



Price  
Rs 125

(Nehalem) i7 Extreme 965 Tested

Agent001 Shops For An SMPs And Cabinet



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November 2008

# digit

YOUR TECHNOLOGY NAVIGATOR

Colour Management for Adobe and Corel



Bazaar: iPhone 3G, Samsung Innov8



Crysis Warhead Reviewed



Green Revolution: Power Management



Guide to the world of 3D  
modelling and animation

## TESTED

**CPUs,  
MOTHERBOARDS And  
GRAPHICS CARDS**



# The 3D REALM



# Editorial

## Don't Touch My Desktop

THEY'RE ALL AROUND, these people who are gushing over the whole multi-touch revolution. Popularised by Apple (with the iPhone and iPod Touch), multi-touch is threatening to take over my desktop with Windows 7, and I don't want it to.

A lot of you will remember *Digit's* coverage of multi-touch, starting with Jefferson Han's TED (ted.com) presentation, Microsoft's Surface, the iPhone, and now Windows 7. Many of you are probably forwarding YouTube links of multi-touch videos to friends, and are really excited. Don't be.

I can understand the desire to have multi-touch on a device such as the iPhone, even if I do hate its on-screen keyboard. I can even understand why people would want it on laptops or tablet PCs, but how am I supposed to find multi-touch beneficial for my desktop?

There are some inherent flaws with the whole multi-touch concept: for starters, until there's significant improvement in natural language processing (NLP), you can forget about ceasing to work with text. Email, spreadsheets, presentations, IMs, web browsing, blogging, coding and more... they're all keyboard-intensive, and account for most of your time spent in front of a computer.

Another aspect to consider is that multi-touch just isn't designed for desktops. Try touching your screen instead of your keyboard every time you want to do something on your PC; bet your arms are aching in 3 minutes. Of course you could argue that you need the touch surface to be the table, not the screen, so lay your large LCD down on the table, and pretend you have Windows 7 (and a touch screen). How long did it take you to tire (or get a backache) this time? 10 minutes?

Precision is another problem when using your fingers — they can't compete with a mouse or a stylus for the kind of accuracy that most design applications or games require.

So is there nothing good about multi-touch? Just as in the videos you've seen, apps such as Google Maps (or Earth), photo viewers, on-screen pianos, video players, liquid simulations, lava lamp apps, etc., will be more intuitive and fun to use. Perhaps a whole new genre of games may arise from it. The possibilities are still limitless, and multi-touch is something that everyone will *enjoy*. Just don't expect to get too much *work* done using multi-touch — not right away at least.

Obviously, Windows 7 is not doing away with keyboards and mice, but that's not what worries me. With laptop prices falling by the minute and Windows 7 pushing multi-touch (and as a result, mobile PCs), are



Robert Sovereign-Smith, Editor

**“Try touching your screen instead of your keyboard every time you want to do something on your PC”**

we looking at a future when *desktops* are niche? This scares me, because although I enjoy the portability of a laptop, I still prefer the sheer power and screen space that only a desktop has to offer.

To fuel conspiracy theorists, remember, doing away with desktops also just happens to be the best form of DRM; most laptops come with (paid) OEM Windows installs, so there will be very little OS piracy to worry about if desktops die. Going by what we know of Windows 7 so far, it isn't radically different from Vista — more like an enhanced Vista with multi-touch support. Vista was able to force a lot of us to upgrade hardware, only to realise that Aero wasn't worth it; so will multi-touch go the Aero way, or will it live up to its over-hyped expectations?

Marketing-hype, a sneaky new DRM or an interface revolution, whatever the case, multi-touch is here to stay.

A handwritten signature in black ink, appearing to read 'Robert Sovereign-Smith'.

editor@thinkdigit.com



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## Advertisers' Index

### Client ..... Page

APC .....	Back Cover
Benq .....	15
Canon .....	Inside Front Cover
Creative .....	29
Dell .....	17
ECS .....	55
Enjay .....	99
Epson .....	3
Fortune .....	123
Gigabyte .....	13
iBall .....	7, 89
Maruti .....	9
Microsoft .....	21
Mr Site Takeaway .....	121
MSI .....	27, 95
MTNL .....	115
NDTV .....	50
Nokia .....	11
Nokia .....	Inside Back Cover
NVIDIA .....	49
Palit .....	97
Plustek .....	41
Resort Country Club .....	57
RX Tech .....	119
Sagarmatha .....	117
Symantec .....	25
Topgun .....	47
WYSE .....	103

## Products Reviewed This Month

### Bazaar .....58

BenQ MP771  
Creative Vado  
Creative ZEN Mozaic  
DataTraveler HyperX 8 GB  
Intex S133Z-B1110  
Apple iPhone 3G  
Apple iPod Classic (6G)  
Apple iPod Nano  
Apple iPod Shuffle  
Apple iPod Touch 2G  
Microsoft Life Cam VX5500  
Microsoft Wireless Laser  
Desktop 6000  
MSI R4850  
OCZ DDR PC3-106666 GOLD  
Edition  
Samsung Innov8  
WD Caviar Black 1TB

### Graphics Cards .....38

ASUS EAH3850 SMARTOC  
Calibre 9500GT  
EVGA 9600GT KO

GeCube 3650  
GIGABYTE 9400GT  
GIGABYTE 9500GT OC  
MSI 9600GT ZILENT  
Palit 9500 GT SUPER  
Palit 9500 GT SUPER 1 GB  
Palit 9600 GSO SONIC  
Palit 9600 GT 1GB SONIC  
Palit HD3850 Super  
POV 9400GT  
POV 9500 GT 512MB DDR2  
PowerColor HD 3850  
Sapphire HD3850  
Sparkle 9400GT  
Sparkle 9500GT  
XFX PVT94G-YAL3  
XFX PV-T9FG-UDF3  
Zebtronics 9500GT  
ZOTAC 9400GT  
ZOTAC 9500GT  
ZOTAC 9500GT AMP

### CPU Test .....82

AMD Athlon X2 5000+  
AMD Athlon X2 5200+  
AMD Athlon X2 5600+  
AMD Athlon X2 6000+  
AMD Phenom X3 8750  
AMD Phenom X4 9550  
AMD Phenom X4 9650  
AMD Phenom X4 9750  
AMD Phenom X4 9850

### Black Edition

AMD Phenom X4 9950  
Intel Core 2 Duo E5200  
Intel Core 2 Duo E7200  
Intel Core 2 Quad Q8200  
Intel Core 2 Quad QX9650  
Intel Core 2 Quad QX9770

### Motherboards Test .....92

ASUS Crosshair II Formula  
ASUS M2N-HT Deluxe  
ASUS M3N78 PRO  
ASUS P5Q-EM  
Biostar GF8200 M2+  
Biostar TA790 GX XE  
ECS GF9300T-A  
Gigabyte EG43M-S2H  
Gigabyte MA78GPM-DS2H  
Jetway HA06  
Jetway HA07-LF  
MSI DKA790GX Platinum  
MSI G43M2  
MSI P7NMG DIGITAL  
Palit AA-780G  
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XFX MI-A78U-8309  
ZOTAC GeForce 8300  
ZOTAC GeForce 9300

