edit is a breeze. Press the Record button, and a dialog box comes up, asking you to define audio settings—there are options all the way up to 192 KHz 32-bit Stereo. Click on OK to start recording. Whist recording, the timeline cursor scrolls across the screen, with a real time waveform generated behind it. Once you're done with the recording, move over to editing in the

very easy to use. The main interface has just the basics by way of buttons—selection tools, playback and recording controls, zoom and volume controls. The interface serves as a wave editor, as well as a multi-track mixer. You can accomplish basic editing tasks easily with the selection tool. Some operations, though, take too many steps—something that other editors accomplish in a couple of clicks.

You need to get to grips with the way things happen here—a perfect example is deleting a section from the wave. In any other editor, you just select a section and

The noise removal tool in Audacity details the steps to remove noise

What We Used

Cool Edit Pro	Recording and cleaning up
MP3 Gain	Volume levelling
ID3 TagIT	Renaming and tagging
Nero	Write to CD
Advanced MP3	
Catalog Pro	Make a database of your files

hit [Delete]. In Audacity, you need to select it, and then go to *Edit > Delete*, where you will see that the shortcut key is actually *[Ctrl] + [K]*. Most operations, such as loading files, saving, editing etc. happen just as speedily as they do in other programs. But the program was unstable at times, and crashed while opening more than one large file. Audacity has a lot of effects and filters that are labelled simply, enabling novices to understand them too.

The Noise Removal tool included precise instructions, telling you to select a sample and make a profile, then return to remove the noise. This was really nice, compared to the other software, which left us bewildered with the array of complicated settings that were not of much assistance.

Let's record then...

Time to get down to actually recording your files. There are several tools that we used; You may use one of the alternatives we've tested here, or any other software that you're comfortable with.

The first thing you need to do is get the music on to the PC. Recording is actually the most crucial step in this entire process. If something is not right here, the problem becomes all the more difficult to deal with as we proceed further. It is also the stage where the smallest changes can have the biggest impact on the eventual audio quality. So, it's worth spending a little extra time to get it done properly.

For starters, ensure that your cassette deck is in peak condition—get it serviced, if necessary. Choose your connecting cables with care—OFC cables perform much better than standard wires. Try, and avoid unnecessary adapters and connectors—the more links there are, the more the chances of loss in quality. Use a single direct cable, and plug it from the Line Out of your deck to the Line In of

your sound card. The connectors on your deck or sound card may have developed carbon deposits, manifesting into a loud crackling sound when you twist the plug in the socket. You can remove this by using a contact cleaner.

Before you begin, it's a good idea to ensure you have enough disk space for your recording. An hour of wave-file audio will take approximately 600 MB on your hard disk. Though some applications support it, recording directly to MP3 is not advisable, as the audio is compressed. When further processing is done on these files, the quality degrades rapidly. You should also defragment your hard disk for optimal performance.

Now, open the Windows Volume Control menu by double-clicking on the speaker icon in the Taskbar. Alternatively, you can go to *Start > Programs > Accessories > Entertainment > Volume Control*. From the menu, select *Options > Properties*. Ensure that the correct sound card is listed as the Mixer Device, and then select the Recording radio button. Also, ensure that the checkbox for your input source is selected below (Line In or Microphone), and then click OK. The window now changes to the Recording Control Window. Select the checkbox for the input source you are using, and set the volume temporarily to the Maximum.
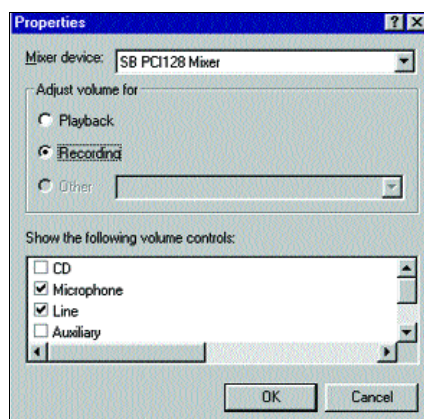
Select your source and set your recording level here

Launch Cool Edit Pro (CEP). If you have a previous mix, or wave file open, close it, and make a new file. Play your tape to check if you can hear it through

Nothing like CD

No matter how much effort you put into it, your recordings will not match the sound quality of an original CD that is mastered in a studio. If you wish to add your own CDs to your music collection, or just keep them in MP3 format, you should use a CD-Ripper to rip them onto your disk directly. This way, you ensure the highest possible quality, and it's likely to be done several times faster than recording through your sound card.

Another benefit of ripping from a CD is that the file name and ID3 tags are filled in automatically by most ripping tools. They get this information from online databases of pre-recorded CDs, such as CDDB or FreeDB. You can also add your custom compilations to these databases for free, so when you carry your CD to your friend's place, that PC will automatically download the track names.

your PC speakers. This indicates that the audio is coming through correctly. Next, double-click the level meters at the bottom of the screen to enable the level preview before recording. If the level reaches the end, and the red lights come on, then the sound is too loud, and is clipped. Sound that is clipped, is lost. Avoid this by reducing the volume till it is just short of reaching the red lights. If no sound comes through, double-check the Recording Options, and make sure that the selected source is the correct one.

Now, rewind your tape to the beginning. Press the recording button in CEP, and select 44 KHz, 16-bit Stereo quality. Click OK to start recording, and then begin playing the tape. It is important to start the recording early, and not just before the song starts. That will make the noise reduction process easier and more effective. You can record the entire tape as one wave file, and split them later. Stop the recording when the tape runs out and save it as a wave file. Repeat the procedure for Side B.

After the recording is done, and the files are saved, clean up the sound and split it into tracks. In the Edit mode, load one of the wave files. First, remove the →
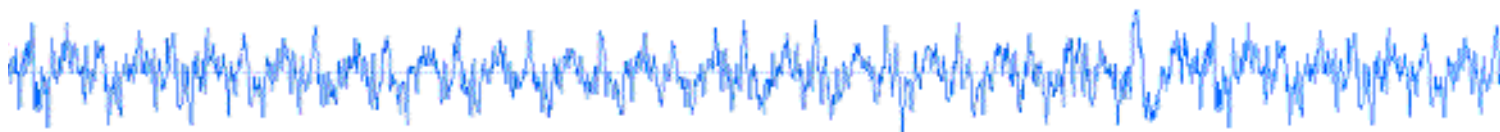
excess noise, or the background noise. To do this, select a few seconds of the recording that has just noise, and no music. Select the portion that's just about 3 seconds before the first song, go to *Effects > Noise Reduction > Noise Reduction* and click on 'Get Profile from Selection' to scan the selection, and make a noise profile. Click Close. Now, deselect the area, and return to *Effects > Noise Reduction > Noise Reduction.* Press Preview to hear the effect of the noise reduction. If the sound is changed dramatically, then reduce the level of noise reduction applied. Conversely, if the noise is still too much, increase the amount. If the noise reduction does not seem to be very effective, or makes the track sound very different, refine the selection used to make the noise profile, and repeat the process. When you are satisfied with the results, click OK. CEP will now apply the noise reduction, which may take quite a while, depending on the speed of your PC. Normally, noise is most audible in quiet areas between tracks. A good idea is to apply less noise reduction than what is actually required, so that it just gets removed from the music, and you can completely remove any audio from in between songs. Do this by selecting the area, and going to *Effects > Silence.*

You can also apply equalization to the music to make it sound smoother, or to give it more punch. Select the area you want to equalize, and go to *Effects > Filters > Graphic Equalizer*. Choose from the numerous preset settings available, or simply go ahead and make your own changes. The bars modify lower to higher frequencies from right to left. The lower frequencies

Frame Accurate Editing

When working for Audio CD output in Cool Edit Pro, set the timeline to CD Frames. You can do this by right-clicking on the timeline, and from the context menu, select *Display Time Format > Compact Disc 75 Fps*. Right-click again on the timeline, and select *Snapping > Snap to frames (Always)*. This is important since CDs store 75 frames of audio per second. If you edit finer than that (in between a frame), the CD burning software fills the edited frame with blank data.
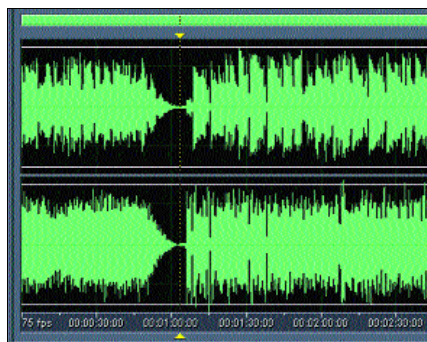
Place the marker before the start of a new song

represent bass and lower notes. The mid-range is where you find the vocals.

After you're satisfied with the overall sound, you can split the long wave into individual files for each song. Place the cursor exactly where you want to cut the file. You can move the cursor in small increments by pressing the left or right arrow keys. Increase the zoom to increase the accuracy. Place this marker just before the start of a new song and press [F8] to make a new cue at the cursor. Do this for all the songs, and then place one marker at the start of the first song, and another at the end of the last song.

Go to *View > Show Cue List*. Select the first item, and press [Shift] + [End] to select all the cue items. Now, press Merge to convert the individual Cues to Cue

Merging in the Cue List

Ranges. Notice the Begin and End times for each individual track. Click on Batch, and select the 'Save to Files' radio button from the window that comes up. Enter a filename prefix, and browse to the folder where you wish to save the files. Set the output format as MP3, and click Options to set the quality manually. Once you're done, click OK, and then OK again to begin outputting your files. You will now find a separate MP3 file for each track,
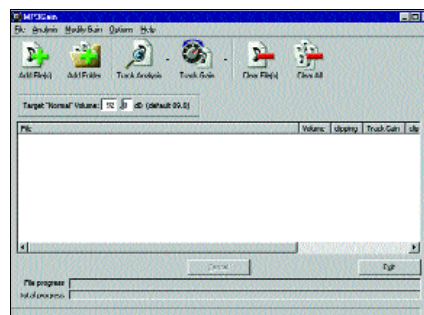
Use MP3 Gain to make all your songs the same volume

which you can use to make a CD.

Normally, songs from different artists tend to be at different volume levels. So, listening to them, one after another, will involve a lot of jumping for the volume knob. The Normalisation feature does not take care of this effectively; it simply makes the highest level in the track equal the maximum volume possible. But some songs still sound louder than others. A simple program called MP3 Gain provides the solution to this. It sets the audio level, based on how loud the human ear would perceive the sound signals to be. The results are quite impressive.

Click Add Folder on MP3 Gain's main button bar. Browse to the folder of your choice, and click OK. Now, click 'track analysis'—MP3 Gain will analyse each track, and may take quite a while to complete if you set many tracks to analyse. Next, set the target normal value in the text box—the default value of 89 makes the songs seem too soft. Enter 92, and then click 'Track Gain' to process all the tracks to that volume.

Now, rename and organize your media. This not only applies to the tunes you've just recorded, but also to the other few gigabytes of music hiding all over your hard drive.

We've tested three tools that aim to get your music collection into shape.

J. River Media Center 9

Media Center 9 aims to be your one-stop media shop, and does make a good effort too. The program is vast in its capabilities and options. It not only handles a large number of music formats, but also does stills and video files. It takes several shapes—from the normal full-size window,
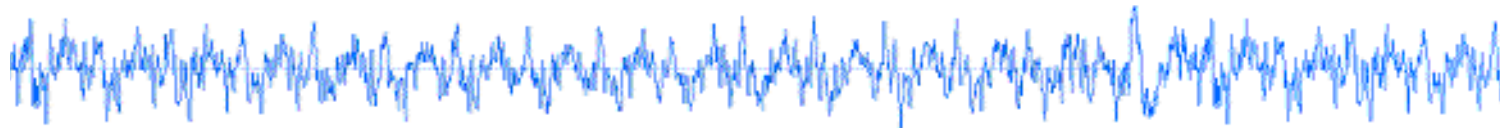
to a smaller player component called 'mini-me'. There is also a full-screen mode, and a Party mode when your PC turns into a DJ.

The first time the program runs, it brings up a dialog box to search for media on your hard disk. The search is comprehensive—it finds all the media types you specify—not just MP3s, but images and videos too. It's best to stick to MP3, and any other format you store your music in. Avoid searching for JPEG and other media files, or you will end up with thousands of tiny files from all over your hard disk.

Media Center 9 flexes its organizing muscle in the form of Smart Lists. These are automatically generated play lists, based on certain criteria. For example, you could ask to hear some of your favourites

The smart single-click rating system

that you haven't heard recently. It knows which songs are your favourites because you can assign ratings to each song. I know what your thinking—how am I ever going to rate thousands of songs? All you have to do is click the number of stars you want to assign to the song in the media list. So, it's just one click per song, and you can do this while listening to music. Doing a few at a time will get your collection in shape pretty quick. The ratings, combined with the Smart Lists, will really make your listening more enjoyable.

Using its listing capabilities, you can see all the files of a particular artiste placed together. You can even move all the files into one folder on your disk. This comes handy when you want to use another program to manage your tunes, or burn CDs.

Media Center 9 also has a built-in CD-Burning and CD-Ripping. By default, songs are ripped into the Ogg Vorbis format. If you want to rip directly into MP3, you need an additional component. This can be downloaded at

http://www.musicex.com/cgi-bin/down-loads/mcplugins.pl. In Options, you will also find that you can automatically perform normalisation whilst ripping tracks from the CD.

While Media Center is the most feature-rich software here, the wealth of features detracts from its usability, and makes finding some options and tasks difficult.

Zortam MP3 Media Studio

The first thing you notice about Zortam Media Studio is its speedy installation—a few clicks, and a fewer seconds later, it's done. However, things slow down considerably, once you start working with it. The first time we ran it, we were greeted with multiple windows on top of each other. Each one obviously had a different function, and was titled accordingly, but we didn't know where to begin.

The place to begin is the 'Search Media' button in the top left of the main interface. This enables you to search your drives for music files. The search took a fair amount of time, and found all the MP3s on our PC—even the ones on the CD that was in the drive at the time. The files found are displayed in a huge table that has fields for Artiste, Title, and the other typical ID3 Tag fields. This tool's core competency is the powerful renaming and tagging available. The bottom third of the screen is a dedicated renaming zone. When you select a song in the main list, the file's ID3 version2 (ID3v2) information is displayed on the left, and ID3 version1 (ID3v1) information is displayed on the right. You can click on any field, and edit it there itself. You can copy tags between ID3v1 and ID3v2. There is also a synchronisation option that works effectively most of the time.

The database maintains all the requisite information: Artiste, track name, etc., and can be exported to an HTML or text file. Zortam also allows ripping a CD to various qualities of MP3, and Wave format. It also does conversions between Wave and MP3.

Advanced MP3 Catalog Pro

This is a no-frills tool, designed simply for cataloguing. It is, by far, the simplest looking tabbed interface tool reviewed

here. The first tab is the Catalog where you can see your entire collection sorted into Volumes—based on the location of your songs—much like separate drives in windows. The left pane displays these and their subfolders, in a Windows Explorer-like tree.

You can click the New icon to make a new catalogue. As soon as you do so, you will be prompted to scan your PC for MP3 files, or to add a new volume manually.
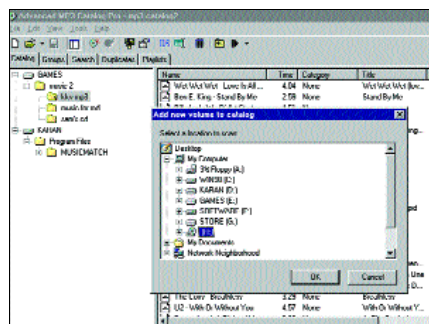
Add each of your CDs as a volume

The first time you run the program, you should complete a full scan. Once the scan is complete, you can rename the volumes created for your convenience.
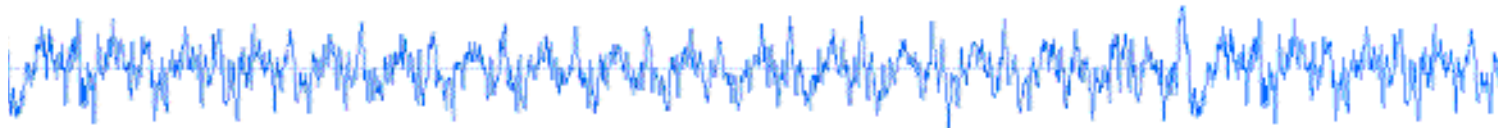
added individually as a volume, and can be renamed as you have named the CDs. Once added, the Advanced MP3 Catalog Pro stores the track details in the database. Just find the song that you wish to play in the database, and select Play. You will be told which CD to insert, and your song will play automatically in your default player.

The Groups tab lets you browse your collection by album name, year, artiste, etc. The built-in searching, and duplicate finding are also very powerful. Other features worth mentioning are a label printer that prints jewel case inserts of your MP3 discs, the ability to export lists in various formats and simple ID3 tag editing.

Advanced MP3 Catalog Pro does a great job of keeping your collection organised, especially if it's largely on a CD. It lacks in features as compared to others, but serves the purpose best, and that, with minimal effort.

Now, tag and stack it

For some things though, you just need a dedicated tool. A good example is tagging that refers to entering the relevant information into the ID3 Tags. These tags are the most popular way of maintaining the track's information, with most portable devices being capable of reading and displaying them during playback.

Use a free tool, called ID3 TagIT found at *http://www.id3-tagit.de/english/download.htm* to rename and tag MP3s. As you launch the program, a simple Explorer-style window greets you, with a directory tree in the left window. Browse to the folder that has the files you wish to edit, and click on it. All the MP3 files in the folder are read and their tag information is displayed. This may take a while, if there are many files. Ensure that you are currently viewing the ID3 tag version2 as shown on the toolbar's top-right corner. The right pane displays a table, with the tracks and their tag's details listed. To edit the tag information of a single song, simply double-click on the song name. If you wish to edit a particular field of multiple songs simultaneously, select the tracks, and then click on 'Multiple Edit ID3 v2' on the toolbar, or press [Ctrl] + [N]. Type in the details in the field to be replaced,

for example, the artiste's name. Keep in mind that the same data will be written to all the files selected. You can also change the case of your Tags.

Once you're done, you can copy the ID3v2 tags to the ID3v1 tags for backward compatibility. Click the Transfer/Convert icon, or press [F4], to bring up the window. Here, select Transfer ID3v2 to ID3v1, and select all the fields.

You must also copy the tag information to the filename, so that your files can be easily managed in Windows Explorer. Close the program, and click on Yes to save the changes.

Ideally, you should have all your music in one folder. Within that folder, there could be subfolders for artistes, with further sub-division into albums. If you listen to a lot of music away from your PC, JRiver's Media Center can burn your

favourite tunes onto CDs, using smart lists. If you don't need this capability, Advanced MP3 Catalog will suffice to simply organise your collection.