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**Test Centre**  
**DX10 On A Budget**  
So you want DX 10 cheap eh? One of these will satisfy



**Main Story**  
**3D Animation And Modelling**  
An introduction to the principles of modelling and animation, with some suggestions for how to develop your skills in this field

**Drool Maal**



**12**  
An Interview with Jon Von Tetzchner

**12**  
Intel-AMD License War

**14**  
Chrome's Loops And Holes

**16**  
Printing Hearts

**18**  
Little Big Planet Delayed

**19**  
Adobe's Buzzword

**20**  
W5H: BGC3

**20**  
eBay Stops Poachers

**105** **Power Management**  
**Green Revolution**

There was a green revolution in the 1960s which increased the yield of agriculture production in many developing countries. Similarly, there is another type of green revolution that is occurring in today's environmentally conscious world for IT systems



**107**

**SMB Storage Considerations**  
**A Store Lore**

SMEs face a much greater challenge in managing the growth of its storage capacity, which may be rapid but will always be unpredictable

**108**

**Infrastructure Management**  
**Remote IT Infrastructure Consolidation**

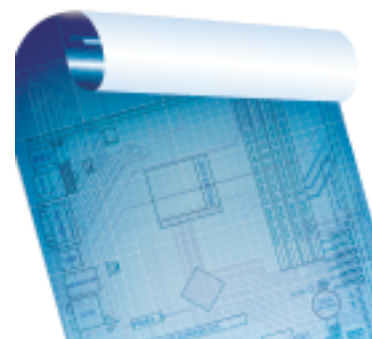
Site consolidation has a tremendous ROI, as long as user application performance is preserved

# Contents Magazine

November 2008



**Test Centre**  
**War At The Core**  
Meet the latest bad boys from AMD and Intel. They're fast, they're mean; and they're gunning for a place in your machine



**Test Centre**  
**Building Blocks**  
Designing your dream PC requires a base plan, which translates to a sturdy and reliable motherboard. Let us help you decide

**Lead Feature**  
**Colour Management In Adobe And Corel Products**  
Comparing the approaches of two competing image editing products is very helpful in understanding how colour management works in practice.



**Agent 001**  
**Get To The Body Shop**  
Agent001 Takes You Cabinet And Power Supply Shopping

**Crysis Warhead**  
Going Psycho



**FIFA 09**  
Feature Presentation



Tech Talk .....12  
Security Watch .....14  
Digital World .....16  
Stat Attack .....19  
Buzzword Of The Month .....19

W5H .....20  
Agent001 .....66  
Tips & Tricks .....69  
Whatever Happened To .....116  
People Who Changed Computing .....118

Bluff Your Way Through .....120  
Wild Wild Web .....120  
Blogwatch .....122  
Tech Quiz .....114  
Inbox .....124

**116**  
Whatever Happened To: UEFI

**118**  
People Who Changed Computing: Dennis Ritchie

**120**  
Bluff Your Way Through: MMORPGS

**120**  
Wild Wild Web

**122**  
ThinkDigit Blogwatch



## Tools

### MULTIMEDIA Photo! 3D Album 1.0



Photo! 3D Album gives you an exciting opportunity to create stunning 3D albums where you will see your photos in the dreamlike environment of picturesque 3D galleries. 3D albums can be viewed in automatic mode, when the program itself guides you through the gallery halls. You can also enter the free move mode and wander freely inside the virtual space using your mouse.

- BonkEnc
- Data Crow
- DVDStyler
- GrafxShop 3.9
- Lyrics 1.01
- MediaPortal
- Microsoft Expression Studio
- Smplayer
- Tuber Video Player 1.04
- xVideoServiceThief
- ArKaos VJ DMX 3.6
- BW Tools 1.2
- NTI CD & DVD Maker Platinum Edition
- PowerDirector 7
- RapidSketch 2.3 Build 2601
- StudioLine Photo Classic 3.12
- Thirdbrush 1.11
- Vlog It! 2.5

### INTERNET Freenet 0.7



Freenet is a large-scale peer-to-peer network which pools the power of member computers around the world to create a massive virtual information store, much like a global hard drive. The network is built first and foremost with anonymity in mind. Communications by the nodes are encrypted and are "routed-through" other nodes to make it more difficult to determine who is requesting the information and what its content is.

- BigBlogZoo 1.0.9
- Coppermine
- Feedreader
- Freenet 0.7
- Kids Playground Web Browser 10.0
- MyFolder 1.0.3
- RevConnect
- Memopal 1.0.0
- Web Scraper Plus+ 4.0.12

### SYSTEM HARDiNO 2008 Professional 6.00

HARDiNO 2008 is a System

Information, Diagnostic, Network Monitor, Benchmark and Computer Management application designed to be used by Small Business to Large Business and Professionals.

- Intel Desktop Control Center 2.1
- Keyser Soze's XP Security Pack 3.0
- Microsoft Virtual PC 2007 SP1
- Advanced Uninstaller PRO 9.5.2
- Diskeeper 2008 Professional 12.0
- Girder 5.0.2 Build 536
- HD Observer 2.0
- Paragon Hard Disk Manager 8.0
- PerfectDisk 2008 Professional Build 64
- VisualCron 4.9.11

#### ESSENTIALS

- .net Framework 2.0
- µTorrent 1.7.7
- Avast Home Edition 4.8
- Comodo Firewall Pro 3.0.25.378
- Foxit Reader 2.3
- Free Download Manager 2.5 build 758
- Irfan View 4.20
- Java(TM) 2 Runtime
- K-Lite Mega Codec Pack 4.1.4
- Opera 9.6
- Silverlight
- Spybot Search and Destroy 1.60
- VLC Player 0.9.4
- WinRAR 3.71
- Real Player

#### UPDATES AND ADDONS

- AVG Update
- Avast Update
- Norton Internet security update
- Symantec Professional Update
- Kaspersky definition Update



## Productivity

- Java runtime update
- Adobe Shockwave
- Spybot updates

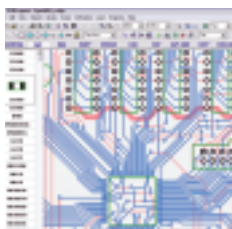
### CREATE Alfresco

Alfresco is an open source enterprise content management repository and portlets (CMS) built by a team that



includes the co-founder of Documentum. Its modular architecture uses the latest open src Java technologies: Spring, Hibernate, Lucene and JSF.