For those with disk space, it's ideal to have all your songs on your PC itself, so that they are instantly accessible. If you can enjoy this luxury, all you have to do is scan your PC with Advanced MP3 Catalog Pro. Start the program, and click on the New icon. You will be prompted to scan your PC. Complete the scan, and you're done. Those with too many MP3s, or too little room on their hard disks, need to write their MP3s onto CD. Use your CD writing software to do this. Once you have your CDs done, you can add them in as volumes into Advanced MP3 Catalog. To do this, click the Add Volume icon, or press [Insert] on the keyboard. Select your CD drive from the browse window that comes up. Pay attention to naming the volumes, and your CDs correctly. When you run a search for a particular track, and that track is on a CD, you will be asked for that CD by the Volume name. So, if the names aren't the same, things will get confusing.
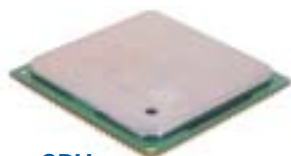
Have you ever copied tracks off a CD, only to end up with two copies of one, or more numbers? If this is a regular occurence with you, the problem is likely to be compounded. You can search for duplicates using Advanced MP3 Catalog. Switch to the Duplicates tab, and select the basis for comparison of files to determine if they are duplicates. If your collection is large, it's recommended that you search one criterion at a time. Start with File Size, as it's the best way to determine exact duplicates. Click Start to begin searching. You will be presented with a list of possible duplicates. Compare the files visually by their file name and select one of each. Use [Ctrl] to select multiple files. Once you're done, review your selection, and press [Ctrl] + [Delete] to remove them.

So there it is, and easier than you thought! With just a little know-how, and your good old PC, you can resurrect your musical past, and blend it into your organised musical future. Sounds good, doesn't it? d

KAIZAD VAJIFDAR
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The A-List

A list of the best products in different hardware and software categories

Products that topped our performance tests

CPU
Pentium 4 3.2 GHz 800 MHz FSB
+ Supports 800 MHz FSB and Hyperthreading
− Very expensive
Contact: Nebula Technologies
Phone: 022-26730567
E-mail: pratik@nebulatech.com
Price: Rs 38,000

Motherboard
Intel 875 PBZ
+ Native support for SATA
− No possibility of over-clocking
Contact: Nebula Technologies
Phone: 022-26848612
E-mail: pratik@nebulatechnologies.com
Price: Rs 13,000

Primary Storage
Maxtor 250 GB MaxLine Plus II
+ Tons of space
− Gets heated
Contact: Cyberstar
Phone: 011-6438216
E-mail: yogi@maxtor.com
Price: Rs 21,000

Secondary Storage
Sony CRX 300A
+ Top performance, vertical mountable, half height, Mt. Rainer support
− No CD-R/CD-RW media
Contact: Rashi Peripherals
Phone: 022-28260258
E-mail: ho@rptechindia.com
Price: Rs 6,250

Graphics Card
Gainward FX 5800
+ Future-proof
− Gets very hot
Contact: Mediatech India Pvt Ltd
Phone: 022-56396696
E-mail: sales@mediatechindia.com
Price: Rs 37,975

Sound Card
Creative SoundBlaster Audigy 2 Platinum
+ 6.1-channel output
− Expensive
Contact: Creative Technology Ltd
Phone: 9820357713
E-mail: rajshekhar_bhatt@ctl.creative.com
Price: Rs 15,199

Speaker
Creative Megaworks THX 5.1 550
+ Mindblowing sound
− No digital inputs
Contact: Creative Technology Ltd
Phone: 9820357713
E-mail: rajshekhar_bhatt@ctl.creative.com
Price: Rs 25,999

Display
LCD Monitor
SONY SDM-N80 18.1-inch
+ Stylish looks combined with great performance
− External power supply takes up extra space
Contact: Rashi Peripherals
Phone: 022-28260258
E-mail: ho@rptechindia.com
Price: Rs 1,49,000

Input Devices
Microsoft Multimedia Keyboard
+ Great feel
− Comes at a high price
Contact: Microsoft Corporation Pvt Ltd
Phone: 011-26292640
E-mail: connect@microsoft.com
Price: Rs 1,600

Microsoft Wireless Optical Desktop
+ High precision and sensitivity
− Batteries make it heavy
Contact: Microsoft Corporation
Phone: 011-26292640
E-mail: connect@microsoft.com
Price: Rs 4,500

Laptop
Dell Latitude D600
+ Good design, has dual band 2.4 GHz and 5 GHz wireless
− Temperature shoots up after prolonged use
Contact: Dell Computers Asia Pvt Ltd
Phone: 1600 33 8044 (Toll free)
E-mail: marketing_response@dell.com
Price: Rs 1,53,366

Laser Printer
Samsung ML-1710
+ Extremely fast
− Does not support USB 2.0
Contact: Samsung Electronics India information and Telecommunication Ltd
Phone: 011-51511234
E-mail: farrukh@samsungindia.com
Price: Rs 16,000

Inkjet Printer
Canon S530D
+ Supports direct printing from digital cameras
− Expensive
Contact: Canon India Ltd
Phone: 011-26806572
E-mail: rajeev.singh@canon.co.in
Price: Rs 21,747

Scanner
HP Scanjet 4570C
+ Excellent scan quality
− Heavy and bulky
Contact: HP India Ltd
Phone: 011-28260000
E-mail: ashwini-k_aggarwal@hp.com
Price: Rs 17,999

PDA
Sony CLIE PEG-TG50
+ Runs on Palm OS5 and has a 320 x 320 TFT LCD display
− Rapid battery consumption
Contact: Solar Systems
Phone: 022-56916834
E-mail: solarsystems@vsnl.net
Price: Rs 27,000

Mobile Phone
Sony Ericsson P800
+ Easy and intutive navigation
− Blocky design makes it bulky
Contact: Sony Ericsson Mobile Communications International
Phone: 011-26180808
E-mail: sudhin.mathur@sonyericsson.com
Price: Rs 35,500

Digital Camera
Canon IXUS 400
+ Cerabrite body, better buttons layout, wide shutter speed range
− Ultra compact body hampers handling
Contact: Canon India Pvt Ltd
Phone: 011-2680 6572
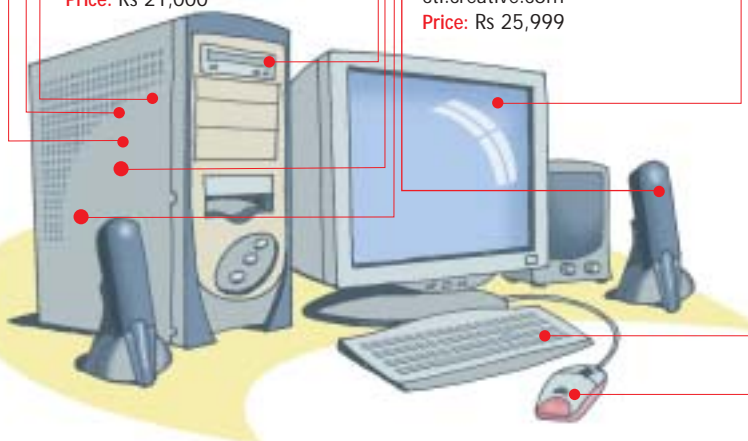**E-mail:** Shyam@canon.co.in
Price: Rs 49,995

MP3 Player
Creative LX 100
+ Decent feature set, easy to install, large LCD
− No bundled software, no ID3 tag support
Contact: Creative Labs Asia
Phone: 9820357713
E-mail: rajshekhar_bhatt@ctl.creative.com
Price: Rs 9,799

BEST VALUE digit SEPTEMBER 2003

Products that are the best value buy

CPU
AMD XP 1800+
+ sufficient power for normal desktop use
- Difficult to install the heat sink
Contact: AMD Far East India Ltd
Phone: 011-26238620
E-mail: amd@surfgold.com

Motherboard
ASUS A7S266
+ Support DDR and SD, onboard video, onboard sound, onboard graphics, USB 2.0
- Not appropriate for gamers
Contact: Neoteric Infomatique
Phone: 022-24172600
E-mail: sales@neoteric-info.com
Price: Rs 3,900

Primary Storage
Samsung SV1203N 120 GB
+ Noise Guard and ImpacGuard
- 5400 rpm drive
Contact: Samsung Electronics India Information Telecommunication India Pvt. Ltd
Phone: 011-6322517
E-mail: marketing@samsungindia.com
Price: Rs 7,200

Secondary Storage
Benq CRW5224W *NEW*
+ Cheap
- Data cable not bundled
Contact: BenQ India Pvt Ltd
Phone: 022-25705231
E-mail: salesenquiryin@benq.com
Price: Rs 2,800

Graphics Card
SMEDIA GeForce4 MX 440
+ 64 MB Video RAM, AGP 4X, 270 MHz clock speed
- No hardware support for DirectX9
Contact: Xserve India
Phone: 080-5202915
E-mail: vivek_gupta@xserves.com
Price: Rs 3,000

Speaker
Adcom ACSPSW-660 2.1
+ 2 satellite speakers and one mini sub-woofer, performance in the gaming sector was quite good
- Volume cannot be set to maximum
Contact: SABS
Phone: 022-23808564
E-mail: sabs@vsnl.net
Price: Rs 550

Display
CRT
LG StudioWorks 700S
+ High resolutions, great performance, anti-static, anti-glare, anti-reflection surface treatment
- No extra accessories
Contact: LG Electronics India Pvt Ltd
Phone: 0120-2560900
E-mail: response@lgezbuy.com
Price: Rs 9,400

Input Devices
Samsung PC Keyboard
+ Unmatched value for money
- No multimedia buttons, wrist support not bundled
Contact: Samsung Asia Pvt Ltd
Phone: 022-2281/ 4886
E-mail: marketing@samsungindia.com
Price: Rs 300

Digital Camera
Kodak DX6340
+ 3.1 megapixel camera with 4X optical zoom
- only 16 MB memory provided
Contact: Neoteric Infomatique
Phone: 022-24172600
E-mail: rajeev@neoteric-info.com
Price: Rs 20,900

Laptop
ACI Emerald PIV
+ Integrated Web Camera, FireWire port and an Ethernet connection, can play games such as *Quake III*
- Bulky, no manual
Contact: Allied Computer International (Asia) Pvt Ltd
Phone: 022-26366800
E-mail: sales@aci-asia.com
Price: Rs 89,990

Laser Printer
Wipro Laser 1540
+ Maximum resolution of 1200 dpi, 2 MB buffer, USB and parallel port
Contact: Wipro Peripherals
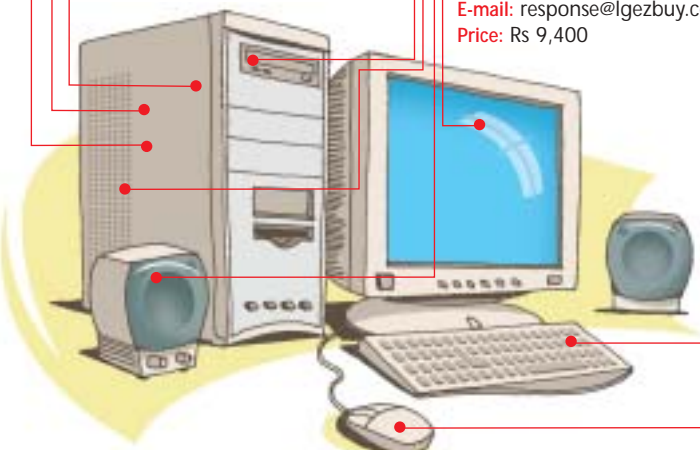**Phone:** 022- 26397418
E-mail: helpdesk.mumbai@wepindia.com
Price: Rs 10,750

Inkjet Printer
HP 3325
+ Very small form factor
- 765 KB of buffer memory
Contact: HP India Ltd

Logitech scroll mouse
+ Ambidexterous design
Contact: Rashi Peripherals
Phone: 022-28260258/ 59
E-mail: ho@rptechindia.com
Price: Rs 550

Phone: 011-26826000
E-mail: ashwini-k_aggarwal@hp.com
Price: Rs 550

Scanner
HP 2300
+ Low warm-up time
Contact: HP India Ltd
Phone: 011-26826000
E-mail: ashwini-k_aggarwal@hp.com
Price: Rs 3,499

PDA
Palm Zire
+ Affordable, good battery life, comprehensive PIM applications
- No Palm Universal Connector, no backlight, no expansion slots
Contact: Tech Pacific Technology (India) Limited
Phone: 022-55960101
E-mail: aparna@corvoshandwick.co.in
Price: Rs 7,000

Mobile Phone
Sony Ericsson T200
+ Light-weight, perfect grip, WAP 1.2.1 browser and 43.2 Kpbs GPRS, PIM features
- Keys are hard and noisy, unusual socket for the charger
Contact: Sony Ericsson Mobile Communications International
Phone: 011-26180808
E-mail: sudhin.mathur@sonyericsson.com
Price: Rs 6,495

MP3 Player
Creative MuVo 64 MB *NEW*
+ Good audio quality, user-friendly, long battery life
- No LCD, no voice recording, no FM tuner, no playlist or folder support
Contact: Creative Labs Asia
Phone: 9820357713
E-mail: rajshekhar_bhatt@ctl.creative.com
Price: Rs 5,999

Bazaar

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

Fujitsu Stylistic ST4110 Tablet PC
A tablet for your office worries

The Stylistic ST4110 is a true tablet, unlike the notebook convertibles we tested earlier. One of the lightest tablets around, the ST4110 weighs a little less than 1.5 Kgs, and measures 301.3 x 220 x 20.9 mm—just about the size of an A4 sheet. The suede backing at the rear ensures it does not slip from your hands while you're moving around.

Input is as simple as writing on paper, with the full-sized stylus. However, all ports, apart from the external monitor port, are exposed, which can be bad because of dust and humidity.

The optional docking station includes a CD-RW and DVD combo drive. It also adds additional USB ports as well as network, monitor and Firewire ports.

On the performance front: the ST4110 can handle all standard office applications. Handwriting recognition is fairly accurate. The MobileMark 2002 battery test logged a battery life of a whopping 4 hours and 12 minutes. However, both MobileMark 2002 Performance Test and *Quake III Arena* simply refused to run on the device. Also, it does get warm with extended use, but the suede covering at the rear makes life easier.

The Fujitsu ST4110 promises to be a workhorse for the true mobile professional, however, at Rs 1.95 lakhs for just the tablet, it does not compare very well with the Acer TravelMate C100, which is about Rs 40,000 cheaper.

Price: Rs 1,95,000 for the Fujitsu Stylistic 4110 Tablet PC; Rs 2,55,000 for the Fujitsu Stylistic 4110 Tablet PC, USB FDD, Wireless Mouse, Tablet Dock with Combo Drive, Wireless Keyboard, Stylus Pen, Screen Protector
Contact: ACI Infocom Ltd
Phone: 022-2826603/ 32
Fax: 022-28250674
E-mail: desmond@aciinfo.com
Web site: www.fujitsu.com

SPECIFICATIONS

800 MHz ultra low voltage mobile Intel Pentium III processor, 256 MB SDRAM, 10.4-inch LCD display, 40 GB hard drive, Intel 830M integrated graphics, SigmaTel STAC9767 audio, two USB ports, Ethernet (RJ-45), modem (RJ-11), IEEE 1394 (Firewire), Infrared, 802.11b Wi-Fi compliant module, six launch keys, scroll keys, built-in microphone and speakers, Type I/II PCMCIA slot

Fujitsu Stylistic ST4110 PC				**B**
Performance				
Features				
Value for money				
Build quality				

ACi Centrino Notebook
Long lasting performance

The ACi Centrino is powered by an Intel 1.5 GHz silicon square complimented by 512 MB of DDR SDRAM, and provides enough juice for your heavy applications. A 15 inch TFT display provides a brilliant, sharp display which is hooked internally to an ATI Radeon 9000 Mobility graphics card. The laptop offers better performance in the graphics department as compared to other laptops that make do with a SiS integrated display. In the graphics benchmark using *Quake III Arena*, the mobility Radeon delivered 107 frames in normal mode, but the frame rate dropped to 73.3 frames at 1024 x 768 x 32 bits.

Where other laptops are bundled with lower rpm drives, this laptop, with a 5400 rpm, delivers a decent work-around in the performance department. This notebook offers seemingly unlimited options when it comes to networking, and the two network icons in the system tray are just proof of the forward thinking that ACi has put into making this laptop—it offers you both wired and wireless LAN capability. When we tested the wireless LAN, the connection was up and running in just a few seconds. However, the connection kept dropping even in a good test environment.

The battery life, when tested with reader workload —where the system is not stressed— came to four and half hours, which is nearly 2 hours more than a regular laptop. The claimed figure, however, is seven hours, which might be possible to get if you lower the brightness; but this strains the eyes.

Overall, priced at Rs 1,15,000, it offers features which more than justify the price, and is a good buy if you want a performance-rich laptop with Centrino technology as the icing on the cake.

Price: Rs 1,15,000 (approx.)
Contact: Allied Computer International (Asia) Pvt Ltd
Phone: 022-56943260
Fax: 080-5586107
E-mail: sales@aci-asia.com
Web site: www.aci-asia.com

SPECIFICATIONS

1.5 GHz Pentium M processor, 512 MB DDR memory, 15-inch TFT LCD, ATI Radeon 9000 mobility graphics card, 5400 rpm hard disk and built-in wireless connectivity

ACi Centrino Notebook				**A-**
Performance				
Features				
Value for money				
Build Quality				

Hercules 3D Prophet 9600 PRO

Kid pro revs up the heat

Hercules, with its reputation for top quality video cards, got everything right for the 9600 PRO. Installation was fairly simple, and the first thing that caught our attention when the test machine was booted up, was the card's fan. There's

a small neon-blue LED under the fan which makes it look like a futuristic gizmo.

The 9600 is based on the RV350 chipset, which is a derivative of the R350 chipset used in the 9800 PRO, and is the first ATI card manufactured using the 0.13 micron fabrication process. The RV350 features four DX9 pixel pipelines and two vertex shaders, which is exactly half of the R350 used in 9800 PRO. The two variants of this core are the 9600 and the 9600 PRO, running at 325/400 (200 MHz DDR) and 400/600 (300 MHz DDR) respectively. ATI therefore expects that the performance to price ratio of the 9600 would make it agreeable to consumers.

Our test bed comprised a Pentium 4 3.2 GHz, Intel D875PBZ motherboard (Canterwood), 512 MB DDR333 RAM, 120 GB Seagate SATA hard drive, Creative Audigy 2 and the Hercules 3D Prophet

9600 PRO. The drivers for the card were the latest Catalyst 3.5 drivers. Installation of the drivers went well without any hitches, and the system was up and running without crashes.

In the tests, the 9600 PRO packed a mean punch. It gave a comfortable 107.2 fps with *Serious Sam SE* at 1024 x 768 x 32. *Quake III Arena* was no different, with 216.2 fps at 1024 x 768 x 32. The most surprising results were in 3DMark2003 tests: this card gave us a whopping score of 3465 with all the eye-candy turned on!

The 9600 PRO is DirectX 9 and OpenGL 2.0 compliant. Fill rate is at a massive 1.6 billion texels per sec with a memory bandwidth of 9.6 GBps—this translates into comfortable, playable framerates at high resolutions with DirectX 9.0 and OpenGL 2.0 games. You also get dual monitor support and an S-Video out with this card for those multi-monitor sessions. It's very important to note that the card will not fit into AGP slots in older motherboards, because it has only a single notch for 1.5 volts.

This card is priced at Rs 16,875, which is much lesser than what the 9800 PRO costs, and with the features this card provides, it is one great buy!