**DipTrace Free 1.50**  
DipTrace is an advanced PCB design software application that comes with a



PCB Layout module, a powerful auto-router, schematic capture and component/pattern editors to design your own component libraries. Besides being very simple to learn, which is quite an accomplishment for an engineering software application, the software has a very intuitive user interface and many innovative features.

- MySQL
- Python 2.6
- CoCreate Modeling 2.0

### WEB BO2k

BO2K is a remote administration tool for Windows systems. It comes with a client and a server.



### KompoZer

KompoZer is a wysiwyg HTML editor (Nvu/Composer fork) aimed towards advanced users.



### BlackWidow 5.21



BlackWidow is a multi-function Internet tool: offline browser, web site scanner, site mapping tool, site ripper, FTP client, and site mirroring tool. Use as a site mirror or to be converted by it into a locally linked site for off-line browsing and long-term reference.

## Trailers

### HD

#### Inkheart

Inkheart is a thrilling adventure that stars Brendan Fraser as Mo Folchart, a father who possesses a secret ability to bring characters from books to life when he reads them aloud.

- The world unseen
- Synecdoche
- Frost / Nixon

### REGULAR

#### Waltz With Bashir

One night at a bar, an old friend tells director Ari about a recurring nightmare in which he is chased by 26 vicious dogs. Every night the same number of beasts. The two men conclude that there is a connection between the dream and their Israeli Army mission in the first Lebanon War of the early eighties.

- Hank & Mike
- Splinter
- Happy Go Lucky

## Gaming

### GAMES

#### Pro Evolution Soccer 2009

Players are able to select fully licensed Manchester United, Liverpool, Real Madrid, and Barcelona club teams, or



the licensed Italian or French national sides. All new visuals with completely remodeled players and animations, and new physics routines to ensure the ball behaves more realistically have been included, while the AI of the CPU sides has been enhanced to provide an ever evolving challenge.

- Flash Games 1.01
- Desert Combat 0.7
- Eudemons Online 1115
- Quantum of Solace
- Hard to Be a God English Demo

### TRAILERS

#### Tomb Raider: Underworld



- Call of Duty: World at War
- Fire & Destruction
- Silent Hill
- Dynasty Warriors: Strikeforce
- Need for Speed Undercover

## Tools

### MULTIMEDIA FrostWire 4.17



FrostWire is a fork of the very popular LimeWire PRO Gnutella/Bittorrent client. The purpose of FrostWire is to keep and maintain the freedoms that LimeWire LLC may be forced to withdraw. Share any type of file on Gnutella and the Bittorrent network.

### JetAudio Basic 7.1



JetAudio is integrated multimedia software made up of a single compact rack. Not only does it play various music and video files, it also has features such as CD burning, recording, and conversion to other file formats. You can create your own Internet broadcast by using JetCast, provided with JetAudio, and you can play all major file formats, including WAV, MP3, MP3Pro, OGG, WMA, MPEG, AVI, WMV, MIDI, RM, and video and audio CD tracks.

### Burn4Free CD and DVD 4.6

Burn4Free CD and DVD is a burning solution that's compatible with more than 3,000 DVD and CD burners. Burn data and audio from different file types (WAV, WMA, MP3, OGG, FLAC, WavPack, and CDA). Burn and save ISO files, open and save your project to disk, verify content, print compilations, copy DVDs, and import your audio compilation from M3U and ASX playlists. The drives supported include dual-layer DVD, CD-R, CD-RW, DVD-R, DVD+R, DVD-RW, DVD+RW, and DVD-RAM (SCSI, IDE, EIDE, and USB 1.0 and 2.0).

### Ares Tube 3

Download video movies from youtube, google video, Blip Tv, Daily Motion and metacafe to local video formats (iPOD, MP4, MPEG, and AVI). Ares Tube optionally will export your videos, to your iTunes platform. Just

browse to the desired video and click Add to download list. Now includes support to Angry Alien, Blennus, Vimeo, Blip.Tv, Break.com, StreetFire, Daily Motion, Double Agent, Yikers, eVideoShare, Vidiac, Sharkle, Google Video, Grinvi, That Video Site, iFilm, Keiichi Anime Forever, Revver, Metacafe, MySpace, SmitHappens, Putfile, Totally Crap, Pixparty, vidiLife, vSocial, PlsThx, AnimeEpisodes.Net, YouTube, NothingToxic, Zippyvideos, Badjojo, Newgrounds, Blastro, Bofunk, Music.com, Bolt, Castpost, Lulu TV, CollegeHumor, Current Tv, HipHopdeal, Dachix, Danerd, Kontraband, DevilDucky and EVTV1. Version 3 includes support for 50 video sites and AVI format.



### Xilisoft MOV Converter 5.1

Xilisoft MOV Converter is a MOV converter software which can convert QuickTime MOV to MPEG, MOV to AVI format. It also supports convert MOV file to popular video formats including AVI, MPEG, WMV, Divx, and convert MOV to audio formats MP3 and WAV.

### GrafXShop 3.9

GrafXShop is an image-editing, page-publishing, and

Web-authoring program for the PC. It comes bundled with many features that let you edit digital images, create logos and brochures, create Web pages, and publish through secure FTP.

- FLV Player 2.0.24
- PowerISO 4.2
- MP3 Rocket 5.1.4
- Free Mp3 Wma Converter 1.7.3
- Riva FLV Encoder 2
- AtomixMP3 2.3
- iDump 27
- iMesh 7
- Mp3 My Mp3 Recorder 2.0
- DVDFab HD Decrypter 5.1
- SUPER © 2008.build.30
- Videocharge 3.16
- Axialis IconWorkshop 6.3
- Capture One Pro for Windows 4.0.12289 Beta

### INTERNET

#### All Media Extractor 1.0

Take full control of all hidden Media on your Computer and on the Web. Media extraction and visualization tool for Web sites, Zip files, Folders and MS Office documents.

#### Qube 2.7

Qube is the next generation websearch client for instant, single-click access to information from the collective index of traditional search engines. It emphasizes on usability rather than availability of information allowing you to search the web with a click, using a custom-defined mouse and keyboard combination (hotkey), without having to type the keyword manually, like we did so far.

#### Ghostzilla 1.0.1

Ghostzilla is a browser for surfing the Web when you

don't want anyone to physically see what you are doing. It renders Web pages to look indistinguishable from your work screen. You make it disappear instantly with one move of your hand and bring it back with another. It can show Web pages discreetly within literally any application you work with. Use this browser for nefarious activities on the Internet.

- IPSentry 5.3.1
- RetroShare for Windows 0.4
- AgileRss for Windows 3.1
- SimpleDownload 3.1
- ManyCam 2.2
- Advanced URL Catalog 2.1

### SYSTEM TuneUp Utilities 2008

TuneUp Utilities makes Windows faster, more secure, and comfortable. All important aspects of system configuration, security, cleaning and maintenance are combined under a modern graphical user interface.