SPECIFICATIONS

256-bit architecture, 400 MHz clock, 0.13 micron fabrication, AGP 8x , 128-bit 600 MHz DDR, 128 MB video RAM, 400 MHz RAMDAC, maximum resolution of 2048 x 1536 at 85 Hz

Price: Rs 16,875
Contact: Mediatech India
Phone: 022-56396696
Fax: 022-222014083
E-mail: info@mediatechindia.com
Web site: www.hercules.com

Hercules 3D Prophet 9600 PRO	A-
Performance	▶ ▶ ▶ ▶ ▶
Features	▶ ▶ ▶ ▶ ▶
Value for money	▶ ▶ ▶ ▶ ▶
Build Quality	▶ ▶ ▶ ▶ ▶

Epson Stylus CX 5100
A premium multi-functional device

Multi-functional devices seems to be the *mantra* of recent times—the Epson Stylus CX 5100 can scan, print and copy documents in colour and monochrome. It is targeted at the SoHo (Small Office Home Office) segment, and is not meant for heavy-duty print or copy jobs.

The CX 5100 sports elegant looks and a fairly small footprint. There is a small LCD display for selecting paper, print

quality, number of copies and so on, using a neat and easy to use set of buttons on the front face.

The CX 5100 has individually changeable ink cartridges. It supports a maximum printing resolution of 5760 dpi (interpolated) and claims a maximum printing speed of 22 ppm in economy mode. The paper capacity is 150 sheets and it is top-loading.

The flat-bed scanner has an optical resolution of 1200 x 2400 at a colour depth of 48 bits. It comes with a transport lock that prevents the scanner lamp from moving while transportation. Setting up the device was an easy job as it comes with a USB interface. Windows XP detected the printer instantly, and installed the drivers without

any trouble.

The device took around 17 seconds and 27 seconds respectively to print a full sized monochrome text document in normal mode and best quality mode, which is quite impressive. But we were disappointed by the print quality—there was some smudging which continued even after a number of prints. In the photo printing capability test, the colour reproduction was not accurate and the overall contrast was poor, even on photo paper. It simply failed to impress.

But to our surprise, the scanner made for lost ground by producing some stunning scans that were brilliant in every aspect. The only negative thing we noted was a little drop in the brightness level. Its document scanning was also satisfactory, and it passed the OCR test with reasonable accuracy. Document copying is very simple: place the document to be copied on the scanner bed, and select Colour or B&W using a button on the top. The copies were of acceptable quality; the settings, however, were non-changeable.

At Rs 22,500, the CX 5100 a premium product as far as pricing is concerned. And overall, the CX 5100 has excellent scanning capabilities and below average print quality.

Price: Rs 22,500
Contact: EPSON India Pvt Ltd
Phone: 080-5321266/70
Fax: 080-5321065/5581799
E-mail: sales@eid.epson.co.in
Web site: www.epson.co.in

SPECIFICATIONS

Maximum resolution: 5760 x 1440 dpi, A4 flat bed scanner, maximum optical resolution: 1200 x 2400 dpi, 150 Paper capacity and USB interface

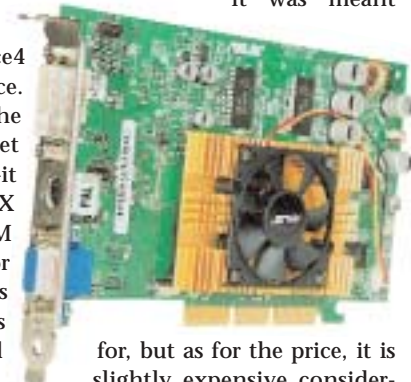| Epson Stylus CX 5100	B-
Performance	
Features	
Value for money	
Build quality	

Asus V9180/TD
GeForce4 for the masses

Asus has a reputation for building some of the most feature-packed and robust nVidia chipset cards. Enter the V9180/TD. The chip is meant for those who want the GeForce4 tag at an affordable price. This card is based on the GeForce4 MX440 chipset with one addition—it features the new AGP 8X standard. The Video RAM is 128 MB—enough for you to play your games without framing. As usual, the extras provided by Asus include a pack of games.

Instead of running at 270 MHz (GPU) and 400 MHz DDR like its predecessor, these cards are set to 275 and MHz. This gets that extra oomph into your gaming.

The card does not feature either a pixel or a vertex shader, so you won't be able to play upcoming games with the eye-candy enabled. But

The frame rates in *Quake III* were good; so was the Direct3D performance.

This card does well what it was meant for, but as for the price, it is slightly expensive considering the specifications; newer cards based on the FX5200 chipset retail for nearly the same price.

SPECIFICATIONS

256-bit architecture, 275 MHz clock, 0.15 micron fabrication, AGP 8x , 128-bit 500 MHz DDR 128 MB video RAM, 400 MHz RAMDAC, max resolution of 2048 X 1536 @ 85 Hz.

Price: Rs 7,200
Contact: Asus India
Phone: 022-56926013
E-mail: info_india@asus.com.tw
Web site: www.asus.com

Asus V9180/TD	B
Performance	
Features	
Value for money	
Build Quality	

Logitech Momo Force Feedback Wheel
Must-have accessory for the hardcore gamer

The 'Momo' on the Logitech Force Feedback Wheel comes from the fact that it is designed by professionals from Momo, who specialise in building gear knobs, steering wheels and such, for F1 racing cars.

The rubber-clad wheel offers excellent grip and smooth, jerk free movement. It sports a maximum rotation angle of 240 degrees. The centre of

the wheel has six programmable buttons. It also has two paddle shifters behind it, and the gear knob is at a fairly reachable position. Both the paddles and

the gear knob are programmable and offer good audible and tactile feel. You throttle using the floor pedals which are placed on a heavy plastic base, with anti-skid rubber cladding on the underside for a firm grip. The clamping mechanism of the wheel is also solid with no lateral movement—no matter how hard you thrash it. The force feedback is good enough to experience every bump and thump in the game. The wheel did well when it was tested for precision when negotiating hair pin curves.

Price: Rs 8,975
Contact: Rashi Peripherals
Phone: 022-28260258
Fax: 022-56916609
E-mail: ho@rptechindia.com
Web site: www.logitech.com

The price tag of Rs 8,975 is justified for a highly featured and performance-packed device such as this, though the force feedback could have been a little more effective. This device is sure to give you the ultimate experience as far as racing games are concerned.

SPECIFICATIONS

240 degree rotation angle, six programmable buttons, two paddle shifters, gear knob, floor board

Logitech MOMO Force Feedback Wheel				A-
Performance	▶	▶	▶	▶
Features	▶	▶	▶	▶
Value for money	▶	▶	▶	▶
Ergonomics	▶	▶	▶	▶

Odyssey 5113RF Keyboard
Great concept; poor design

The Odyssey 5113RF is an RF-based cordless multimedia keyboard, with a lot of multimedia keys thrown all over the place, and also a track ball embedded in the key-

board.
The keyboard has a black body with dark-grey keys.

The location of the track ball is odd, with the ball in the upper right hand corner, and the left and right mouse keys in the left hand corner. Not only is this ergonomically unsuitable, it is also inconvenient to work with. The 15 multimedia keys

are handy, and can be programmed to do a particular task.

Typing requires some time to get used to, but once you're done, it's smooth sailing. The biggest disappointment is the mouse—it's slow and difficult to track.

The keyboard has a good range and works perfectly fine within a range of 2m, and nearly perfect at all angles.

Priced at Rs 3,055, the 5113RF is expensive when you consider the mouse and the key layout.

SPECIFICATIONS

2m (6.4 ft) and ±45° (horizontal) and ± 60° (vertical) operating range, receiver with 2 PS2 connectors, 15 multimedia keys, inbuilt mouse, battery-low LED indicator

Price: Rs 3,055
Contact: Compuage India Ltd
Phone: 022-23842200
Fax: 022-23842210
E-mail: info@compuageindia.com
Web site: www.compuageindia.com

Odyssey 5113RF Keyboard				B-
Performance	▶	▶	▶	▶
Features	▶	▶	▶	▶
Value for money	▶	▶	▶	▶
Ergonomics	▶	▶	▶	▶

Samsung SGH -V200C
Smile, twist and click

The SGH-V200C gives you a 180 degree rotating camera; the phone lets you flip and zoom images right while taking pictures. Apart from being tri-band, MMS and GPRS enabled, it is also sleek and stylish, with a crisp, vibrant 16-bit display. However, the external antenna does get in the way.

Menu operations in this model are far simpler as compared to the earlier R220. The easy to use four-way scroll key allows you to hop directly to predefined menus.

The memory capacity for contacts 500 names and also an extra SIM capacity of 250 names with a 32k SIM; and with 16 MB of internal mem-ory, it allows you to store a sizeable number of images, ring tones and messages. The device also comes with an extra set of batteries.

The phone has an Infrared port, but for some reason it failed to receive any sort of data in our tests. Even though it is MMS enabled, you can't add audio to your messages, and the T9 dictionary does not allow you to save custom names.

Overall, this is a nice phone but does not justify the price tag of Rs 29,999.

Price: Rs 29,999
Contact: Samsung Electronics India Information & Telecommunication Ltd
Phone: 011-51511234
Fax: 011-51608818
E-mail: chandrasekar@samsungindia.com
Web site: www.samsungindia.com

SPECIFICATIONS
16-bit display, 355 x 288 camera resolution, 500 entry address book, 16 MB inbuilt memory, GPRS and Tri-band enabled, MMS capability and two sets of Li-ion batteries

Samsung SGH -V200C	B+
Performance	
Ease of use	
Value for money	
Features	

HP PSC 1210 All-in-One
Magic box

The PSC 1210 is a simple and compact multifunctional product from HP. It converges printing, scanning and copying into one single unit that is not larger than a full size inkjet printer. The software required for all its tasks comes bundled.

The printer resolution is 1200 x 1200 on plain paper, and 4800 x 1200 on photo quality paper. It took just 18 seconds for a full sized text test page in normal mode. The photo-quality test prints were comparable to the best in the low-end printer class.

The flat-bed scanner can scan A4 size paper at a maximum optical resolution of 600 x 2400 dpi and 36-bit colour depth. Twenty seconds for a text document was what the scanner took, and the quality of the scan was acceptable. The results were disappointing for high quality photo. The OCR software gives a minimum of errors. A press of a button copies a document.

The HP PSC 1210 is the ideal device for home use where you print and scan occasionally. We don't recommend it for colour copies and scans, however. But finally, at just Rs 7,999, it is the best thing to hit the market in recent times. Go ahead and buy it!

Price: Rs 7,999
Contact: Hewlett Packard India ltd
Phone: 011-26826000
Fax: 011-26826056
E-mail: rajiv_rao@in1.exch.hp.com
Web site: www.hp.com

SPECIFICATIONS
1200 x 1200 dpi maximum resolution (4800 x 1200 optimised dpi when printing from a computer on premium photo papers using 1200 x 1200 input dpi), 600x2400 dpi maximum scanning resolution at 36 bit colour, USB interface, 8 MB buffer, 2 cartridge printing (colour, black).

HP PSC 1210 All-in-One	A-
Performance	
Build Quality	
Value for money	
Features	

Pushpam HandsPC 1600
Touch me not

The HandsPC 1600 has several good features, and has an elegant silver body and chrome finished buttons that make up the bottom third of the body. It looks quite like an iPaq, and at first glance, it's hard to distinguish it as a locally made product.

The 1600 comes with a bright white backlight, which is not crisp or sharp enough for reading. The touch screen also lacks accuracy, but the handwriting recognition is excellent, and the preferred input mode is writing onto it. The user interface is similar to that of the Palm OS.

This PDA is packed with features—it has an MP3 player, a Dictaphone, and powerful PIM functionality. The most important feature is the bundled software that is customised for Indian professionals—one that caters to accountants, and the other to LIC agents. These software have full functional capability provided by similar desktop software.

The 1600 Hands PC is priced at Rs 19,200, which may seem a little steep. This handheld does have customisations, but that does not justify the price tag.

Price: Rs 19,200
Contact: Pushpam Infotech Corporation
Phone: 020-4215162
E-mail: sachin@pushpam.com
Web site: www.pushpam.com

SPECIFICATIONS
33 MHz Motorola Dragon Ball processor, Penbex OS, 2-inch 12-bit colour display, IR port, 64 MB Compact Flash, serial connection

Pushpam HandsPC 1600	B+
Performance	
Ease of use	
Value for money	
Features	

Drive Image 7
Crash helmet for your PC

The worst nightmare of every computer user is that their PC will not boot, or that all their data will be lost overnight. And this casualty, just because they kept postponing data backup—because it's cumbersome and takes time!

Drive Image 7 is built precisely to resolve this issue. All you need to do is use its wizard for backing up your drives according to your preferences, and it does the rest for you, fast. Installation was a breeze. You have the option of storing your drive image to a hard disk, a network drive, a CD, or DVD-R/RW. Drive Image 7 works with all versions of Windows.

You can specify the amount of space on each CD (or disk) to be used so that the backup image can span across disks, and you can make the software ignore bad sectors on the hard drive. A compressed-backup feature is available too.

In our tests, Drive Image took 1 minute and 16 seconds to make an image of a 601 MB drive. The software took 4 minutes to restore a 549 MB folder. Drive Image performed all the tasks it claims to do—fast backing up, restoring single files, and verifying file integrity—at a low enough price. So the next time you want to back up your data, you know what to use!

Price: Rs 2,997 (approx.)
Contact: Sonata Information Technology Ltd
Phone: 080-6575800
Fax: 080-6567487
E-mail: charudutt.gurkar@sonata-software.com
Website: www.powerquest.com

SPECIFICATIONS

Drive Image 7.0 for Windows XP & 2000: 256 MB RAM, Pentium compatible or higher processor and CD-ROM drive
Drive Image 2002 for Windows 9x, Me, NT Workstation 4.0 (SP6a): 32 MB RAM, Pentium compatible or higher processor and CD-ROM drive
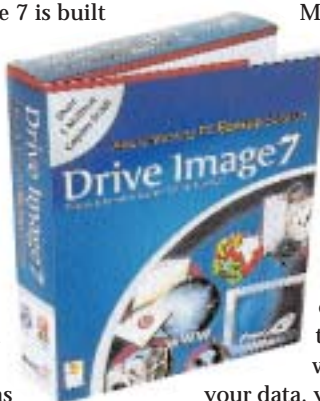
Drive Image 7				A-
Performance	▶	▶	▶	▶
Ease of use	▶	▶	▶	▶
Value for money	▶	▶	▶	▶
Features	▶	▶	▶	▶

WinTasks 4 Professional
Ask the task manager

Without efficient resource and task management, a lot of your hardware bucks may go down the drain. WinTasks 4 Professional allows you to control the potential of your computer's resources.

WinTasks makes it easy to find and remove unnecessary background processes, and to assign resources to higher-priority tasks. The statistics window shows you the CPU usage and how the internal memory is used. Buttons allow you to stop, increase or decrease the priority level of processes. You can get a description of the processes, and the DLLs that they use; launch scripts; view CPU and memory usage statistics; record program logs; and enable, disable, add or remove programs from the registry.

The Event log window automatically logs information about all the programs that were run. You can save this information in a file for later analysis. Using the 'built-in script', you can create functions to automate handling of processes and resources.

The lack of support for Windows Me, and the fact that the CPU and Memory usage is not available for Windows 98, was disappointing.

Overall, priced at Rs 1,997, WinTasks 4 is well worth it.

Price: Professional: Rs 1,997.50, Upgrade: Rs 1,250, Standard: Rs 1,497.50, Elements: Rs 997.50 per license for 100 or more licenses.
Contact: Liutilties
E-mail: contact@litutilties.com
Web site: www.liutilities.com

SPECIFICATIONS

Pentium 200 MHz or higher; Windows 98/NT/2000/XP; 10MB hard disk space; 32 MB RAM; 4X CD-ROM Drive

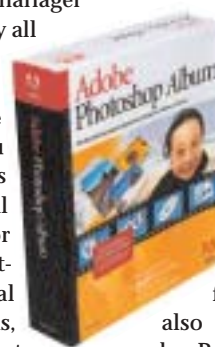| WinTasks 4 Professional				B+
Performance	▶	▶	▶	▶
Ease of Use	▶	▶	▶	▶
Value for money	▶	▶	▶	▶
Features	▶	▶	▶	▶

Adobe Photoshop Album 1.0
The perfect digital photo album

Adobe Photoshop Album is a photograph manager which manages nearly all types of images on your hard drive, no matter where they're located. It allows you to capture photos directly from a digital camera, scanner, or folders across your network, into a central repository. Besides this, you can also incorporate video and audio clips into your Photoshop Album, and organise and view them.

When you start the Photoshop Album, the QuickStart guide window automatically opens, and points you to all the major tasks. It provides powerful tools such as the Timeline tool that organises photos by date. The Calendar view allows you to view the photos according to the day you took the photos. Thumbnails are displayed on dates of photographs. The Tags option allows you to add information in order to organise your photos, and it allows you to burn your imags to a CD. Searching for your images is also very fast. All this makes Rs 2,500 not too much to pay.

Price: Rs 2,500
Contact: Adobe Systems India
Phone: 0120-2444711
Fax: 0120-2537681
E-mail: sandeepm@adobe.com
Web site: www.adobe.com

SPECIFICATIONS

Intel Pentium III or IV; Windows 98SE, Me, 2000 or XP; 128 MB or more RAM (256 MB recommended); 250 MB or more hard disk space; colour monitor capable of displaying thousands of colours at 800 x 600 resolution; CD-ROM drive

BenQ M100 Optical Mouse				A-
Performance	▶	▶	▶	▶
Ease of use	▶	▶	▶	▶
Value for money	▶	▶	▶	▶
Features	▶	▶	▶	▶

A View to View

Agent 001 seeks out the right monitor

Personal computers have become the hub of digital entertainment—there's no denying that. But it wasn't temptation enough to do away with the 15-inch monitor that had been sitting on my desk for the last 3 years. It was sufficient for all my word processing needs, and *Quake III* looked impressive enough at a resolution of 1024 x 768.

Everything was hunky dory till the day that photo-editing job invaded my world. Of course, I was glad to help, but the only thing that vexed me was the fact that I hadn't tried Photoshop on my PC—on my 15 inch monitor, to be precise. Macromedia Flash had not been quite friendly with my PC either, a few weeks back. Anyway, I decided to give it a go, and opened the PSD file.

Blink! All I could see was toolboxes that clothed the image with a shroud of obscurity. Was it the resolution? Pumping that up only made the fonts squiggle, and the flicker exasperated my eyes. I thought I could survive until I reached a stage when I realised that I couldn't take the visual annihilation anymore.

Now, as that *Matrix* guy says, I started to believe, I needed a monitor upgrade... ASAP! And then began the battle of choices: should I buy an LCD, or a CRT? This battle was still on as

I headed straight towards a local vendor near my house, hoping he could help me out.