#### RollBack Rx 8.0

RollBack Rx allows computer users, regardless their skill levels, to easily and quickly repair their computer problems in seconds. Empowering both users and enterprise IT support personnel to achieve tremendous savings of time and money on maintaining their computers.

- O&O Defrag Professional 11.0
- Auto Type 4.1
- SiSoftware Sandra 2009
- Diskeeper 2008 Lite 7.0



## Trailers

### Let the Right One In

A fragile, anxious boy, 12-year-old Oskar is regularly bullied by his stronger classmates but never strikes back. The lonely boy's wish for a friend seems to come true when he meets Eli, also 12, who moves in next door to him with her father.

### Christmas On Mars: the Flaming Lips

It's Christmastime, and the colonization of Mars is underway. However, when an oxygen generator and a gravity control pod malfunction, Major Syrtis (the Lips' Steven Drozd) and his team (including the Lips' Michael Ivins) fear the worst.



### Splinter

A young couple has retreated to the wilderness for a romantic camping weekend-but the trip quickly spirals into a nightmare when they are car-jacked by an escaped convict and his girlfriend - at a remote and isolated gas station.

## Gaming

### OFFICE

#### Rocket Arena 3 1.76



What started as a rocket dueling mod for Quake 1 has now evolved into an entirely new way to think of first person deathmatch. No longer is the winner determined by who can run the level the best or time the quad or get the best weapons.

#### Fission Balls

In this game there will be a ball falling from the top of the screen. You need to shoot it and then it will split. Shoot the splitted balls again so that they split further, you need to shoot the balls repeatedly so that there is at least one ball in the screen.

#### Warzone

2 player board game played on a diagonally chequered board with each player moving one of their army machines in a bid to capture an opponents by landing in the same space on the board.

#### Gravetaker

1 player scrolling platformer. The Gravetaker walks again, hell bent on revenge against the counterfeit money criminals who are disturbing his graveyards.



**Check Out The All New ThinkDigit.com**

The screenshot shows the thinkdigit website interface. At the top, there's a navigation bar with links like 'Sign in', 'Check Registration', 'Subscribe to Digit', and 'Remember Me Sign up'. Below this is a banner for 'Inspiron 1525' by Dell. The main content area is divided into sections: 'PRODUCT REVIEWS', 'BLOG WATCH', 'DOWNLOADS', 'DIGITAL MARKET', 'VIDEOS', 'TECH Q&A', 'SPECIAL', and 'SUBSCRIBE'. A sidebar on the left contains a 'Search for Articles' box, a 'Featured Tech Articles' section, and a 'Tech News' section. The main content area features a 'New Launches' section with a 'DIGIT STORE LAUNCHED!' banner, a 'Tech Q&A' section, and a 'FREE GIFTS' section. The footer contains a 'Featured Tech Video' section.

Annotations on the screenshot include:

- Quick and easy registration process that gives you access to cool features**: Points to the 'Sign in' and 'Remember Me Sign up' links in the top navigation bar.
- Exciting video content from across the globe**: Points to the 'VIDEOS' section in the main navigation bar.
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**KPower Mania**  
Banned

Join Date: Jun 2008  
Location: In Satan's Grasp  
Posts: 1,376

## My review of Brothers In Arms : Hell's Highway

Hello guys. Back to you with a new review. The BEST WW2 shooter I have played. The graphics are great, gameplay is authentic but the best is the story. The story is so great that it beats many other FPSes leave alone WW2 shooters. Lets move on to the review now.

**Graphics (8/10):**  
Good details present on the characters, weapons and other objects. The cutscenes are made with great care and the facial expressions look very real. There is one flaw with it though, the water. Large bodies of water (rivers, lakes) look like complete POS. Hope they will take care of it in the next game. Otherwise, great work here.

**Sound (9/10):**  
Great sound and amazing voice overs. Some of the best voice acting I have experienced. Apart from that, the ingame sounds are great too. The guns sound like they should and explosions are also decent.

**Story (10/10):**  
The story is just mind-numbing. Its better than many games leave alone war games. Its unimaginable how the devs fit in such a story in a WW2 based game. It shows the turmoil of war and the pain of losing your friends. It displays the hardships one has to face to suppress a guilty secret within you. The game is a must play for its story only.

**Gameplay (9/10):**  
Great work here too. Its basically a squad based action game. You get to control various squads (Base Fire, Assault, MG Squad and Bazooka Squad). It depends on the missions as to which squad you will get to control. In the beginning you get to control Assault and Bazooka. Then Assault and Base Fire. As you near the end (last 3-4 missions), you will get to control Base Fire, Assault and MG. The shooting is mostly like a normal FPS with cover tactics like Gears of War and R6 Vegas. There are 3 missions in which you get to control a tank. The tank works flawlessly. The game's physics are good and its nice to see the limbs

of the Germans flying . All in all, its good. Though it has some flaws. The reloading is very awkward. Sometimes you dont get to see the reloading animation but the weapon is reloaded and sometimes you can only hear the reloading sound and not see the animation. Another on is the grenade system. Its messed up. I was hardly able to throw grenades where I wanted to! But these can be over looked.

**Final Verdict:**  
Definitely recommended. It will last for a good time too! Took me 9 hours to complete the SP campaign. The story alone is worth it.

## Luxpro Sues Apple For Market Domination

A Taiwanese MP3 manufacturing company called Luxpro has sued Apple in a US court for using unfair means to stamp out competition and take monopolistic control of the market. Luxpro was previously sued by Apple for making shuffle clones



## Nokia Makes Symbian Open Source

Following on the footsteps of Android, Nokia has decided to transition its Symbian OS for smartphones into a free licensing model. Symbian will be available as an Open Source platform from June 2010. Windows Mobile is now the only holdout



# Enter



Jon Von Tetzchner  
CEO, Opera Software

*Jon Von Tetzchner was in India recently and we had a two hour chat with him and Opera's India Country Manager Sagar Chandra over lunch one afternoon.*

### Opera 9.60 is almost out. What's new it and why is it important for India?

Other than being optimised for slower connections and also slow computers, Opera 9.60 has support for local languages such as Hindi, Tamil and Telugu to be used in the inbuilt mail client.

### What part of Opera is developed in India?

A lot of the widget related work is done in Opera's office in India based out of Chandigarh. Some of the quality testing of the product also happens there.

### With Opera's desktop version being free, where does the money come from?

Our income comes from our commercial browser for the mobile devices — Opera Mobile. We also have other clients who use our products — Nintendo is one example of a company that uses our browser in the Wii and also their new mobile gaming device the DSI.

### Tell us more about Opera Mini and how do you promote its use in India?

India is already the third largest user of the Opera Mini browser on mobile phones. We also have tie-ups with phone manufacturers and service providers in India to carry preinstalled copies of Opera on their devices.

### Will Opera ever go Open Source?

There are no plans of making Opera Open Source. We decided to make Opera free and it was a good move welcomed by people everywhere. We have a great product in our hands and we have a path for it. We believe in an open and free Web. We actively listen to the community for suggestions for the future and any issues that exist, are quickly fixed by our team.