There he was, that buck-toothed guy, standing in front of his small shop, looking very much like a distorted
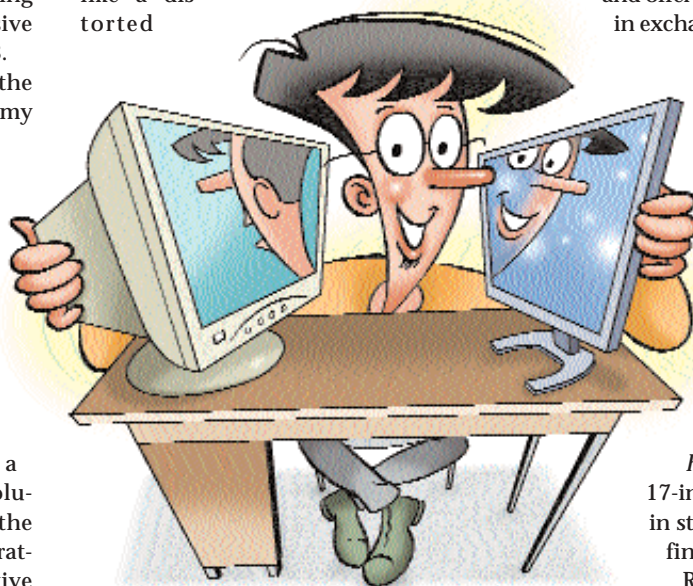

ILLUSTRATION: Mahesh Benkar

version of Scrooge. I told him of my upgrade dilemma, and I enquired which the best available was. He opined that Samsung was the best, and with a flourish, pointed towards the 763S 17-inch CRT monitor that was available for a cool 7,000 bucks. Boy! The price was impressive enough, but now, I was curious about the other players. With another grand gesture, he pointed to a good-looking LG Flatron E700S flat screen CRT monitor that would lighten my pockets by Rs 9,000. That seemed a fairly decent buy, but what about the LCDs? To my utter dismay, he said that he no longer stocked LCDs as they were too costly, and that nobody was interested in buying those.

I was not going to take that for an answer, since checking out one of those LCD beauties was something I was hell bent on doing. (I need to be impartial, right?) I went across to his local rival. Alas, the story was the same. *"Digital*

milega 'ell shee dee' nahi."

And then, as all roads lead to Lamington Road, I found myself there. The first dealer showed me an LG 700S 17-inch CRT, which according to him, was the best. He quoted a price of Rs 6,900, and offered me a discount of Rs 2,000 in exchange for my monitor. I asked him if he had any 19-inch CRTs. He offered me an LG 900B for Rs 14,000, which is quite enticing, I must say. Then I asked him which one was better—an LCD, or a CRT? He gave me an interesting reply. "*Aare ek LCD ke price mein teen CRT khareed sakthay ho, toh achha kya hoga?" Touché!* He did have a 17-inch LCD Samsung monitor in stock that would deplete me, financially, by a whopping Rs 36,000. I gave him a sheepish smile, and slipped into the next shop.

This wonderland was with the times, and the owner was quite tech-savvy too. He reckoned that LCDs offer sharper images, and take up very little space, but CRTs are much cheaper, and colour reproduction is richer on them. He offered me a 19-inch CRT from Samsung, and a 15-inch LCD from Philips, for Rs 14,400 and Rs 22,000 respectively, as an exchange offer. He also added that Samsung packed in a 3-year onsite warranty. Pronto, confusion waylaid my thoughts. Should I go for the 15-inch LCD that provides superior image quality, but lesser screen space, or the tried and tested 19-inch real estate?

Reason won over wonder, and i chose the 19-inch monster, for the enormous workspace it provides, which was the whole reason for looking for a display in the first place. At the end of it all, I had saved a mint cool Rs 6,000, and my eyes had found a view to fall for! ▪

SHOPPING TIP

■ If you are planning to build a new PC, go for 17-inch monitors that are available within the range of Rs 6,000 to Rs 7,500.

■ Stay away from 14-inch monitors, as the dealer may be trying to sell an old piece, as they are not in production anymore.

■ Check if it an onsite warranty is supported, since transporting CRTs can be cumbersome.

■ Opt for an LCD if space constraints or aesthetics are your major deciding factors.
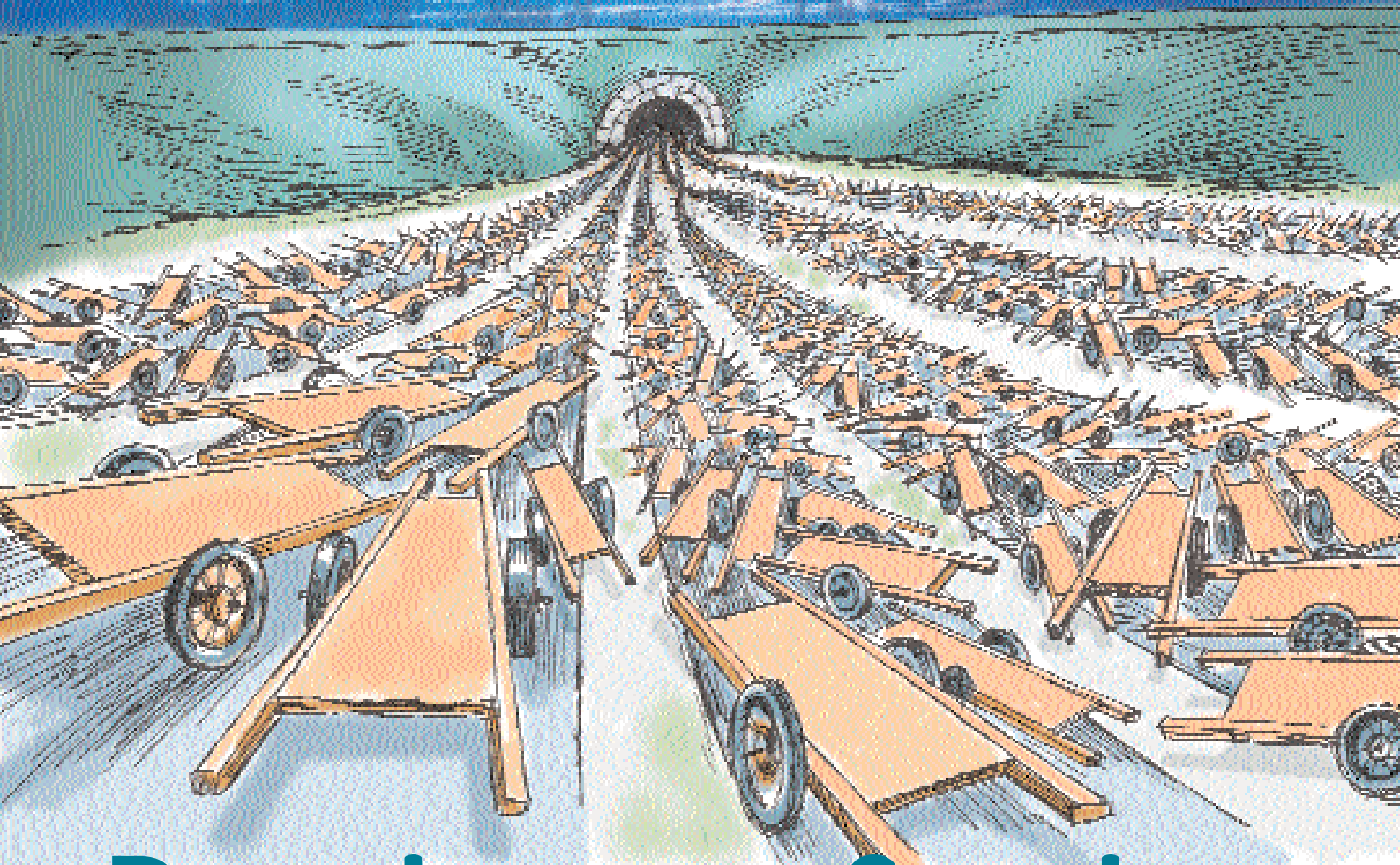
Denying you Service

Plant a tiny ticking time bomb that has been fine tuned to attack, on the Internet. Watch it lie in wait for a single instruction. Traffic on the Internet comes to a crashing halt when the moment comes. The show has just begun—or should we say, ended…

Picture this: you're heading off to the beach on a fine sunny day, and you've just pulled down the top of your convertible. As you leisurely cruise down the highway, you can't help but feel good when you think about the rest of the day. That is, until you face the mother of all traffic jams right up ahead, and there soon seems no way for you to progress. Now apply that analogy to a 'Denial of Service' (DoS)' attack on the Internet: the information autobahn—that lifeline of all services online—that you are cruising on, can turn out to be worse than that demolition derby you saw on TV.

In the networked world, a single click of a button can turn off the gas. That's as simple as it's getting to be, to attack the Internet.

Denying you access

A Denial of Service attack is one in which a remote machine or network is targeted such that its ability to conduct normal and legitimate business is tied down by swamping it with bogus requests for information, and utilising all the available machine and network resources. Distributed Denial of Service (DDoS) of service attacks initiate hostile action from several machines having diverse, and possibly rapidly changing, origins.

A DDoS attack could involve large numbers of slave or compromised computers, from between a few hundred to several thousand. The attacks are usually well planned and smoothly orchestrated, take place in discrete steps and generally take advantage of some known vulnerability in the targeted machines. The first phase involves rapidly scanning a very large number of diversely located hosts to find out the machines that respond to an existing vulnerability. This could be some previously known vulnerability, or some new, unknown one—in the software or hardware setup of the machines being scanned.

Once all the hosts have been probed, the machines that have responded favourably—that is, those that still have

these vulnerabilities and have weaker defences—are attacked in order to gain access to them. Once in, all traces of the break-in are wiped out, and special replacement tools called rootkits are installed. These prevent other root users (or administrators) from locating and removing the unauthorised intruders. In the next step, the perpetrator of the attack shifts focus to using the compromised machine as a platform for further attacks, by deploying a remote-control tool on the compromised machine. With this machine in control, the perpetrator can further target other machines, using this machine to progressively scan and probe and break into more systems and networks, and install the same remote-control tools.

Most attacks are generally non-OS-specific—the tools used to break into and acquire control of these computers could be ported into the OS and architecture of choice. Now here comes the scary part: with the kind of widely available automated tools, including worms that can be written for known vulnerabilities, it would take less than 5 seconds to compromise a single machine—meaning that several thousand hosts can be attacked, and taken over in less than an hour.

Blastin' its Way

In July 2003, Microsoft acknowledged a vulnerability in their Windows NT, 2000, XP and Server 2003 related RPC (Remote Procedural Call) implementation. A buffer overflow mechanism was detected over the part of the RPC implementation that dealt with message passing. A successful attack would grant the remote intruder full administrator access on the local system.

MSBlast takes advantage of this vulnerability, and gains access to the target system. The worm then retrieves a copy of a file named msblast.exe, executes it and starts scanning for other vulnerable hosts. The infected computers reboot with a 60 second timeout. With Internet access available, the worm is coded to target a SYN flooding attack at the official Microsoft update site *(www.windowsupdate.com)* on port 80, if the current date is the 16th or later (from January through August), or any day of the month between September and December. The only solution here is to patch up the OS; a free removal tool is available at *http://securityresponse.symantec.com/avcenter/venc/data/w32.blaster.worm.removal.tool.html*

But wait up, the show is just starting—the final step is the actual DDoS attack. Each one of these compromised machines are called zombies in SysAdmin-speak, and with an informal network of thousands of zombies, each one can be ordered to attack a given target using a variety of techniques. The attacker can control each zombie with just a single command, and instruct them to launch any type of attack. Turning off the attack is as simple as issuing another command. As the examples of some of the most ferocious attacks in Internet history will show you, the attempt succeeds because the co-ordinated effort across numerous slave machines overwhelm the resources of the victims.

If this dangerous sequence of steps was done under manual supervision and control, the number of computers that could be compromised would be limited to what the cracker could handle. But take this technique and automate it down to one self-propagating program—a worm that will mindlessly follow the directives programmed into it, millions of times over—and that is the nature of the world's most destructive Internet DDOS attacks.

Slamming it down, hard

The Slammer attack that struck around the 25th of January 2003 hit all the records, and went down in history as the fastest computer worm ever. Slammer is a slickly crafted worm that takes up a mere 376 bytes of memory. The worm took advantage of a rather common flaw that can potentially exist in most applications, known as buffer overflow.

During normal operation, code is read into the system memory and occupies certain real estate there i.e., allocated memory blocks called buffers. A buffer overflow happens when too much data is pushed into a buffer. After the buffer fills up, the data being read wipes out the program code in the neighbouring blocks, and substitutes that code with the new code. This is where arbitrary code can be fed into the system and malicious instructions executed.

Slammer exploited a stack buffer overflow flaw in Microsoft's SQL Server: the worm pumped data into the server, way beyond what it was legitimately allotted. As a result, other data got read into memory space where it was not supposed to. This effectively let Slammer give new instructions to the host computer—the ones Slammer used to propagate itself—which the computer executed.

This security loophole had already

been identified in July 2002; patches that resolved this had been released by Microsoft before the public announcement of the vulnerability. Slammer managed to get through anyway, because not enough people had patched up, early enough. It used some pretty smart tricks to ensure rapid infection. The infected population was estimated to double roughly every 8.5 seconds. It used random IP scanning, to zero-in on other computers all over the Internet. Just one 376 byte UDP packet (the kind used to send information across the Net) destined for UDP port 1434 spread
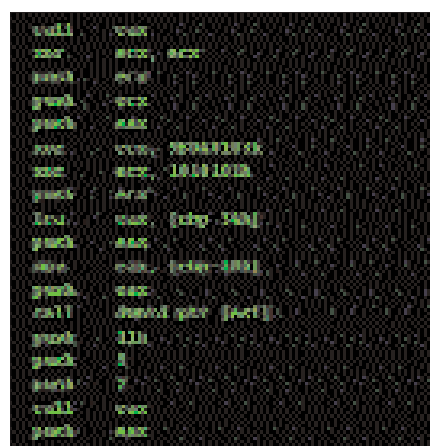
Slammer: 376 bytes long, spreading worldwide, coming to a computer near you

across millions of random IP addresses, and ultimately infected an estimated 75,000 hosts. Networks all over the world started going out as each infected machine spewed out more packets to random IP addresses, as fast as network connectivity would allow; the sheer volume of senseless traffic being put out was bringing down networks in North America, Europe and Asia. In the US, ticketing and schedules of the domestic airline, Contenental Airlines were disrupted; Seattle's law enforcement and emergency response units went offline and the employees found themselves back in the early 20th century with radio sets and pencils; the 13,000-strong ATM network of Bank of America went on the blink; and many Internet sites went offline as their servers were swamped by traffic. All of South Korea and many parts of Europe went offline, and five of the Internet's root servers—the Internet's version of a lookup directory service—went down.

Despite the havoc, Slammer did not seem to contain any destructive payload, and has not appeared to have destroyed any computer files. Still, a worm that spread over the world in roughly 10 min-

utes lead some analysts to predict that Slammer may very well be the first of many such swiftly spreading worms that could use enormously destructive payloads.

Slammer's origins have remained unknown—the small size of the worm ensured there was no additional information about the worm in the code, and has made it hard to trace its origin.

Red is the colour

Back in June 2001, security professionals detected a vulnerability in Microsoft's IIS 4 and 5, running on Windows NT, 2000, and beta versions of Windows XP. The flaw here was a gaping hole in the Indexing Services of IIS 4 and 5, another remotely exploitable buffer overflow problem; any intruder who could reach a vulnerable Web server could execute arbitrary code and eventually gain complete access to the system. Microsoft released a patch that addressed this problem. Those who didn't patch up quickly enough, faced a new worm around July 12th, one that exploited the IIS vulnerability to the hilt. The worm called Code Red attacks by attempting to connect to TCP port 80 of a randomly chosen host. The 4 KB sized worm passes a carefully constructed URI (Uniform Resource Identifier) to the HTTP service (a 'GET' request). If the system is vulnerable, the request will almost certainly exploit the buffer overflow vulnerability in the system, and allow the code to execute.

The worm came with some pretty good smarts programmed in. It first spawned 100 threads, thus running a 100 copies of the worm at that time. It then followed a fixed timetable—between the 1 to 19 days of the month, it would try to infect other hosts. From the 28th day to the end of the month, the worm would go to sleep. The

real action would happen between the 20th and the 27th day, when the worm would launch a packet flooding DoS attack on the IP address 198.137.240.91. At that point of time, that IP address was assigned to the official Web site of the US Presidential office. The worm also affected certain Cisco routers, triggering off an unrelated vulnerability. The DoS attack on the White House site was performed by sending 98,304 packets to the whitehouse.gov server. Now, all 100 threads of the worm can take part in this attack, giving rise to 100 times 98,304 packets every four-and-a-half hours, after which the worm slept. Finally, the 100th worm thread defaces the server with a message saying it had been hacked by the Chinese.

The only indicator of the abnormal activity of DoS is unusually high traffic. Code Red could be swept off a system if the system is rebooted. The problem is that since all the Code Red infected systems scan the same IP addresses, they tend to re-infect as soon as the computer comes online again.

But that's where Code Red was flawed—its random number generator was not perfect, and so, identical lists of seemingly random target IP addresses across different machines were created. This meant that the worm spread rather slowly, probing and scanning infected or invulnerable machines.

Code Red was followed by a smarter Code Red v2, the CRv2 worm. CRv2 came with a far more sophisticated random seed so that each infected computer came up with different lists of random IP addresses to target; this vital difference in code allowed CRv2 to infect so many machines that world-wide traffic in the third week of July 2001 slowed down considerably. Also, CRv2 was so smart that it no longer hard

coded the White House's Web site address—it queried a DNS and looked up the address.
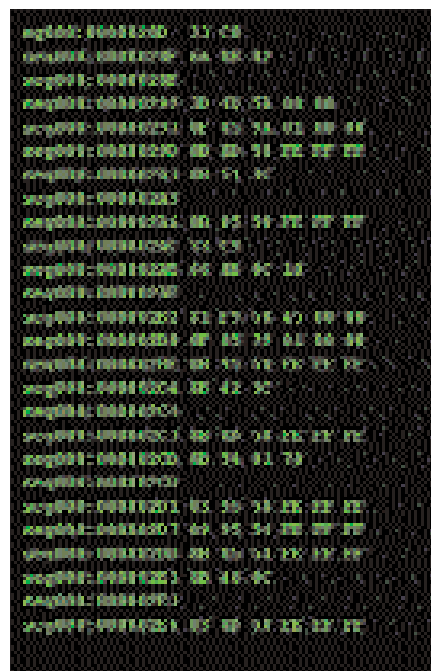
In August of 2001, yet another worm came out into the wild. This one was called CodeRedII; it was unrelated to the first two, but used the same vulnerability in the IIS servers. This was no mean worm—unlike the first two, CodeRedII was not memory resident, so a mere reboot would not help. After infection, it initiates propagation, and then opens up a backdoor and remains dormant for a day. Intriguingly, the worm does no damage to any files or Web pages—instead, the

Code Red: lying silent and waiting

Know Thy Enemy

It looks like just about any computer on the Internet, with a standard OS and offering standard services, but with one difference: it's a honey pot. Honey pots have been designed to appear as attractive options to crackers, the sort that they just cant seem to ignore. They appear to be a normal machine to the cracker; loaded with what appears to be genuine data the cracker can explore. Meanwhile, the good guys are busy using the honey pot to trace the hacker and learn more about the

compromised aspects of the system as well as how the hacker probes the computer.

An extension of this is the Honeynet project that uses several systems over a network. In the network, inbound and outbound connections are analysed, informing users about the kinds of intrusions that take place. The Honeynet provides services very similar to a production system, making it appear genuine. The Honeynet project is located at *http://project.honeynet.org/*

really dangerous thing about it is that the backdoor it opens allows for root-level access to the infected machine and permits any code to be executed, thus making the machine a potential zombie.

Most of the world appears to have patched up against CR and CRv2. But the Code Red story doesn't end here—there still exist systems that are vulnerable, ready to infect others, waiting.

Target the roots

The internet today relies on 13 crucial DNS (Domain Name Service) root servers that act as a sort of main directory service for routing packets across the Internet to make sure they reach the correct machine. The central 'A' DNS server is operated by Network Solutions Inc, and this server maintains the master list of all top level domain names (such as .com, .org, .net, .mil and country-specific codes). This list is duplicated in the 12 other root servers on a daily basis (the servers are designated 'A' through 'M'). The list is made available to all routers across the Internet, and routing tables are updated by referring to the lists in the root servers. For example, this is what converts *www.google.com* to its respective IP address, and lets you locate a machine's location through its domain. Now, to ensure redundancy, and to make sure that all the root servers don't get taken down by the same natural or unforeseen calamity, the servers are dispersed globally, in places as far apart as Stockholm, London, Tokyo and Maryland. They are monitored by the US government agencies, as well as research organisations and universities, they are variously defined as 'battle hardened' and 'equipped to live through attacks of all sorts'—or so they wish.

On the 21st of October 2002, nine of the thirteen root servers showed how vulnerable they were. In an attack that lasted just over an hour, a major distributed DoS attack was mounted on the root server system worldwide. The root DNS servers have been attacked before and subjected to DoS attacks, however what made this different, and more serious was the fact that all the root DNS servers had never been targeted at the same time before. The attack itself came as a huge ICMP flood. ICMP, the Internet Control Message Protocol, is a system designed to carry error reporting or testing data. To put it simply, what happened was a ping-style flood that was used to clog up the access lines, and eat up all available bandwidth, so that all legitimate data packets got lost.

Jargon Buster

Zombies: Zombies are computers that have been taken over by a remote attacker, and are used to attack other computers.

Ports and port number: A port is a termination point on a network. Port numbers allow different processes and programs to use network resources without interference.

Buffer Overflow: Programs allocate fixed size blocks called 'buffers' for reading data. If a program is given too much data that it reads into the buffer without checking the size, the buffer overflows leaking the data into neighbouring memory. This could potentially overwrite the program code, and the computer may execute the overflowing data as a part of the instructions. If the exploited buffer sits in a privileged program, a malicious program could take full control of the computer.

Stack Overflow: A program stack is a block of memory that holds the list of functions to be executed. If a programmer isn't careful, it is possible for a hacker to send a large packet of data that overwrites the stack, and executes functions that the hacker wants. If the exploited stack sits in a privileged program, a malicious program could let an intruder take full control of the computer.

Backdoors: Malicious programs that let intruders access a computer system. These programs may, for example, modify important system tools that would let a hacker access the computer at a later date.

Fortunately though, two things came to the rescue of the Internet. The first was the fact that most DNS query data does not reach the root servers—instead, caching techniques are used, meaning that actually consulting the root servers is generally the last resort. The second was the fact that server administrators quickly realised that the attack was an ICMP data flood, and hence shut down those services. Yet, nine of the root servers were overwhelmed in the attack and succumbed. But reports at the time indicated that since the attack was short-lived, most users on the Internet never came to know about the outage in service. On the flip side, most analysts agree that the attack had indeed continued for several hours, then with the DNS caches slowly expiring the world over, no top-level domain name conversions would have taken place through the root servers, and users would have been snapped out of the online link. The 'F' root server, for example, responds to over 270 million DNS queries every day. To put it in perspective, we were plain lucky that the 'most sophisticated, large-scale assault in the history of the Internet' stopped with just this much damage—but we could expect worse in the future.

Hindsight, 20:20

DoS attacks today have become very sophisticated; the time, kind and duration of the attack, and the victim's IP address are now programmed into an attack mechanism or code. The fact also is that the acquisition and infection phase is pretty sophisticated, and that's why, once a host has been taken over, the population of infected machines enlarged.

The Code Red and Slammer attacks have targeted specific known vulnerabilities in application software. This is certainly not the only way to attack and take over machines, but the most successful attacks in recent times have been of this type. With more and more vulnerabilities being identified in common application software, the likelihood of worms that target them is definitely going to increase. And Brute force attacks, such as the October 2002 DNS root server attack, can always be done.

If you believe that switching over to open source solutions is a remedy, think again—the problem lies not with the kind of software, but with how well informed and how well-patched up you are. Both open source, as well as proprietary solutions, have shown vulnerabilities, and this does not take into account attacks that target bugs and features in protocols. In both the Code Red and the Slammer worm attacks, critical patches were available before the attacks took place, yet the spread of the worms in both cases was astonishingly fast—showing that a vast number of servers had not been patched. And here's some more food for thought: News.com reported over two years back, that over 4,000 DoS attacks hit the Internet every week. Now that is scary. With all of four billion hosts on the Internet, how big is this statistic going to be in the next few years? More importantly, will you be yet another number in a table?.

SRINIVASAN RAMAKRISHNAN
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30Minutes Expert
Rely on the Net

You just bought a Reliance cell phone, but are a little confused about how to connect it to your laptop or PC for Internet access. We show you how to do it in 30 minutes flat! Let's get started.

Enter the username and password in the dialer

The first thing you should do is get a data cable to connect your handset to your computer. Most data cables have either of two interfaces—Serial (COM port) or USB. We recommend a USB interface, for the sheer ease of installation and use. Make sure you get an original, manufacturer-recommended data cable for your cell phone model.

Next, in Windows 98 or Me, install the Dial-up Networking and TCP/IP protocols for the Dial-up adapter. To do this, go to *Start > Settings > Control Panel* and open Add/remove Programs. Click on Windows Programs, select Communications and click on Details. Check Dial-
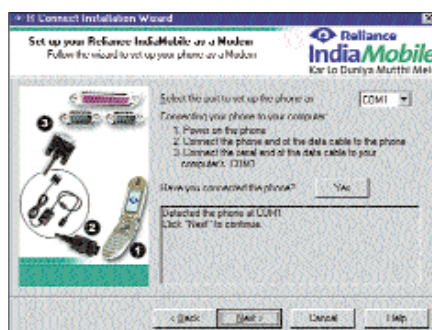
Select the model and the port to which it is connected in the wizard correctly

up Networking and click OK twice. Now, from the Control Panel, open Network and click on the Add button. Select the Dial-up adapter and click OK to install it. Next, click on Add, select the Microsoft TCP/IP protocol and click OK twice. The setup will prompt you to insert the Windows installer CD, do this and reboot your computer when the installation is done.

Insert your R Connect CD after your PC restarts, and start the Installation wizard. Click Next at the Welcome screen, and select your handset's make and model number. Set the cable type to USB or Serial, as per the cable you have. Here we used a Serial data connector, as it is the cheaper and more popular data
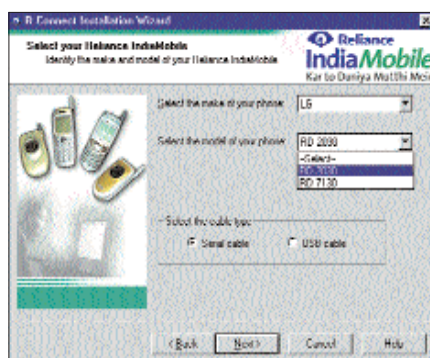
Select the port to which the phone is connected

cable interface. Before connecting the cable to your phone, you have to set your phone to work as a modem. Type in '*412' and press the call button. You will receive a confirmation SMS that tells you that your phone is now ready to be used as a modem. Now you can connect your PC to the phone via the data cable.

Continue the R Connect installer wizard by selecting the COM port that your phone is connected to—either COM1 or COM2. Click on Yes and the phone will be detected—if it isn't, choose the other COM port and click Yes. After the phone is detected, press Next and all the necessary drivers will be installed. The phone will now be displayed as a modem in Windows. You will
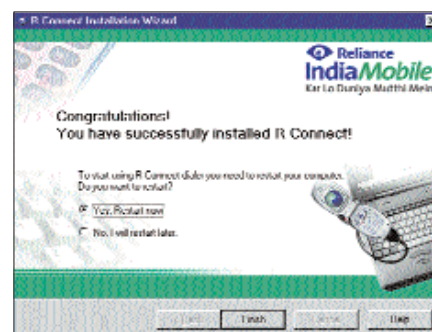
Restart your PC after installing the R-Connect software

be prompted to restart you PC, so close all applications and select 'Yes, Restart Now'.

After the reboot, the Reliance dialler will pop up, and ask for the username and password. If your mobile number is (+22) 3101 XXXX, then your username and password will be 223101XXXX. Enter the number accordingly, and hit Connect—the connection will be established almost immediately.
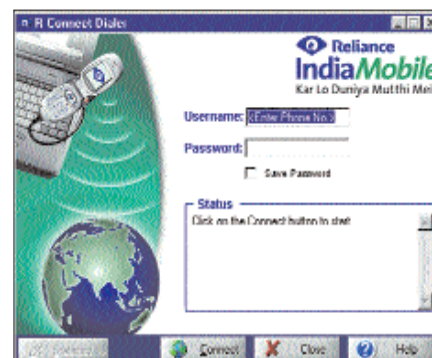
Enter your username and password in the dialler box and click Connect

You can set Internet Explorer to always use this connection from *Tools > Internet Options > Connections*. Now, you will get Internet speeds between 40 Kbps to 80 Kbps, but also remember that this service is a battery hog—a fully charged phone battery will only last for about 30 minutes of continuous connectivity.

NIKETU SHAH
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MONEY
Matters

Let the penguin pinch your pennies

In Linux, two accounting packages called GnuCash and Quasar do all your money management for you. Gnu-Cash, with its simple to use interface is more suited to home users or amateurs, while Quasar is a more professional financial accounting software, suitable for professional users such as chartered accountants and so called advanced users.

GnuCash

GnuCash allows you to track bank accounts, stocks, income and expenses. It is an easy-to-use software based on professional accounting principles to ensure balanced books and accurate reports. This software comes bundled with most distributions such as Red Hat and ELX.

As soon as you start the software, it prompts you to choose from either 'Create a new set of accounts', 'Import files', or 'Start tutorial'. Start with the 'Create a new set of accounts' option.

Now a new account setup druid starts. This druid helps you create the basic accounts that are needed to start your finance management and accounting actions. The next step the druid does is to select the currency. Click 'Select button', keep the Type as Currency, set 'Currency/security' to 'INR' and press OK.

To create accounts, select the categories that are applicable to you. All the necessary account heads relating to that category will be created automatically. For

Set the default currency in GnuCash to have all values displayed in a currency of your choice

example, if you select 'Common Accounts', the category will include all accounts that would be needed by you to maintain your accounts. Accounts thus created will consist of income accounts such as salary, expense accounts such as education, insurance, taxes, etc. It will also include assets and liabilities accounts such as credit cards and savings accounts. Press Next to create all the selected accounts. Once the accounts are created you need to specify the opening balance for the accounts. Finally, press Finish to get out of this druid. Now you can enter the figures on a day-to-day basis. But before you start, make sure you have changed the default date format. Navigate to *Settings > Preferences > International,* and set the date format to UK (mm-dd-yyyy).

Now you can begin managing your moolah. First, enter the salary details. To do this, expand the Income group by clicking the 'plus' sign next to Income, and then double-click on the Salary entry. A new window will appear as a column.

This is what your salary entries will look like, from the the start of the financial year

Entries Transferring Funds from Bank Account to Cash-in-Wallet

Begin by entering the date you received your salary cheque, then a small description to summarise the salary transaction (writing the cheque number in the description is a good idea). Then, in the Transfer column select 'Assets:Current Assets: Savings Account', and finally, in the Income column, type the salary amount. An example entry is as follows:

Description: Salary for the month of September
Transfer: Assets: Current
Assets: Savings Account
Income: 1000.00

The financial year starts from April, so you will need to feed in all the entries from April, to the current date.

Once your income group is updated, you need to work on the expense group. For example, an important account in Expense that needs to be mentioned is transportation cost. For this, you can use the Public Transportation found within the Expense group, and double-click on the entry to open it. Here you will find a column similar to that in the Salary account. If you use your own vehicle to commute, you can use the 'Fuel refill' category, which will also be mentioned in the Public Transportation account. Whenever you make any entry within the Public Transportation account, most of the entries will have the Transfer column value as 'Assets:Current Assets:Cash in Wallet'.

Your salary goes directly to your savings account, while your transportation and other expenses are cash transactions. So you'll have to make entries in the system to reflect a cash withdrawal transaction. The entry will transfer a certain amount of funds from the savings account to the 'Cash in Wallet' account. For such entries, the Transfer column will contain 'Assets:Current Assets:Savings Account' with the 'receive' column containing an amount, say Rs 100.00. An example entry:

Description: Monthly Expenses
Transfer: Assets: Current
Assets: Savings Account
Receive: 100.00

All other expense transactions can be created in the same way. You may need to update different expense accounts such as rent, property tax and so on. Another type of entry that involves transactions in three accounts, is credit card transactions. To replicate this scenario in the software system, first double-click on Clothes within Expenses, then create a new transaction

1/2 page H AD

Types of Accounts

The following terms each identifies the account as being:
Bank: A bank account.
Accounts Receivable: Used for providing customers with a line of credit.
Other Current Assets: A current asset other than a bank type account or a receivable type account. A prepaid bill is an example of a current asset.
Fixed Asset: Fixed assets include such investments as buildings and land.
Other Asset: An asset other than a current or a fixed asset.
Accounts Payable: The account that is used for the purchase of products. Multiple payable accounts can be defined.
Credit Card: For company credit cards.
Other Current Liability: Any current liability, other than a payable account or a

credit card account. Income tax payable is one such liability account.
Long Term Liability: A would be a long term liability.
Equity: An equity account; say the share holder capital in a company.
Income: A standard income account. Sales accounts are all income accounts.
Cost of Goods Sold: When a product is sold, the inventory is reduced by the cost of the goods sold. This account keeps track of your total cost of sales.
Expense: Expense accounts are for all expenses such a fuel, power, water, rent and staff costs.
Other Income: A non-standard income account.
Other Expense: Any non-standard miscellaneous expense account.

(if you've purchased clothes using your credit card) with the Transfer column pointing to 'Liabilities: Accounts Payable: Credit Card'. Finally, create an entry with the same amount in the Savings Account with the transfer field, pointing again to 'Liabilities: Accounts Payable: Credit Card.' This completes the cycle and settles the balance amount in the Credit Card account to 0. You can check this by double clicking on the Credit Card account within 'Accounts Payable' in 'Liabilities.' It looks something like this:
Entry within Clothes
Description: Clothes Shopping
Transfer: Liabilities: Accounts
*   Payable: Credit Card*
Expense: 150.00
Entry within Savings Accounts
Description: Repayment of Credit Card bill
Transfer: Liabilities: Accounts
*   Payable: Credit Card*
Withdrawal: 150.00

At any instant, while you are using this software, you can view the Profit and Loss value in the bar just below the toolbar. If the values show in dollars, click the arrow button to the left, and from the drop down list, select INR. This figure gives you information about your current financial situation.

Once you have updated all your income and expense details into proper accounts in the software, you can go on to view the reports. When you open a report for the first time, it will show you figures in US dollars, so you need to specify the

currency as Indian Rupees (INR). Do so by clicking Options in the toolbar, then selecting the report's Currency INR. Press OK for the changes to take effect.

In the Report section, the most frequently used fields will be Accounts Summary, Profit and Loss Account and Balance Sheet. GnuCash provides all three, along with a set of pie and bar charts such as assets bar chart, income pie chart, and others. After you've chosen all your settings, choose the folder and the file where all the data should be stored. Do so and close the file.

Quasar

In Quasar, the base package is available free of charge for a single computer, while add-on modules are available for a nominal fee.

To install Quasar, you need the quasar-1.2-3.tar.gz file. You can download the software from *www.linuxcanada.com.* To start the installation, execute the following command: *'tar -zxvf quasar-1.2-3.tar.gz'.* This will create a folder called 'install'. The next step is to go to the 'install' folder and execute the install.sh file. When you execute this script, it will install all necessary files, and start the Quasar server.

When the Quasar server is up and running, start the GUI client by executing the command *'quasar'* in the terminal window or run window. When the software starts for the first time it will request you to select the default language; choose 'English (United States)'.

Quasar has a license agreement that you have to accept in order to get to the welcome screen. The welcome screen provides you with an option to 'Open company' or 'Open sample company.' If this is the first time you're using the software,
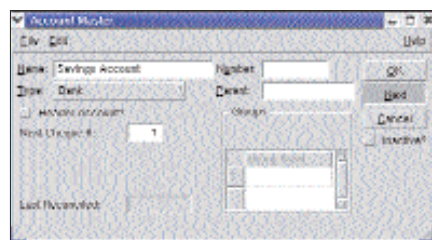
Create a new account here

select 'sample company,' then go to *File > New Company*. A wizard will take you through the process of creating a new company. Here, you have to specify the mailing address, the month to be set as the first financial month and the filename for the data file.

Before you begin working with the software, you will have to set up a few important configurations manually. Go to *File > Configuration > User Configuration > Internationalisation*, and press Customize. Here you will be able to customise a lot of settings—from the date and time, to

currency format, the number of digits after which a comma should be placed, and so on.

Once all the settings are complete you need to create the accounts for the various income, expense and other groups. At the very least, you need a bank account, cash-in-hand, credit card and salary account, plus a few additional expense accounts such as transportation, clothes, etc. To create your first account, the Bank Account, go to *Ledger > Chart of Accounts > New.* Here, specify the account name, say Savings Account, and select the account type as Bank. Press Next to create more accounts in a similar way.

The default account type for Salary should be 'Income', for credit card 'Credit Card', and for expense accounts 'Expense'. Quasar does not have a pre-defined 'Cash' account type, so to create a cash-in-hand account you will have to specify the account type as Cash.

Once you have all the accounts created, the next task is to enter all the transactions one by one. To insert a transaction, you need to press the Journal Entry within Ledger. The entry page is not as simple as that of GnuCash. The ID field has a value of '#', meaning it will take the next free ID from the database. The memo field is the description field for the entry, so you can enter a small description here. You can select the account you need to debit or credit by first clicking in an empty cell within the Account column and then pressing [F9]. This software varies from GnuCash in terms of debit or credit here too: in GnuCash you can see simple columns such as receive and give, but here, you get the standard screen with a debit and credit column.

Let's start with the salary transaction. Specify the date when you receive your salary, put in a description in the memo field, and select the Salary account. Specify the amount in the Credit column, go to the next row, select the Savings Account, and specify the same amount in the debit column.

Note that the Debit total and the Credit total should be same in the right bottom part of the window. Press Next to continue with further entries. For the Salary account, money is going out, so it has to be credited, and for the Savings account, money has to be debited.

Now, to withdraw money, you need to credit the Savings account and debit the cash-in-hand account. To spend cash for books, the entry should credit the 'cash-in-hand' account and debit the 'books' account. A transaction dealing with credit cards requires two entries, the first debiting the expense account (for example, Books) and then crediting the Credit Card account, while the second repays the credit card bill by debiting the Credit Card account and crediting the Saving accounts. If you buy books worth Rs 624 using your credit card. The entry will look like:

First Journal Entry
Memo: Book shopping
Clothes: 624.00 Debit
Credit Card: 624.00 Credit
Second Journal Entry
Memo: Repayment of Credit Card bill
Credit Card: 624.00 Debit
Savings Account: 624.00 Credit

Similarly, you can carry on your daily transactions with the help of Journal Entries. As all your transactions are entered, if you realise that one of the previous entries was incorrect, correct the entry by clicking on Transaction Journal within Ledger. Select the 'Dates:' as 'This Year-to-date' and press Refresh. You will get all the entries. Just double-click on the entry to modify it.