## PATENT WARS CONTINUED...

# INTEL-AMD LICENCE WAR

A lot has been happening the past few months in the chip manufacturing business. While on one hand Intel's sales have been soaring, its tiny rival AMD has been struggling. Not many years ago, Intel was troubled by the rate at which AMD was eating into its profits.

Today things are a bit different. Intel still maintains its monopoly in the microprocessor business. With sales just dwindling by the day, AMD had no choice, but to take drastic steps in order to be in a position to take on Intel. Among these, was shutting down its own manufacturing plants and raking in as many investments as possible — from wherever possible.

The money did come in, in the form of Advanced Technology Investment Company (ATIC), an Abu Dhabi state-owned venture capital firm that has pledged \$2.1 billion. With this investment, ATIC will get a 55.6-per cent stake in the venture. \$700 million will be paid to AMD, which will hold the remaining stake. As per the deal, both companies will have equal representation on the board.

Doug Grose, Senior Vice President of Technology at AMD will be the CEO of the new company, while Hector Ruiz, the current chairman



of AMD will be the new chairman. Operations are planned at a new factory in New York early next year, with 1,400 employees.

Experts predict the new entity would start as a very small part of the industry, with probably around 5 per cent market share. However, in the long term, it is expected to significantly grow, with visible results expected after 2010. The new company christened Foundry Company will be a 3,000-strong entity and would own AMD's two plants in Dresden, Germany. CPUs as well as chips for other companies will be manufactured from here.

All said and done, the optimistic plans for AMD haven't gone down well with Intel, which has been vocal in questioning the deal.

Intel claims that AMD and Intel have a patent cross-licensing agreement under which AMD pays royalties to

Intel. With controversy hitting out all around this development, what is left to be seen is the implication on prices on AMD and ATI-based processors and cards. Besides, this deal is also closely watched by companies like IBM, which has placed stakes on AMD-based PCs in the future.

AMD's announcement now means that Intel is the last remaining company who both designs and manufactures chips themselves.

## KILLER ANDROIDS?

# ANDROID, NOW WITH A KILL SWITCH

Although the controversy of a kill switch started in the days following the launch of the Android-based phone G1





## Security Watch

## Chrome's Loops And holes

### The Problem

Google Chrome, the new born browser hits a roadblock when it tries to handle the Javascripts methods `onbeforeload` and `onunload`.

This bug seems to affect Chrome users running versions 0.2.149.xx on Windows XP-based computers. The bug messes up Chrome when it gets into an infinite loop with the commands `onbeforeload` and `onunload`.

This means trouble makers can implement this code to initiate a loop in a simple page. In the example shown by Aditya K Sood, the following code in a page gets Google Chrome hung up.

```
<body
onbeforeunload="for
( var chrome_t = 0;
chrome_t < 999999;
chrome_t++) {
alert('I think we're
bugging Chrome');
}return false;">
```

Initially, the CPU utilisation shoots up, and slows Chrome to a crawl. Then, Google Chrome refuses to close and has to be forcibly shut using the Windows task manager.

### The Solution

Google has apparently acknowledged the problem, and a fix expected anytime soon.

Google has an auto-updater utility that runs alongside Google Chrome that keeps the browser up-to-date. When the fix is available, it will be automatically downloaded and patched. When you read this, try the code, and if it doesn't affect Chrome, you know it's been patched.

from Google, it originated from the iPhone. Jonathan Zdziarski, an independent iPhone developer recently came across a secret line of code in the iPhone Operating system containing a URL. Days later, this spread all across the tech arena, and soon questions were left for Steve Jobs to answer.

Jobs eventually accepted the presence of a kill switch in iPhone's operating system meant to kill third-party applications that run on an iPhone to avoid malware and other harmful applications from running on the iPhone. Jobs insisted it was precautionary rather than a function.

With the launch of the G1 from Google, things have moved far off with the detection of a kill switch in it as well. With companies deciding for the end consumer what application should be run, there is concern over end-user privacy. Although, both Google and Apple would release statements claiming that the privacy of the end-user is duly respected, the very fact that they know what application you run on their products is discomfoting.



This is similar to Windows sending error codes to Microsoft's servers without asking for your permission.

### ENOUGH ALREADY!

## More Yahoo!, Google And Microsoft Chatter

The Yahoo!-Microsoft imbroglio seems to have gone through an extended gestation period. It's high time we heard of



Jerry Yang,  
Yahoo! Co Founder

the birth of a new entity. All the expectations are justified, at least with all the attention the whole affair has been receiving, and the limbo it has been over the past nine odd months!

It all started close to a year ago with Microsoft pitching in to buy-out Yahoo!. Steve Ballmer and Jerry Wang were in the news. At times the stock price was the debate, while in the recent past, Google entered the limelight. There were talks of Google entering a deal with Yahoo! to offset Microsoft from gaining hold of the online marketing business.

However, as per recent reports, Google and Yahoo! have decided to put the online advertising deal on hold. This was announced

by both, Yahoo! and Google in a recent statement, after deciding to wait for responses from the Department of Justice. Microsoft was quick to take advantage of the situation and go ahead and announce that the online deal with Yahoo! is still sensible, despite what happened and that it may still be possible.