To know your financial status at any moment you just need to view the trial balance, profit and loss account and balance sheet using the Reports menu. The Reports menu also contains a Transaction and a Report Listing. The Transaction report lists all the transactions that have happened. The Report List has more reports categorized into six sections—Card File, Ledger, Cheques,

Modifying a Transaction

Inventory, Sales and Purchases. The Ledger section contains trial balance, balance sheet and profit and loss accounts, plus an additional Account Listing. Account Listing report shows you the balance for every account in your company.

This software is not just a financial software solution; it is a complete solution for small business units with modules such as vendor billing, vendor claims, quotation and invoices, cheque writing and printing, sales and purchases, and so on—that is, an Inventory Management system.

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Q&A

Haunted computers, cameras that don't work, CDs that refuse to run, computers that won't shut down, or just upgrade advice... Tell us about it and we'll help you solve it

Camera can't find file

Q. I recently bought a Sony DCR-TRV355E USB and a Sony DSC-P8 USB camera. When I restart the machine, after installing the required drivers, I get an error message saying, "File USB-NTMAP.SYS is missing." This happens for both the cameras. Can you tell me what I'm doing wrong?
Abhinav

A. Since the message says that the crucial file is missing or corrupt, the solution would be to replace the needed file—all you have to do is copy the file from the original Windows CD. Look for the file named driver.cab in Windows XP and 2000, or base2.cab in Windows 98 and Me, and extract and copy it. If you do not have the original CD, or if you can't find the file, go to *http://www.usb-drivers.com/drivers/49/49917.htm* and download the file of the same name for the version of

Windows you have installed.

Time for action

Q. Whenever I try to explore any folder including my CD-ROM drive, Windows displays an error message saying, "A run time error has occurred. Do you wish to Debug? Line: 0 Error: Type mismatch: 'KJ_start''." Can you help me?
Sharma Gourishankar

A. Uh-oh! Looks like your machine is infected by a virus; you'll have to delete all the files with the 'htt' extension. The easiest way is to go *Start > Find* (or Search in case of Windows XP), type *'*.htt'* as the criteria and start searching. Once the search is complete, select all the files in the search window and press [Delete].

Now that you've learnt your lesson, go to your anti-virus vendor's Web site, download the latest update and scan your hard drive.

Where's my graphics card?

Q. I have a PC with a Pentium 4, 1.5 GHz, 128 MB DDR RAM, a 40 GB Samsung hard drive and a Mercury KOB 845G/GL NDSMx motherboard with an Intel chipset, and onboard sound and video. My problem is that whenever I try to install Linux 7.2, it does not recognise my video card. Linux 7.2 does not list my

motherboard in the list of in-built drivers. Where can I find the required drivers for my video card?
Saumik Pal

The KOB 845G/GL NDSMx motherboard is supported by newer versions of Linux

A. If you are really attached to your version of Linux, and do not want to upgrade to a later version, you can download precompiled binaries in the rpm format from *ftp://aiedownload.intel.com/df-support/6080/eng/dripkg-1.0-4.i386.rpm*. If you want to compile the code yourself, go to *ftp://aiedownload.intel.com/df-support/6185/eng/20030425-i386.tar.gz*, and get the readme file from *ftp://aiedownload.intel.com/df-support/6080/ENG/readme.txt*.

On the other hand, since your PC configuration is definately good

enough, you can run newer versions of Linux that have the drivers for your motherboard and graphics card. These distributions are available on the DVD provided with the August 2003 issue of Digit.

Faulty CDs

Q. I have a Compaq Presario with a Pentium III 1 GHz processor, 256 MB RAM and 20 GB hard disk running Windows XP. Recently, I got a book called *Red Hat Linux 8 Bible*, which bundled three CDs for installing the operating system. Whenever I try to install Linux from these CDs, it gives me an error message that says, "The second stage of the install which you have selected does not match the boot disk which you are using. This shouldn't happen and I am rebooting your system now". Can you help me solve this problem?
Amita

A Unfortunately, you can't—not using those CDs at least. The problem is that your CDs have the publishers edited version of Red Hat 8 with incorrect file sizes. What you can do is download the correct version from *http://www.wiley.com/legacy/compbooks/errata/redhatpubed/*.

You don't even need to do that; just get the Digit August 2003 issue that has a DVD, with the best Linux distributions, including Red Hat 9.

Misinformation

Q. I have a problem with the Frontech Classycam digital camera that I bought about two weeks ago. My computer is a Pentium 4, 1.5 GHz with 256 MB RAM running Windows XP. It said on the box that the camera works with Windows XP, but when I installed the driver provided with the camera, I got a warning that the

The Frontech Web site clearly states that there are no Classycam drivers for Windows XP

A Boot for a boot

Q. When I create a bootable CD using Nero, the system prompts me to insert the bootable Windows 98 CD. So I need to make, is a bootable Windows 98 CD. How should I go about doing this?
Atul Jain

A To create a bootable Windows 98 CD, you need the Windows 98 installer CD, as well as a bootable floppy handy. What you need to do is insert the bootable floppy, and then start Nero. Select CDROM (Boot) as the type of CD to create and specify A: (or whatever your floppy drive is called) in the 'Bootable logical drive' box. Copy the

ILLUSTRATIONS: Farzana Cooper

'win98' folder from the Windows 98 installer CD to your new compilation, add any files that you want and write the CD.

software was not designed to work with this OS, and may not work. I decided to continue installation anyway.

Now, when I try to download pictures, I get a series of five errors, starting with 'Failed to get USB device'. Can you please tell me the solution to this problem?
Abhinav Sharma

A Looks like you've been duped! The Frontech ClassyCam does not offer drivers for Windows XP, nor are any available on the Internet. In order to use this camera, you're going to have to connect it to a machine running Windows 98, 2000, or Me.

Never shuts down

Q. I have a Pentium III, 800 MHz processor with an 810e motherboard, 128 MB RAM, and two operating systems—Windows 98 and Windows XP. The problem is that my Standby option has been greyed out, and if I select Shut down, the computer just restarts. The problem exists in Windows XP only, and not with Windows 98. I even checked the power options in the BIOS and Control Panel—they all seem to be OK. Then, I tried to disable restart from *System Properties > Advanced > Startup & Recovery*, but got the Error; "0x0000007E (0xC0000005, 0xFC7F1945, 0xFC9589B0, 0xFC9586B0) kbdclass.sys - Address FC7F1945 base atFC7F1000, DateStamp 36d82f3". I have to reboot in Windows 98 just to shut down. What should I do?
*Nitin*

A In Windows XP, the computer reboots automatically when a fatal error occurs. If that fatal error only occurs when you're shutting down, the system reboots automatically. If you haven't changed any of the system failure settings, you should be able to see the error in the Event Log—right-click on My Computer and go to *Manage > Event Viewer > System*.

This can also occur if the Logitech iTouch software version 1.5, or earlier is installed for some Logitech keyboards, such as the Cordless Freedom models. Install the latest iTouch drivers from *www.logitech.com.*

No can hear

Q. I have a Pentium 4 with 128 MB RAM and a 40 GB hard disk, running Windows Me. About a month after installing Power Screensaver Builder, I began facing a problem with the sound. I got an error message that said "MMSYSTEM266 the device could not be loaded, verify that the driver is installed correctly". I tried
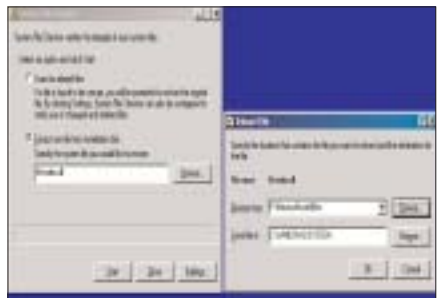
Use System File Checker to replace missing system files

FAQs

Boot the multi-boot menu

Q. I have an Intel 933 MHz on an Intel MB815e motherboard, and an ATX power supply, running Windows 98 SE and Windows XP. The PC works perfectly except that when it shuts down it displays "It's now safe to turn off your computer", instead of directly shutting down.

My second problem is that I have formatted my D drive, where Windows XP was installed, but still get the menu to choose which operating system to boot from. How do I solve these problems?
Ruhit

A Ok here's what you have to do; to fix the shutdown problem, go to the CMOS BIOS settings by pressing [Delete] when the PC boots. Go to the Power Management option in the BIOS menu and enable ACPI, press [Esc], save changes to CMOS and exit the BIOS screen.

Now, for your second problem, right-click My Computer and go to *Properties > Advanced* and click on Settings in the 'Startup and Recovery' section. Here, set the 'Default operating system:' to Windows 98, and set the 'Time to display list of operating systems:' to zero. The boot menu option will not be displayed thereafter. A definitive solution involves modifying the boot.ini file. Click on Edit in the same tab to open the Boot.ini file in Notepad. Here, change the default entry to *default= c:*, and delete the line *multi(0)disk(0)rdisk(0)partition(2)\WINDOWS="Microsoft Windows XP Professional"*

/fastdetect. This successfully clears the boot menu.

Windows XP doesn't install

Q. I have a Pentium III 933 MHz with Intel 815EEa2 computer. My problem is that I cannot install Windows XP. When I restart, it shows an error stating "error: unmountable_boot_volume". I recreated the partition and then formatted the hard disk, but still it did not work. What should I do?
Ryan

40-conductor cable

80-conductor cable

Use an 80-conductor cable to connect UDMA drives, instead the standard 40-conductor cable

A This occurs if your computer uses an Ultra Direct Memory Access (UDMA) hard disk controller, and the following conditions are true: You use a standard 40-conductor connector cable to connect the UDMA drive to the controller, instead of the required 80-conductor cable, and the basic input/output system (BIOS) set-

tings are configured to force the faster UDMA modes.

Replace the 40-conductor cable with an 80-conductor UDMA cable. Simultaneously, in the BIOS settings for your computer, load the 'Fail-Safe' default settings and then reactivate the most frequently used options such as USB Support.

I lost my Red Hat

Q. I run Windows Me and recently installed Red Hat Linux 7.2, after which it showed the LILO boot menu. Next, I installed Windows XP but the LILO boot menu disappeared. Now, I have to use a Linux boot disk just to run Linux. How do I fix this?
Seejo
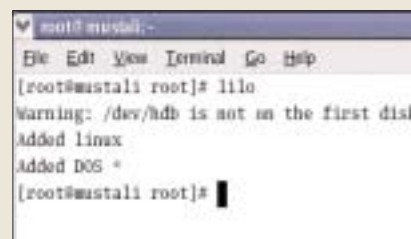
You can repair your LILO boot manager from within Linux

A There's no need for concern—Windows always overwrites other boot loaders. To fix your system, you have to boot into Linux using the boot disk you have. Login as root and go to the command prompt and type *'lilo'* and press [Enter]. You should see something like 'DOS added' or 'Linux added'. Now restart your PC, and the problem will be fixed.

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referring to Help but everything seemed to be in order. I re-installed the software but the problem persisted. I am able to play my sound files in all other programs.
Dev

A This error is caused if any or all of the following files are missing or corrupted: Msvideo.dll, Dciman.dll or Mciavi.drv—all located in the Windows System folder. Reinstalling a multimedia component from *Control Panel > Add/Remove Programs* does not replace these system files. You will have to run Windows Setup from within Windows, as then you are prompted to choose

between running a complete set up and copying all the files again—choose the 'Copy all files again' option and your problem will be fixed.

Another way to do this is to extract only the files you need from the Windows CD, using System File Checker (SFC). To start SFC, go to *Start > Run*, type *'sfc'* and press OK. Next, click on 'Extract one file from installation disk', type the file name *'Msvideo.dll'* and press Start. The next screen will show you where to 'Restore from' and the location to 'Save file in'—press OK. Repeat the steps for all the files mentioned above.

PC to PC

Q. I want to know how to connect my PC to my friend's PC, who lives around 2 Km away from my house. We both have phones and modems, and do not want to buy any extra hardware. We both run Windows 98. Can we do this?
Vishal

A Sure you can. Just go to *Start > Programs > Accessories > Communication > Hyper Terminal* on both PCs. Now either you or your friend can call each other using your modems, and transfer data just as if you were on a network.

Web camera stopped working

Q. I have Windows 98 installed on my machine. The Web camera installed on my system was working perfectly until recently—it just doesn't activate anymore. I tried re-installing the drivers, but the installation failed. The camera is not detected when I plug it in either. I have checked the BIOS, and found the USB port is enabled. I also tried installing another camera, but even that wasn't detected. Finally, I installed my camera on another system and found that it works perfectly. What do I do?
Narender Negi

A. Now that you've narrowed down the possibilities, we suspect that the USB port is the culprit. As you have already checked it is enabled, the port is probably malfunctional. To be doubly sure, you can install a version of Windows with better USB support, such as Windows XP. If the problem persists, your USB port is definitely kaput! You are then left with two options—either buy new USB ports with cables that connect to the USB header on your motherboard (if your motherboard has such headers), or buy a USB PCI card for new USB ports to connect your devices to.

Tweaking Windows XP

Q. I have an AMD Athlon XP 1700+ with Asus-A7V8X motherboard, 256 MB DDR 266 RAM and run Windows XP as the operating system. The problem is that my machine takes a very long time to boot up.
Santosh Choudhury

A. Anytime an operating system is booting up, it requires time to load device drivers, start-up programs, etc. The loading time is further dependent on devices being initialised by their drivers. Sometimes a slow device such as an external modem can increase boot up time. Windows XP is a big step forward from previous versions—it brings along a lot of excess baggage in terms of services that start when you boot. To reduce the boot up time, you can use tweaking utilities such as bootvis, available at *http://www.microsoft.com/whdc/hwdev/platform/performance/fastboot/bootvis.mspx.* If you want more information on how to tweak Windows XP to improve performance, take a look at the *Tips & Tricks special* that came along with the June 2003 issue of Digit.

Too many drives

Q. I have a Athlon XP 2000+ processor, 40 GB Seagate hard disk, 128 MB DDR RAM, ASUS motherboard and run Windows 2000 Professional. I also have a Sony 52X CD-ROM and an LG 48X CD-Writer. Recently, I bought a 16X DVD-ROM. The problem is that my vendor says it's not possible to install all three at the same time, reason being that the PC won't be able to locate both, the DVD-ROM as well as CD-ROM at the same time. Is this true? If yes, what is the solution?
*Dipanshu Banerjee*

A. PCs are normally limited to four IDE devices. From the information that you have provided, you already have a hard disk, CD-ROM and CD-Writer installed. This leaves one IDE connector to which you can connect your DVD-ROM. If you do not have a free IDE connector, then you need to buy a combination drive that accommodates both a CD-Writer and a DVD-ROM. Use of a splitter in case you do not have a spare power connector for the drive. Also, you might run short of drive bays. Some cabinets have only two bays for optical drives. If so, you will have to buy a new cabinet with three bays.

tip**s**&**trick**s

GRAHIC DESIGN: Solomon Lewis
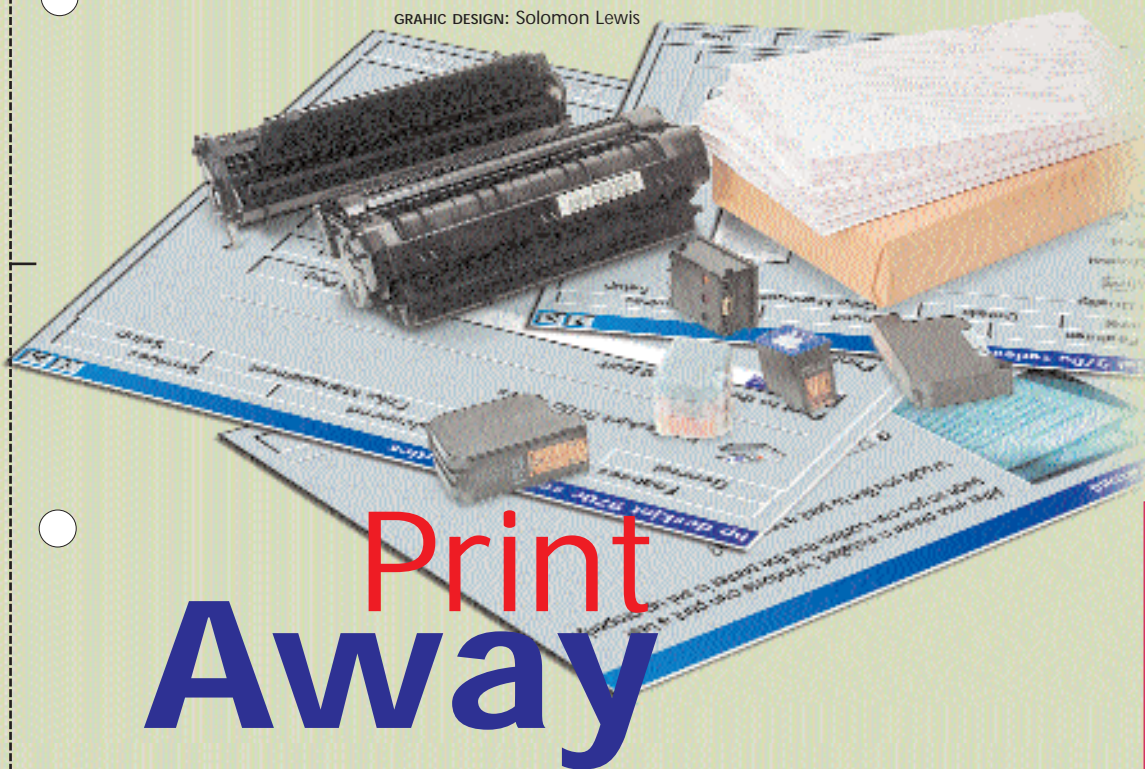
From cleaning cartridges to new ideas on how to use your printer, here's all the printer-related information you need for home or office use

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Print
Away

contents

Toner and Ink Cartridges

Cartridges are not only the most important part of a printer, they are also the only part that is maintained and handled by the user. We tell you how to squeeze the last drop out of your cartridges, and get crisp and sharp prints that won't burden your pocket.

Laser Printers

Generally, over 50 per cent of printing problems related to laser printers are resolved when the toner cartridge is cleaned. So, clean your toner cartridge regularly. Never touch the drum surface while handling toner cartridges since this could lead to oil spots and scrtaches which will be evident on your printouts. Also, the cartridge should be protected from sunlight so it's always stored it in its original box.

At times, in certain HP printers, the screw in the cartridge cover becomes loose due to vibrations. This screw needs to be checked and tightened, if you see a horizontal white line in the centre of a printed page.

Another common problem is the black dots that appear on printouts. This is usually because of a nick on the drum, caused by a foreign object. If this has happened, there's no way you can get the cartridge repaired—you'll have to replace it. So make sure you are using dust-free paper. Also, keep the printer clea—

clean the outer surface regularly. Use a damp cloth to clean the accumulated debris and dust, whenever you are changing a cartridge. Pay special attention to the rubber rollers—never use alcoholic cleaners on these.

Inkjet Printers

If you are installing a new cartridge in your inkjet printer, keep it in the upright position for a few moments before fitting it in. This ensures that the ink will be at the nozzle when you are ready to use the printer. Also, store the cartridge in an upright position, in an airtight, rigid plastic container. Whenever you feel tha your prints aren't as crisp as they should be, run the printer's head-cleaning utility. This is necessary especially if you are using your printer after a long time.

Using the Right Paper

The regular paper that you use for printing does fine for day-to-day print jobs. However, at times, you may want to print on special types of paper. Different types of paper are available for different printing needs.

Photo Paper

This is similar to the paper used by film developers, and is designed to produce high-quality images. They come in both, matte and glossy finish, and in standard photo sizes such as 4 X 6 inches. Use photo paper for studio quality photos.

Greeting cards

These papers are thicker, prefolded, and smaller than regular paper. They come with matching envelopes. Printers typically come with bundled software, with several templates, for creating greeting cards. Use this paper to create personalised greeting cards that have a professional look.

Glossy paper

Glossy paper has a shiny, coated surface on one or both sides. This produces vibrant colours, but the prints are

ILUSTRATOR: Mahesh Benkar
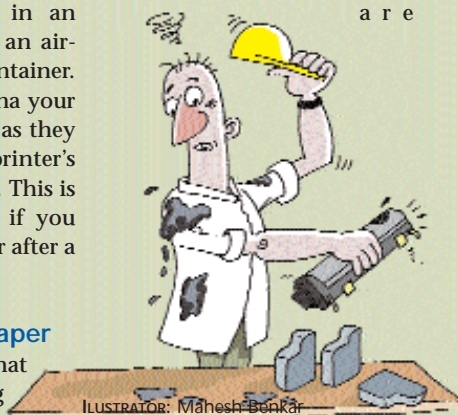
susceptible to fingerprints. Use glossy paper for brochures, flyers and report covers.

Transparencies

These are clear plastic sheets, and are used to create overhead-projector presentations. These can only be used with inkjet printers, as transparencies cannot tolerate the heat generated by laser printers.

Craft papers

Craft papers come in a huge

variety. For example, iron-on paper allows you to print and image and transfer it to a cloth. Banner papers, used to create banners, also come in this category. Other papers in this category are Vellum, parchment, printable fabric sheets, shrink-wrap plastic and so on.

Stickers and labels

Stickers and labels are available for mail, folders, diskettes, CDs and whatever else you can think of. You can use fonts, images and colours to customise them. Re-stickables allow for a lot of creative flexibility.

Remember to check your printer manual for compatibility, before using specialty papers. Otherwise, you may experience paper jams and such.

Maintenance
Clear paper jams

Carelessness while clearing a paper jam could lead to accumulation of toner dust, which could be hazardous to the health of your printer. If the paper jams before it reaches the Fuser roller—the roller that fuses the toner with the paper—the toner will just lie on the page, in the shape of the image being printed. Caution is necessary here, so that the toner doesn't fall into the printer while you're pulling out the paper. If it has not yet begun to come out of the printer, pull the paper towards the inside of the printer. If the paper had just begun to feed, and you

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pulled it back through the Feed rollers—the rollers that feed the paper in the printer—the toner on the paper could fall onto the rollers. This could cause following copies to come out dirty.

Avoiding paper jams

The thumb-rule is not to overload the printer. Too many papers can lead to pressure on the paper separation tabs, and result in double feeds. Special care is needed to feed specialty papers such as photo paper. Since these are thicker, the best thing to do is to feed them manually, one by one. Also, do not use transparencies, or other media that cannot tolerate high levels of heat. Cleaning your printer, especially the roller, plays an important part in avoiding jams. This is because dirty rollers hamper the movement of paper inside the printer.

Static electricity

The laser printers that are most affected by static electricity are those based on the Corona Wire technology.
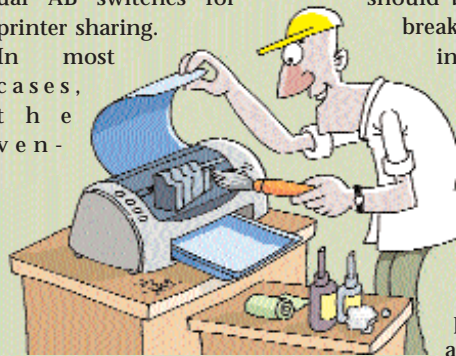
Static electricity increases because of two things—wind or movement, and dry air. In winter, the problem is compounded by low humidity, and dry heat in offices and homes. You may notice random black streaks, or blotches of toner on your pages because of this. To remedy this, the humidity level in the room should be at least 35 per cent. Further, you can decrease the static

electricity around the printer using a solution comprising one tablespoon of liquid fabric softener and about 300 ml of water—spray this on the carpet around the printer. Do not spray it directly onto the printer.

AB switches

Be careful when using manual AB switches for printer sharing. In most cases, the vendor's warranty becomes void if you use them. A better option would be to use electronic switches.

Ozone filters

One more component that needs to be taken care of is the ozone filter. A clogged ozone filter can harm your printer by increasing its temperature, and by blocking the airflow—thus slowing down the fan. A fan that's slow causes harm to printer components, and the ozone produced oxidizes them. Change the ozone filter once in 6 months.

Corona wire

Some of the older laser printers, such as the HP Laserjet II and III, are based on corona wire technology. Special care

is needed to clean them.

Most vertical streaking caused by a dirty Corona wire will be hazy or uneven, and intermittent. The wire is found in a metal furrow that runs the width of the paper, along the bottom. It may be covered with angled wire. The wire is very thin, like a strand of hair, and care should be taken not to break it while cleaning. First, the furrow should be cleaned with a vacuum cleaner, and then with a cotton swab dampened with water or peroxide. After all the toner is removed from the floor and walls of the trough, gently brush the length of the corona wire with a dry cotton swab to remove any dust or debris.

Many toner cartridges have a charge wire inside them. Removing dust from this will prevent most vertical streaking.

Inkjet Printers

Cleaning the head

The head cleaning utility, that comes with almost all printers, does not always do an efficient job. Often, ink deposits build up on the end of the print head, causing the cartridge to function suboptimally. It's better to clean the head manually, to ensure proper functioning and crisper prints. Clean the

head by wiping it gently with a soft cotton cloth—don't use tissues since they tend to stick onto the head. Snap the cartridge in and out a couple times, to get a good connection after cleaning.

General Cleaning

If the printer is printing in streaks, and is smearing, there's excess ink in the carriage area. Open the printer and remove the cartridges. Fold a letter-sized piece of paper in half, and then in half again the other way, so that it is quartered. Insert this paper into the regular feed slot or space. Move the paper to the left and to the right, to remove excess ink under the carriage. Once the excess ink is removed, the printer should resume printing normally.

Apart from this, do call your technician at least once a year to get your printer cleaned thoroughly. There are parts that are impossible to get at without disassembling the machine. These need to be attended to by a professional.

Printing Images

There are a few general rules that can be followed to print high quality photographs. The first rule is to use specially designed photo papers. Several well-known brands such as HP, Kodak and others have their own brand of photo papers. The second rule is to use a photo cartridge. Your inkjet printer will have to support this, however. The third rule is to

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choose the correct settings in the 'Print' dialog box. For this, click 'Printer properties', and set the print quality to the highest possible value. Also choose 'photo paper,' if you are using one, as the paper type; use high resolution.

Customising images
First off, the photo that you want to print should have a resolution of at least 300 dpi, otherwise the prints won't be good enough. If you're scanning a photo to print, scan it at 300 dpi. Use a format such as TIFF that preserves the colours and sharpness, if you intend to print the image. You should therefore also save your digital camera images in the TIFF format, if there's an option to do so. Also, don't enlarge the image using an image-editing software. This is because an image of 1280 x 960 pixels at 72 dpi, has the same amount of details, as a 4 x 3-inch image at 300 dpi. However, this also means that you can safely use a 1280 x 960 pixel image to print a 4 by 3-inch photo.
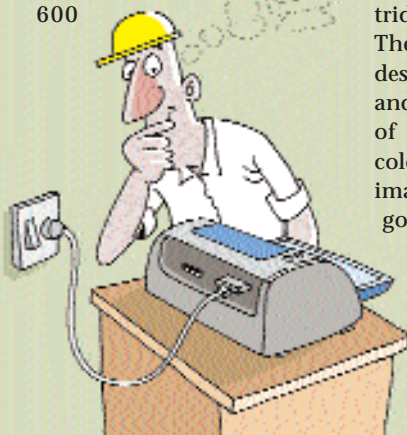
You might notice that the printed image doesn't look exactly like the one on the screen—this is simply because the images on the screen are in the RGB (red, green and blu) format, and the printer uses CMYK inks (cyan, magenta, yellow and black). There are colours that can be rendered in RGB, but not in CMYK. To avoid this problem, convert your image to the CMYK mode, using

image editing software such as Adobe Photoshop, or PaintShop Pro.

Also use a photo editing software to edit your image, to correct the red eye, dust and specks problems. You can use sharpening filters to improve photo edges.

Print settings and paper
Next comes the printer. The printer should be able to print at least 600 x 600 dpi. The higher the dpi, the better will be the quality of the printed images. You also need to keep your printer drivers updated.

The next step now, is to adjust the print settings. Set the print-quality to maximum, and choose the right paper setting, as it controls the amount of ink that gets onto the paper. It's better to use the same brand of paper as your printer's as a company usually customises its paper for its printers.

After printing, you need to allow the printout to dry.

Normally, the drying time is one hour. If the photo will be in close contact with something else—for example, if you're going to frame it—it's better to let it dry for 24 hours. If you are printing multiple copies, remove each copy from the printer as soon as it is printed.

Printing black and white photos
The best way to print black and white photos is to print them using the colour cartridge. Yes, you read right! The black cartridge is designed to print black text, and cannot produce shades of grey as efficiently as a colour cartridge can. Use an image-editing software for good quality results. Open the photograph in your favourite image editing tool, and convert the photo to greyscale. Now, print the photograph with 'Automatic' colour settings, the highest print quality and the correct paper type. You'll get a fine photo.

Power Tips
Printing marked selection
When printing selected text say on a Web page, select the text, and go to *File > Print*. If you're using Internet Explorer 5 or higher, choose to print 'Selection' in the dialog box that pops up. Most of the newer browsers have the Print Preview in the File menu. This feature can be very useful if you want to print only selected pages.

Use the Print dialog box in Internet Explorer to choose what you want to print

Decide upon the pages that you want to print in the Print Preview dialog box, and then click 'Print...'. Now in the Print dialog box, enter the page numbers and click OK. This procedure is practically the same for most browsers, including Netscape.

Printing large documents
Sometimes, you might want to print a large document that is laid out in many pages—one being the index page, and all the chapters linked to it. Internet Explorer has an easy solution for this problem. Just print the index page, and in the Print dialog box, tick the 'Print all linked documents' option.

Printing with background
By default, the background of the page—that may include images—is not printed. To print background images and colours in Internet Explorer, go to *Tools > 'Internet Options...'*. Click on the Advanced tab, and scroll down to Printing. Here, tick the box that says 'Print back-

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ground color and images', and click OK. Now, you will be able to print a Web page with its background images and colours.

If you use Netscape, go to *File > Page Setup*. Under 'Format & Options', you will see a check box labelled 'Print Background (colors & images)'. Tick this, and click OK. Now go to *File > Print* and click Print.

Fun with your printer
Creating monthly calendars

Most word processing applications come with specific methods to create calendars. In MS Word, you can find it by going to *Insert > 'Object…'*, and then choosing 'Calendar Control.' But this might not provide the level of customisation that you want in order to mark certain important occasions, like your anniversary. An easy solution is available at *http://www.timeanddate.com/calendar/*. This Web site has calendars customised for many countries, which you could use as your template. Copy the calendar pertaining to the months you wish to

You can print the Outlook calendar with all notes and meetings reminders

print, into your word processing or image-editing program, customise it and then print them.

Another way is

to use specialised software such as Calendar 200X, which can be downloaded from *www.graffman.net*. You can also use Outlook to print a calendar. Just switch to calendar, and go to *File > 'Print…'*. You will be presented with a dialog box, asking you to choose the printing style. You can print weekly or monthly views of your calendar, with your appointments marked out.

Creating a personalised mouse-pad

You can create a personalised mouse pad, using a 3mm thick foam sheet, double-sided adhesive sheets, inkjet coated-satin finish fabric, coated paper, glossy-finish acrylic spray, and a pair of scissors. First, choose a design that you can print on coated inkjet paper. If you are satisfied with the results, take a final printout on the satin-finish fabric. Allow the ink to dry completely. Then,

spray it with acrylic, and leave it to dry again. Peel away the covering from one side of the adhesive, and apply it to the flipside of the fabric. Cut out the design, a n d remove the other covering of the adhesive. Now, paste it on the foam sheet. Cut out the foam sheet in the shape of the design, and your mouse pad is ready!

Card modelling

Card modelling is the art of creating a scaled model with card paper. This is somewhat similar to Origami—the craft of folding paper. You can use your printer to print ready-made kits, available on some Web sites, or create them yourself from scratch. Here are a few Web sites that will help you get started: *www.fiddlersgreen.net*, *www.digitalnavy.com*, *www.paperparadise.com* and *www.cardfaq.org/faq*. All you need in order to create these paper models is a computer, printer, scissors, glue and good quality printing paper.

Computerless printing

Thus far, you've needed a computer to act as an interface between your digital camera and your printer. Now, with newer cameras and printers, you can print

photographs from digital cameras without a PC! Some of the latest printers provide you with a special slot for the memory card of your digital camera. You can download your pictures to the printer, preview them on the printer's LCD, choose the ones that you want printed, make adjustments, and then print them. HP has come up with its Photosmart series of cameras and printers, which provide you with this functionality.

Some printers do not require a memory card to be inserted; the camera is directly attached to the printer via a cable. Canon's Powershot series is one such example. You can customise photographs by using the camera controls and the LCD, and print directly to the printer.

Page setup

Most of the printing software provide you with a 'Page Setup' feature. This lets you determine how your page is going to print. The first thing that you can set is margin. The margin is the distance of the printed material from the edge of the paper. If you were printing formal documents, you would prefer larger margins—especially the left margin. Otherwise, you can opt for smaller margins. Remember that you cannot set the margins to be zero—most applications are smart enough to warn you if you try to do so.

The next customisable thing is the gutter. The gutter identifies a blank space on

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the paper that will be trimmed off or bound into the bind of a book. Set this option only if you plan to bind the pages. You can set it to be on the top or on the left of the page.

You can also choose the Page Orientation. It can be Landscape or Portrait. In Landscape prints, the width is more than the height. For Portrait prints, the height exceeds the width.

Troubleshooting
Inkjet Printers

If horizontal or vertical lines appear on your printouts, the first step would be to run the print head cleaning utility three or four times. In most cases, this solves the problem. Check the paper if the printouts appear faint. The paper should not be damaged, old, or loaded incorrectly. If you use speciality paper such as photo paper, make sure you're printing on the correct side. Also, check the printer's manual for information regarding the compatibility of the paper with the printer.

To unblock a cartridge's print head, place the print head in a shallow bowl of hot water for 20 to 30 minutes. This will soften the dried ink so that it flows through the print head. You should see the ink bleed out. Repeat if necessary. Next, insert the cartridge into the printer, and run the print head cleaning utility. If soaking the cartridge in water hasn't cleaned and dissolved the dried ink, place the print
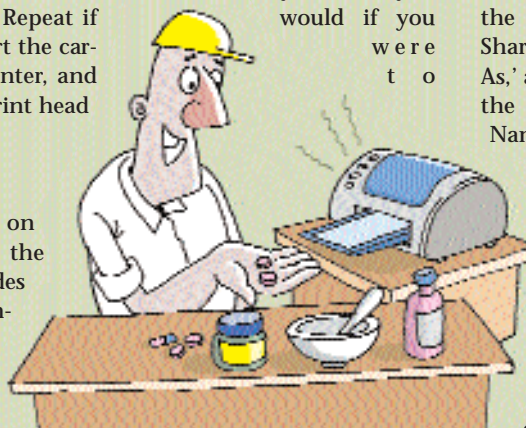
head part of the cartridge in a shallow bowl containing a mixture of very hot water and bleach (or ammonia) in equal amounts—just enough to cover the print head, for two or three minutes. This should hydrate the dried ink, causing it to flow through the print head, and the ink should bleed out. Repeat if needed. Now, insert the cartridge into the printer, and run the printer's print head cleaning utility.

Laser Printers

Streaks appear on printouts when the drum cleaning blades make improper contact with the drum surface. These blades are made of rubber, and so require replacement. If the streaks look like thin pencil lines, the drum itself has scratches, and must be replaced. Try cleaning the drum with alcohol. Wipe it gently with a soft tissue. If this doesn't work, you have to change the drum. Do check the Fuser unit, where the toner is fused with paper. Be careful, as this may be very hot. You will need to clean the upper heat roller, which is usually black in colour.

Sometimes, a brand new cartridge may not work properly. A reason for this could be that there is no pool of ink at the exit port (the pre-chamber) that the built-in print head can suck from. Some of the sponge-filled cartridges can develop air pockets at the

bottom of the cartridge that can block the flow of ink. Wrap the cartridge in a towel or cloth, and place it in a plastic bag. Hold it in your hand, with the head or exit ports pointing down. Extend your arm, and swing the cartridge down towards the floor rapidly, as if you would if you were to throw it. Repeat this a couple of times. Then, remove the cloth wrapping. There should be a visible spot of ink from each chamber. Repeat if there isn't. Now, place the cartridge back in the printer.

Network Printing
▪ Installing Network Printers

In order to access a shared printer on a network, you need to install it first. You can install any number of printers on your machine. You'll need to first locate the computer that has put the printer up for sharing, using Network Neighbourhood. Right-click on the printer icon within that computer and click Install. Alternatively, double-click the printer

icon—this will bring up the Add Printer Wizard. Follow the on-screen instructions to install the network printer.

▪ Sharing a local printer

If you want to share the printer that's connected to your computer, go to *Control Panel > Printers*. Right-click on the printer icon, and click Sharing. Here, select 'Share As,' and type in the name of the printer in the Share Name field. Click OK.

▪ Controlling network printing

If your computer has Windows 98 and the print server is running Windows NT or 2000, you don't have much control over the printing process. One solution to this would be to install a Remote Procedure Call Print Provider (RPCPP). To install RPCCP, insert your Windows 98 installation CD into your CD-ROM drive, go to *Start > Settings > Control Panel* and double-click Network. From the configuration tab, select Add. In the 'Select Network Component Type' dialog box, choose Service and then click Add. Then click Have Disk. In the 'Copy Manufacturer's File From' box, type in '*E:\tools\reskit\netadmin\rpcpp*' (where E is the drive letter of your CD-ROM). Then click OK. Click OK again after the installation, and reboot your machine.

After you've done this, you'll be able to choose the remote printer to send your

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job to, as well as being able to see the print queue. You can also cancel any print jobs by going to *Start > Settings > Printers*.