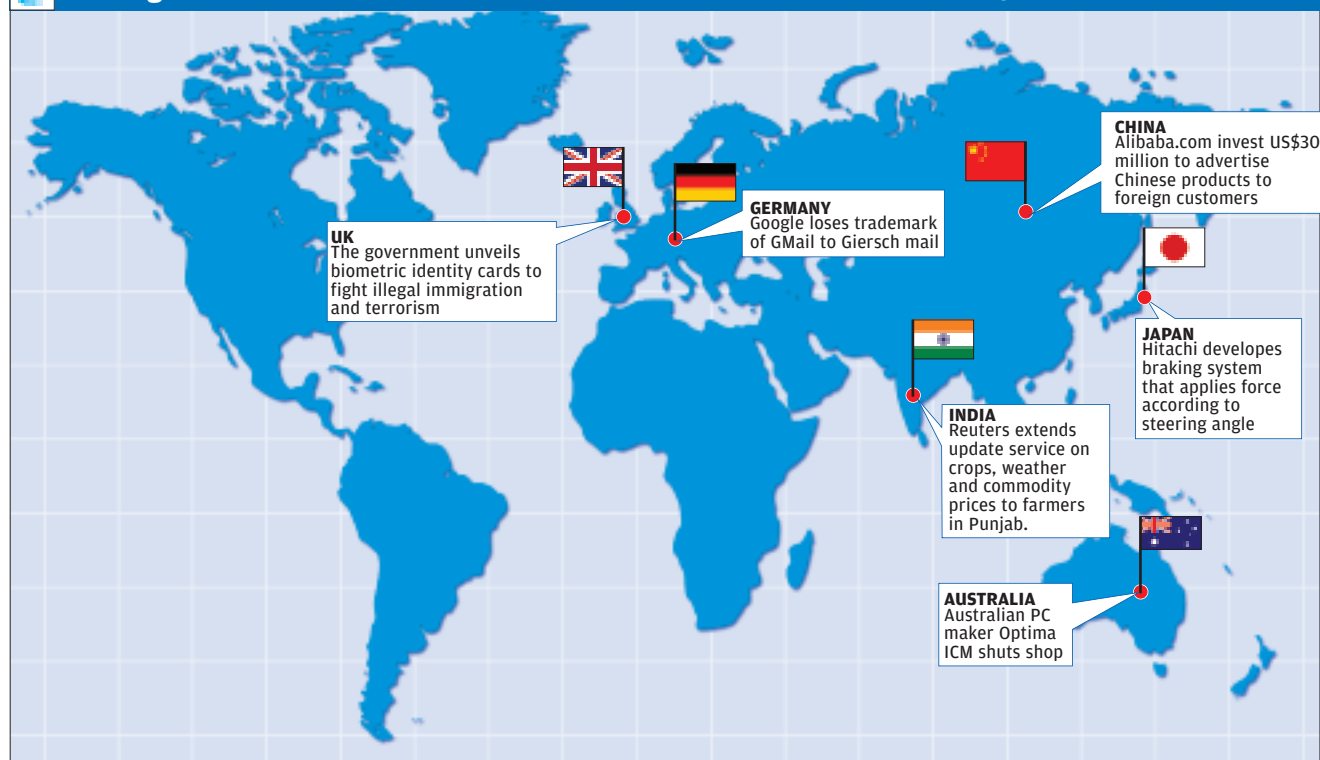
Ballmer also said that the two companies are not currently negotiating, ever since talks fell apart in July. In May, Yahoo! had rejected a \$33-per share offer that amounted to \$47.5 billion, with a reason



Steve Ballmer,  
Microsoft, CEO

that the company was worth much more than said figure. However, this was the case before Wall Street crashed and burned, as a result of the global financial crunch.

However, in the current scenario, the impact on Yahoo! share prices is being closely studied by Microsoft. Ballmer has already hinted that they expect to see opportunities to have a partnership later. The impact of failed talks has been graver on Yahoo! than it has been on Microsoft. Share prices have fallen to a five-and-half-year low of \$11.37. Perhaps that \$33 per share offer wasn't so bad, was it Jerry? As for the rest of the world, we've just had enough. Will someone please buy someone else and end all this speculation?



## TISSUE-JET TECHNOLOGY?

## Printing Hearts

Decades ago, space missions seemed to be a dream, or fiction. Then one fine day, President Kennedy felt man should reach the moon. The objective was realised, and soon fiction was reality! That's precisely how inventions change our perspective of ideas.

When we think about printers, all that comes to mind are offices, pictures, documents, and most of all paper. But one Japanese professor went the Kennedy way and thought out of the box. Although the idea seems impossible when you think about it, he's actually inching closer to achieving it.

Professor Makoto Nakamura is working on a printer that prints organs.

No, not the musical instruments, or pictures of body parts, but actual organs like hearts and kidneys! He has already succeeded in printing a tube of cells as narrow as the human hair. Nakamura says it will take him about 20 years before he is able to 'print' a heart. These tubes were made by an inkjet printer that Nakamura's

team has developed after three years of work.

The printer is precise to the extent of one-thousandth of a millimetre. A tube of three millimetres takes a minute and a half to print using Nakamura's printer.

The journey began 13 years ago, when Professor Nakamura was a paediatrician. During those

days, he came across several children with threatening heart problems that didn't respond to conventional medication. It deeply saddened Nakamura to see them die without any options. A 36-year-old Nakamura felt he shouldn't just be a mute spectator and should do something about it. He left a decade long practice to become a researcher and contribute to progress in this field.

One day Nakamura was researching artificial hearts and realised that mechanical hearts are not effective substitutes to donor organs, because mechanical organs are not able to generate energy, secrete hormones or even fight infection. In his search, he discovered that an inkjet printer's drops and human cells are about the same size — approximately one-hundredth of a millimetre.

Nakamura got in touch with a customer care





executive at Epson and told her about his idea of printing cells with a printer. The executive politely turned him down. A persistent Nakamura, however, got in touch with another Epson official who was interested in his idea, and agreed to provide technical support.

In 2003, Nakamura was able to get cells to survive the printing process, and the rest is history.

We're hoping that Nakamura succeeds, and answers the prayers of thousands of patients across the world.

#### A LITTLE BIG DELAY

## PS3 Title 'Little Big Planet' Delayed

PlayStation has delayed the long-awaited launch of its PS3 title *Little Big Planet*. The reason for this is the discovery that background scores in the game are offensive to some users. This was brought to the notice of PlayStation by some users on their forum.

In the run-up to the launch, users said "Muslims consider the mixing of music and words from the Koran deeply offending. We hope you would remove that track from the game immediately via an online patch, and make sure that all future shipments of the game disk do not contain it." These were with regard to the lyrics and music of the track *Tapha Niang* by African kora player Toumani Diabate.

*Little Big Planet* is a puzzle-based game, where

you can customise and guide amusing characters to do some intriguing tasks. It was slated for a mid-October launch, but will now be released at a later date. The official word from PlayStation is "We have taken immediate action to rectify this and we sincerely apologise for any offence that this may have caused. Sorry for the delay, and rest assured, we are doing everything we can to get *Little Big Planet* to you as soon as possible."

The game was developed by Media Molecule, who were understandably taken aback by the developments. The game is already popular amongst critics and reviewers.

Media Molecule, in a statement, said that it takes the issue of offensive tracks seriously, and hopes that *Little Big Planet* will still be enjoyed by all.

Media Molecule has prepared a patch that will get rid of the offensive lyrics, which are believed to be Somali. Despite this patch being available, Sony has delayed the launch of the game as it wants to replace all existing disks. The song in question, however, has been uploaded by several users on YouTube in the past days.

Whether sales catch up or not, popularity has certainly caught up globally with the whole controversy. There's no such thing as bad publicity, is there?



#### AGAINST ANTI-PIRACY?

## Chinese Not For Anti-Piracy Drives

Software giant Microsoft, in an effort to curb piracy across the globe had launched the Windows Genuine Advantage program. Aimed at detecting whether the software loaded on your system is genuine or pirated, it nags users of pirated Windows to buy a license. Although this move is not exactly welcomed by even genuine users, it's not surprising that the Chinese are against it, considering the rampant piracy there.

Over the years, Microsoft has not taken a tough stand on its Windows operating system being widely pirated globally. However, with the financial crunch hitting companies globally, Microsoft values your dollars even more.

A couple of years ago, prior to the launch of Office

2007, Microsoft had launched an anti-piracy drive in the UK. Microsoft had then made a statement that it believed upto 63 per cent of Microsoft Office installs in the UK could be pirated. Michala Alexander, head of anti-piracy for Microsoft UK says that the company's investigations have revealed only the tip of a counterfeiting iceberg in the UK. Alexander said, "Piracy costs Microsoft at least \$250 million a year in lost sales. The problem is phenomenal. We had

set up a Web site, Office Genuine Advantage, to allow users to go online to validate their Office software, and in three months, 4,000 people have attempted to validate their software with 63 per cent discovering they were running an illegal copy."

Microsoft is hoping to cash in on those who may not have intentionally pirated their products — such as people who buy systems with pre-installed pirated software, or those who don't know that you cannot install from a friend's CD.

Taking the fight global should significantly increase revenues, considering the higher rate of piracy across the globe.

A furious blogger on a Chinese site said, "Why is Microsoft automatically connected with my computer? The computer is mine! Microsoft has no right to control my computer without my agreement."

While Microsoft is justified in taking a stand at protecting its intellectual property,

## STAT ATTACK

It's all in the numbers

**Yahoo to cut 1500 jobs after reporting losses**

**Google's \$10 million project idea competition attracted 150,000 ideas**

**Internet usage is increasing faster than world population**

**Symbian OS has 74% share in smartphones**

**80% of digital cameras sold in the US in 2008 were 8-megapixel or higher**

**Almost 7 million iPhones were sold in the 4th quarter of 08 — so far**

**Internet penetration of the world population is 22.19%**

whether users in China, the world's fastest growing market, decide to switch to genuine Windows or change their operating system will decide whether this move by Microsoft was wise at all.



#### EVEN MORE DTH

## Airtel Launches DTH Service In India

Expect to familiarise yourself with another one of those small branded dish antennae hanging outside people's home. Bharti Telemedia, has followed close on the heels of ADAG's Big TV with its Direct to Home (DTH) service called 'Digital TV' on October 9. This brings the total number of DTH

services in India to six, with Dish TV, Sun Direct, Tata Sky and DD Direct plus being the other players in the field.

The launch was relatively low profile compared to the grand launch of Reliance Big TV. The service is available in 62 cities/towns and 21,000 retail points across the country. Digital TV will be offering 175 channels using the MPEG-4 technology, and is HD-ready. The packages offered vary between zones, prices start at Rs 2,499 in the North Indian market, and Rs 1,499 in the South Indian market. Included are ten World Space channels, and a single remote for both the TV and the Set-top-box, which is a first for DTH services in India.

The entry of Big TV and Digital TV has started off a huge price war between DTH service providers, with all of them trying to grab a foothold.

Dish TV and Tata Sky have slashed prices (to as low as Rs 100 per month), introduced new and innovative packages, and are amping up the bells and whistles of the service in terms of providing value added services and interactive content.

It is in this last area that Digital TV is hoping to excel. Using the Infosys Digital Convergence Platform, Digital TV is offering local news, weather and traffic reports, offering user customisable widgets, and a host of other

interactive content. Also in the offing are applications with iCity, iNet and tPortal which allows for an Internet-like experience on your television, without interrupting your viewing pleasure. More applications from Infosys are in the pipeline as well.

Currently, there are 7.5 million DTH users in the country, with Dish TV broadcasting to 4 million pairs of eyeballs, and clearly in the lead. Tata Sky, Sun Direct and Big TV in that order are the next biggest players. DD Direct plus is only popular in the more remote regions of the country, and offers only free content at present. The market is expected to expand rapidly in the next few years, particularly in rural areas.

#### GOOGLE MAKES MORE MONEY

## Google Finds Innovative Ways To Get Cash In The Kitty

Google continues to be on the bleeding edge of advertising proliferation. Now they have invaded the sacred space of online gaming. Their new technology, dubbed AdSense for Gaming beta shamelessly inserts video, image or text ads at the beginning, middle and end of levels in an online game.

## Buzzword of the MONTH

### Buzzword

No, we're not kidding. Buzzword is an online word processor from the folks at Adobe. Head over to <http://buzzword.acrobat.com>. Its free but you have to sign up.

You can save your documents online, so you can access it from anywhere, have an unlimited number of people collaborate on it, control versions and keep track of

changes. The word processor can handle images, give selective access to collaborators based on their roles, and a nifty little document dashboard for easy access to all your documents. Buzzword supports TXT, RTF, DOC, DOCX, PDF, ODT and HTML formats. Buzzword has spell-check support for 18 languages. The only bummer is that it does not have native support for Opera.



## BGC3

### What is BGC3?

BGC3 is the next venture of Bill Gates after Microsoft and the Bill and Melinda Gates foundation. It is a highly mysterious company, no one knows exactly what it is upto, and there have been many esoteric suggestions for what BGC3 means. Bill Gates Company 3 seems to be a fair assumption.

### Why start up BGC3?

To fulfill all of Bill Gates dreams that could not be realised by Microsoft or the Bill and Melinda Gates foundation. It will be a catalyst, a base for upcoming technologies and innovations. The company is widely thought to be a "Think Tank" and a vehicle for Bill to invest all his hard earned money into imminent ventures answering problems of science, society and technology.

### Where is BGC3?

The swanky new office is located at Kirkland, Washington. The office is located a short distance away from Bill Gate's Washington Lake estate.

### When was BGC3 established?

Carillon Holdings was established in March 2008. In July 10, a mere ten days after Bill Gates quit Microsoft, the company officially changed its name to BGC3.

### Who is likely to benefit?

All entrepreneurs look out for fundings. Ambitious start-ups with novel ideas that can use up all the money for some philanthropic goal, or to solve major problems like the fuel crisis, the garbage crisis or even the substandard software crisis; all these will stand to benefit.

### How will BGC3 work?

The details of the working are still obscure at best. They have registered a trademark and a logo. BGC3 is not another capitalist commercial company.

Currently, Google offers Ad Sense for Feeds, AdSense for Search, and AdSense for mobile content.

AdSense contains advertisements advertised by Google and revenue generation on a cost-per-click or a cost-per-impression basis. The revenue from AdSense for Gaming will be shared by Google and the Game Developers.

In the loop are the game developers Konami Corp (as in, the makers of *Metal Gear*), Playfish, Mochimedia, Boonty, Grab, Heavy Games, Arcade Town, Café.com, Zynga and Demand Media. Google is for once behind the pack, frontrunners like DoubleFusion, IGA and Massive from Microsoft are already well established in the in-game advertising industry.

Currently there are only three marketers, Sprint, Sony and eSurance. What Google is really looking to do is "reach the new generation of social gamer", according to their Web site.