Installing additional drivers

If you're sharing your printer, you'll want users running any version of Windows to be able to use it. If you're running Windows 2000 or XP, it is advisable to install additional drivers, so that others don't have to look for drivers before using your printer. To do this, go to *Start > Control Panel > Printers*. Right-click the printer icon and choose Properties. In the Sharing tab, click the 'Additional Drivers…' button. Follow the on-screen instructions to install the drivers. Now all users will be able to install the drivers by just double-clicking the printer name.

Disabling printer announcements

If you are sharing a printer on a Windows 2000/NT machine, it will announce to the other print servers on the network that it has a printer available, every 10 minutes. These announcements can cause excessive network traffic. To disable them, go to *Start > Run* and type in '*regedit*' to open up the registry editor. Navigate to *HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\Print*, and add a new value with the name as DisableServerThread, and the type as '*REG_DWORD*'.

Enter a value of 1. This disables the announcements, but also means that the printer will not be visible when one is browsing the network. It can still be accessed by entering the name in manually. To turn the announcements back on, change the value in the registry back to 0.

Instead of disabling the announcements altogether, you can change the time interval between announcements. Simply add a new key named ServerThreadTimeout at the same location as above. Enter the value for this key in milliseconds. For example, if you want to extend the interval to one hour, enter the value '*3600000*'.

Restricting printer times

You can set a schedule for when a printer will be available for use. In Windows 2000 and XP, go to *Start > Control Panel > Printers*, right-click on the printer, and choose Properties. On the Advanced tab, there are two

You can restrict the times when a printer will handle jobs

choices near the top: 'Always available' and 'Available From…', where you can set the time during which print jobs can be printed. Users can still submit jobs any time they want, but the jobs will not be printed except during the times set for the printer as available.

Command Line Control

You can use the Net Print command to control what print jobs are currently running on a computer. The syntax for the Net Print command is *NET PRINT \\computername\sharename [\\computername]job_id[/HOLD|/RELEASE| /DELETE]*.

Here the vertical bars mean 'or', job_id is the identification number of the job and the optional fields are in square brackets. If you type in just the command without any options, it will display the current print jobs. If you don't remember the share name of the printer, type in '*NET VIEW \\computername*' to list all the shared resources.

Miscellaneous Tips
Printing shortcuts

You don't have to launch an application and then go to *File > Print* in order to print a file. Go to *Start > Settings > Printers*. Select the printer of your choice. Right-click the selected printer, and select 'Create Shortcut'. Windows will tell you that it can't create the shortcut here, and will ask you if you want it on your desktop. Click Yes. Then,

whenever you want to print in a hurry, just highlight the file you want to print, and drag it onto the printer shortcut on your desktop.

You can also add a shortcut to the Send To menu of the Explorer for immediate printing. To do this, open *C:\Windows\SendTo*, and create a shortcut there for your printer. Next time you want to print a file, simply right-click the file in the explorer window, and choose your printer from the Send To menu.

Economic printing

To save toner or ink, it's a good idea to keep your default print settings to Draft, or EconoMode—especially when you don't always need high quality prints. To do this, go to *Control Panel > Printers*, and choose the printer properties by right-clicking the printer icon. You can later change the settings temporarily through the Print dialog of the application that you are printing from, as and when you need high quality prints.

Further, save paper by printing on both sides of the page. If your printer doesn't support two-sided printing, feed the paper manually, and flip it over to print on the other side. You can also use software such as FinePrint (*www.fineprint.com*) for double-sided prints. Do remember to set the page margins to the minimum value s upported. This will allow more matter to be printed on fewer pages.

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Two printers

Generally, black text print-outs are taken in economy mode, while images are printed using the best quality mode. This requires you to change the printer options, to suit the print job at hand. Avoid this by installing another copy of the printer, but with a different name. Do this by going to *Control Panel > Printers*, and clicking Add New Printer. Now, use different default print settings for these two printers. You can choose either of them, to suit your printing needs.

Speed printing

Windows normally spools print jobs before sending them to the printer. Spooling involves writing the data to be printed, to a temporary file. This allows you to work while the printing in progress. However, this slows down the printing process. On most printers, you can turn off the spooler by going to *Start > Settings > Printers*. Right-click on the printer icon, select Properties, and then click Details. Click 'Spool Settings' at the bottom of the dialog box. Select the 'Print Directly to Printer' option. This will tie up your application until the printer has all the data, but your print job will be done faster. This option is handy if your print spooler crashes, and you need to print before you reboot your PC.

Print-related software

The standard print dialogue box doesn't provide all the flexibility and customisation that you would like to have. There are various software that let you do them. One such software is FinePrint (*www.fineprint.com*). FinePrint is a Windows printer driver that provides you with advanced printing capabilities. It has some very useful features, such as the ability to add blank pages, and delete pages. The 'Ink Saver' provides options to convert coloured text to black, and to skip graphics. You can print multiple pages on a single sheet of paper, add watermarks, headers and footers, and you can even insert customised letterheads. It also allows you to design your printouts as an image, and also to retain the text format maintained in the Web page that you're printing from.

Another useful software is Directory Printer (*www.galcott.com*). With this, you can print the directory structure of your hard drive. It can print all the folder names and file names. It can also export the structure to a text file.

PaperlessPrinter (*www.rarefind.com*) allows you to convert printable documents to HTML, JPEG and BMP formats. You can use it to publish documents in HTML, JPEG or BMP, preserving their look and content—complete with fonts and graphics. You can distribute your HTML documents by e-mail, or store them on the Web, an intranet, a file system, or on a CD.

Stuck Print Jobs

Sometimes a print job gets stuck in the print queue. Viewing the queue shows that the job is being deleted, but it never is actually deleted, and other jobs don't move forward. To resolve this, you don't have to restart the print server, but only the print spooler. To do so, if you are using Windows 2000 or XP, open up the DOS prompt, and type in the command '*net stop spooler*'. Wait until the service stops, and then type in '*net start spooler*'. You can also do this by going to *Start > Settings > Control Panel > Administrative Tools > Services*, highlighting the Spooler service, right-clicking it and choosing Restart. Now you should be able to delete a stuck print job, if it is not deleted automatically.

Cleaning up old printer files

By default, any print jobs sent to a printer will be temporarily spooled to a folder on the hard drive. Usually, these files are deleted when the job has printed. Sometimes, these temporary files don't get deleted. If you're not expecting anything to be printed, you may safely delete any files in that folder. The default folder location is *%systemroot%\system32\spool\printers, where %systemroot%* is usually either 'C:\windows' or 'C:\winnt.'

If you want to change the location of this folder—because you want to free up space on your drive, or for any other reason—go to *Start > Settings > Control Panel*, and click Printers. Now go to *File > Server Properties*. Under the Advanced tab, you'll see a field that says 'Spool Folder.' Here you can type in the new location path of the spool folder.

Printer pooling

If you are using Windows 2000 or XP, and using several identical printers, you can create a pool of the printers, that will enable Windows to balance the print jobs. To do this, connect all the printers to your

Create a pool if you have multiple, similar printers

machine on different ports. Install the drivers for one printer. Now go to *Start > Settings > Control Panel*, and double-click Printers. Right-click the printer name and click Properties. Under the Ports tab, tick 'Enable printer pooling.' Now tick all the ports to which your printers are connected. Click OK. Windows will automatically handle the allocation of print jobs across the printers. ▪

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Off the Shelf

Warcraft III: The Frozen Throne
The iceman cometh…

The Frozen Throne—the successor to the best selling *Warcraft III: Reign of Chaos* took a year to make, but is well worth the wait. This game is an integral part of the Warcraft experience.

The expansion pack attempts to complete the stories of two characters—Illidan and Arthras. The campaign starts off with the Night Elf sentinels, moves on to the Blood Elves of the human alliance, and then wraps up with the undead scourge.

Control the Beastmaster (the new hero for the Horde), and a small force of Orcs, as you complete various quests across one of 35 missions. The enemies on the map re-spawn frequently, and make the campaign tedious.

Battles look great in the game's 3D engine

The standard base building missions are almost absent; Instead, you have extremely limited resources and troops to fulfil your objective. At many stages, you will have to control multiple bases instead of one. The campaign packs in a lot of surprises and unique twists. The enemy AI has also been improved.

There are three new types of in-game terrains. New units balance the races from particular strategies. The game also includes simplistic naval combat.

Multiplayer gaming has always been a strong point in Blizzard games. The game is fully supported by Battle.net. The game has a separate section on the network but *Frozen Throne* players can join regular games.

The game is polished and relatively bug-free. It also provides great replay value, due to the difficulty settings and custom games.

(Courtesy Skoar)

Genre: Real Time Strategy ■ **Developer:** Blizzard Interactive ■ **Publisher:** Blizzard Interactive ■ **Distributor:** World Wide CD Roms ■
System Requirements: 400 MHz CPU, 256 MB RAM, additional 550 MB disk space, 8 MB 3D video card, DirectX 8.1 ■ **Price:** Rs 999
Web site: www.blizzard.com
Rating: ★★★★★

Stealing the Network: How to own the Box
For the hacker inside you

This book gives you an insight into the working of the hacking community. *Stealing the Network: How to own the Box* has ten chapters, each written by a different author. Each chapter combines fiction with real technology, and highlights a different aspect of network security. All chapters start with a story that justifies the reason for the hack, and then dives into technical jargon which explains the tools and method used to commit the hack. The book is written solely for those with a thorough understanding of networking.

It throws all sorts of advanced networking terms and concepts at you, such as ICMP, Class A, etc., without offering any introductions or explanations. For those who have an understanding of networking, this book is a real eye opener. There is a chapter that explains how a hacker can use a networked printer to commit malicious acts—hackers can store data in the printers memory and even run a Web server off it.

The book also reveals how ignorant and careless we are about network security; Chapter seven describes how a hacker visits a software expo with a stack of CDs, labelled 'Customer list', 'Sales Data', etc, and casually leaves these CDs in different vendor booths. Out of sheer curiosity, vendors pop them into their CD drives, unknowingly releasing the hacker's Trojans into their PCs. The book goes a step further, describing how to make a fake gelatin finger with someone else's fingerprint to fool a biometric security system.

This book is highly recommended to those with basic network knowledge, and a desire to learn about network security flaws.
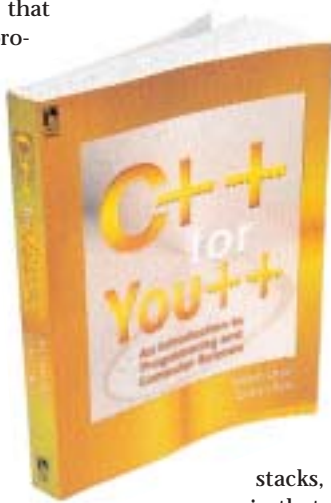
Publisher: Shroff Publishers and Distributors Pvt. Ltd. ■ **Author:** R Russell, T Mullen, FX, D Kaminsky, J Grand, K Pfeil, I Durbrawsky, M Burnett,
P Craig ■ **Distributor:** Computer Bookshop (India) Pvt Ltd ■ **Phone:** 022-22317922 ■ **Fax:** 022-22623551 ■ **E-mail:** orders@cb-india.com
Web site: www.cb-india.com ■ **Price:** Rs 300
Rating: ★★★★☆

C++ for You++
Enchiridion of C++ Programming

There are way too many books that offer an introduction to C++ programming. What sets *C++ for You++* apart is that it doesn't give long essays describing simple concepts, or bamboozle you with advanced explanations. In this dichotomous book, the first section contains the explanation of C++ programming, and the second explains implementation details, such as classes and data structures. The book starts off with an introduction to computers in general, touching upon both hardware and software briefly. The second chapter introduces a C++ program containing all the basic elements such as Pre-processor, loops, library functions, etc. This lets you to get a feel of C++ right from the beginning. From here, all the concepts are explained in detail, in separate chapters. There is an exercise with answers provided at the end of each chapter.

The second section starts with a chapters on linked list, stacks, queues, etc and moves in that direction. Towards the end the authors deal with algorithms, starting with the analysis of algorithms and finishing off with chapters on searching, hashing and sorting. A sore point of the book is the numbering of the pages. Each page is numbered as XXX-DD, where XXX is the abbreviation of the chapter name and DD gives the page number within that chapter—making it difficult to reach to a specific page directly.

The book is definitely not recommended for those who are already fluent in C and want to learn C++. Concepts such as Object oriented programming and related concepts are treated very lightly in the Chapter 22. Also, the book places more emphasis on practical implementation rather than the theoretical aspects of programming. The book is aimed at those who want to start off by learning C++, and the book serves this purpose pretty well.

Publisher: Vikas Publishing House Pvt Ltd ■ **Author:** Maria Litvin, Gary Litvin ■**Distributor:** Vikas Publishing House Pvt Ltd
Phone: 91-11-24314605 ■**Fax:** 91-11-24310879 ■**E-mail:** orders@gobookshopping.com ■**Price:** Rs 295
Rating: ★★★☆☆

Command & Conquer Generals
Stop clickin' around, general!

Developed by Westwood studios, *Generals* is a massive effort to resurrect the dying Command & Conquer series. The game is easily the best one in this particular series.

Units have been modelled neatly, and their motion is fluid. From minute touches, such as track marks, to intricate explosions, the effects are simply marvelous. All the units have a distinct voice-over, and a unique weapon attack effect.

All the factions have different units that use a totally different strategy and attacking style. Use a set of small strikes targeted at specific units and structures.

A new feature is the very obvious Gen-

Amazing explosion effects are quite common in this game

erals system, which can be used to upgrade units, buildings and strategies.

The campaign missions are loosely based on the erratic story. This results in a progressively challenging game with specific objectives.

Generals uses the left mouse button for all commands, unlike other strategy games, which use both left and right mouse buttons—this takes some getting used to. However, unlike previous versions, this one has the control interface on a bottom bar. Also, a change in the battle dynamics has been introduced by including the 'Fog Of War', to hide areas where your units are not stationed.

The game has sparkling 3D visuals, and the sound effects are a real treat. To sum up, *Generals* is a great game to play that offers immense replay value.

Genre: RTS ■**Developer:** Westwood Studios ■**Publisher:** EA Games ■**Distributor:** Gayatri Impex ■**System requirements:** 800 MHz CPU, 128 MB RAM, 1.8 GB hard disk space, 32 MB GeForce2 video card, DirectX 8.1 ■**Price:** Rs1,499 ■**Phone:** 022-23870260 ■**Fax:** 022-23863367
E-mail: sales@gamemasti.com ■ **Web site:** www.gayatriimmpex.com
Rating: ★★★★☆

A photographer, a party and Singapore

Never a dull month, this one's been rollercoaster ride, peppered with the search for the perfect RAM. It's been 10 months since the first batch of Media One students enrolled, and it's already graduation time. Sigh, they grow so fast! And since any reason is a reason to party, we had a fully-fledged graduation ceremony with guest speakers, and all, i.e. free food!

Armed with the T of technology and the M of media, Media One students foray into their new lives, while some stay with us are employees in our various departments.

License to shoot

Speaking of professionals, we had an interesting guest this month—Sherwin Crasto, the senior news photographer from of Reuters, who came to tell us a thing or two about digicams for our cover story. So he did, and how!

But like all good stories, let's start at the beginning. With a field as interesting as photography, and a technology as advanced as the one used for digital cameras, we needed the tests to be exhaustive and authoritative. And who could be more of an authority on digicams then the guys who tested 31 of them—someone who shoots using them exclusively, of course! So we dialled a few numbers and Jiten Gandhi, our in-house photographer-cum handy man, cum 'knower-of-all-important-people-who-hangout-in-Mumbai's-press-club' came to our rescue. Within a few calls he assured us that Sherwin would come down to the Nerul office, to share his wisdom with us. And we waited. And we called. And we waited, but Sherwin the Merlin, was always on some assignment or another. Aliasgar, the test-centre co-ordinator who was supposed to oversee the digicam test began to sprout ulcers. He would look at Jiten *bhai* for reassurance. So Jiten *bhai* pinned down a time, and fixed an appointment.

Sherwin is a soft-spoken man (except while driving), who drives faster than he can click, and enchanted us with tales of danger, and the adventures he has on the job. So much so that Aliasgar was all but out the door to get a camera, and change his career.

In search of the perfect RAM

Singapore, the multi-cultural island is a haven for geeks with its cheap computer components, the latest gadgets and Simlin Square. It was also the place where Microsoft held its workshop for Office 2003. Mitul, from the Test Centre was put on the job of going to Singapore to evaluate the gadget scene there, note all the latest goodies, buy the most RAM he could fit into his luggage, and if he still had the time, to attend the workshop.

Even the best laid (travel) plans go awry. As excited as Mitul was to be one of the four people invited from India, and ECNR stood between him and Singapore. So Mitul ran around for three days to make it to the airport on the evening of the 6th (his plane was to leave at 12 am), only to find that the flight had been delayed. Finally in Singapore, Mitul faced another crisis, that of vegetarian food. While the other journalists feasted to exotic oriental cuisine that more often than not included pieces of indistinguishable meat, Mitul and fellow veggies tried hard to push boiled vegetables devoid of any salt of pepper, down their gullet. Finally the chef whipped up some plain pasta with veggies, much to their relief.

This conquered, Mitul extended his stay by a few days to shop for all the peripherals and components that he dare not come home without!
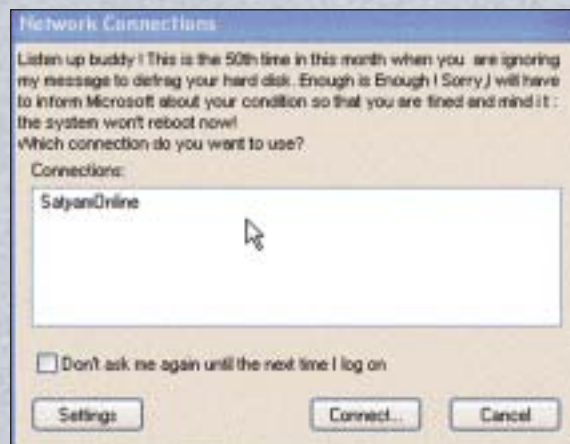

The Media One team with their mentors

Now that's thoughtful! ▲

If Hindi-film names were IT-inspired...

Mera hardisk tumhare paas hai
Screensaver sajake Rakhna
Password Apna Apna
Hum aapke memory mein rahate hain
Programmer no 1
Mouse ka gulam
Java wale job le jayenge

◄ **Didn't know you could
use it for this too**

We bring you your horrorscope...

Virgo

August 23 - September 23

Are you sick and tired of being average? Do people say you lack quality? Are you just too lethargic to be able to keep up? Are you tired of not being able to share the XPerience? Well the stars have some more bad news for you, you're outdated and are going to be upgraded into oblivion; destined to be king of the junk yard, or a Linux fileserver.

Computer *Cupids*

Tumse mila main kal toh,
mere dil mein hua ek sound,
Lekin aaj tum mili to kehti ho:
Your file not found!

Aisa bhi nahin hai ke,
I don't like your face,
Par dil ke computer mein,
nahin hai enough disk space.

Ghar se nikalti ho tum jab,
pehenke evening gown,
Too many requests se,
ho jaata hai mera server down.

Tumhaare liye pyaar ki application,
create main karoonga,
Tum usse debug karna,
wait main karoonga.

Tumhaara intezaar karte karte,
main so gaya,
Yeh dekho mera connection,
time out ho gaya.

Your chance to
bite back!