And another revenue generating solution Google has come up with is to offer buyable content on YouTube. Music, films, TV shows, video games, books, concert tickets and almost every other media related product for sale will be on offer on YouTube. The sales are conducted via Amazon.com, or for music, via iTunes, with a revenue sharing model for users who buy products through YouTube.

YouTube consumes a massive portion of the entire bandwidth usage of the Internet itself, and has not been great at generating revenue for Google. The primary mode

of revenue from YouTube currently is AdSense.

Google is experimenting with in-video advertising using tickers below the video while it is playing. After pulling a load of copyrighted content, YouTube is also experimenting with sharing revenues from copied material by using a Video ID technology, that diverts revenue from copied content to the owners of the content.

## EBAY LOVES PACHYDERMS

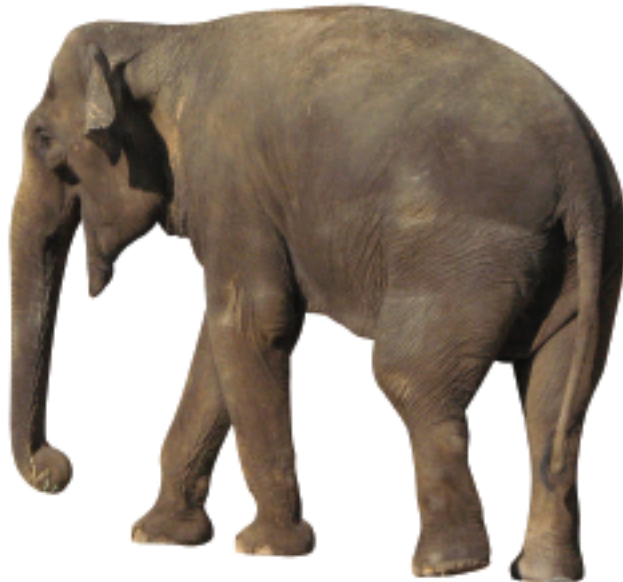
# eBay Stops Being An Incentive To Elephant Poachers

Submitting to pressure from many animal welfare groups and International law enforcement agencies, eBay, the world's leading online auction site has decided to pull the sales of all Ivory-based products from its Web site by 2009.

The International Fund for Animal welfare spotted more than 7000 listings of illegal products, including stools made out of elephant feet, feathers of rare birds, tiger teeth, pelts and skins of endangered animals and tusks. Accusations against eBay's sale of Ivory products includes encouraging the poaching of endangered species, and egging the elephants on to their extinction.

The total ban of Ivory products is a follow up to last years ban on cross border ivory sale. Every subsidiary site in every country is subject to different laws, which makes it a difficult affair to follow all of them. According to conservationists, 9 out of every 10 ivory-based products sold on the Internet contain ivory from poached elephants.

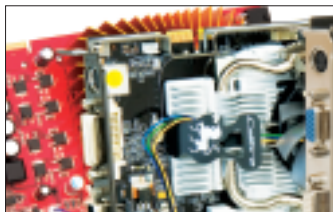
Come 2009, and only very old objects (pre 1900) and with very little ivory in them will be sold on eBay — this includes items like pianos and vintage soap. Guns, ammunition and digital music are also banned on the site and its subsidiaries.







**34** Droolmaal – Gadgets of Desire



**38** Graphics Cards Tested

# Digital Passion

Fuelling The Pursuit Of Technology Knowledge

## Lead Feature

**Edward Henning**

Paintings going back over several thousand years, on pottery (a bowl discovered in Iran, thought to be 5,200 years old), and even in caves, attest to mankind's desire to represent pictorially things, animals and people in motion. It is generally considered that the first genuine animation device was the zoetrope devised by a Chinese inventor (some consider his name to have been Ting Huan), apparently in 180 C.E. This used painted panels turned by a set of vanes that

**An introduction to the principles of modelling and animation, with some suggestions for how to develop your skills in this field**

were driven by rising warm air. The zoetrope was re-invented in the 1800s, as a rotating cylinder with slits to look through; these and similar devices were popular for some time. But, a zoetrope can only show a very short sequence, repeating again and again, and it was not until film techniques were developed that animation was able to progress to the depiction of a whole story.

The most famous of those early animated films were of course from Walt Disney, who produced his first in 1920. In those early films, every single scene had to be hand painted and each photographed one after the other – a

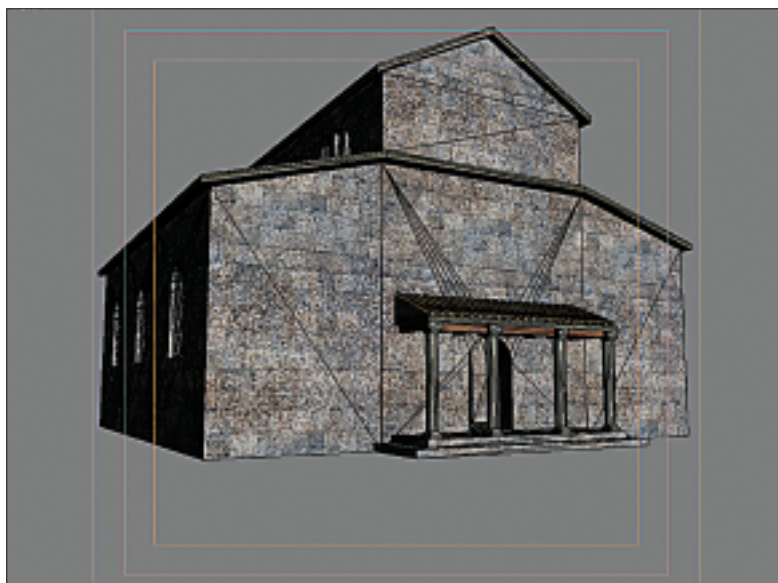
# 3D Animation And Modelling



Rohit A Chandwaskar

very labour-intensive process. Naturally, short-cuts were used as often as possible, and several *cel*s would be combined together to create a scene. A *cel* is a piece of transparent material, usually about a foot across, on which elements of the scene are drawn or painted. In the simplest example, say, for a ball rolling across a floor, a background scene would be painted, and then several *cel*s representing the ball in different positions would be placed one after the other on top of the background, and then photographed. Although we now mainly use computers for animation, terminology that comes from those early days, such as the word *cel*, is often found in use with modern systems. There is also a healthy market for used *cel*s — your favourite Disney or Anime character makes for an interesting collector's item.

3D started to enter the animation industry in the 1950s with the production of *Gumby*.



The top image shows a basilica from the online game *Roma Victor* in the 3D Studio editing window. Below, the same after rendering

This featured a rather odd green character together with his red pony, developed by the American, Art Clokey. This production used clay figures, the positions and gestures of which were changed between each shot. Again, this is very labour intensive, with the small changes between individual frames being made by hand and then again individually photographed. Although one might consider this an out-dated system, of little value today, in recent years this technique has been perfected with enormous success by Nick Park in his *Wallace and Gromit* films, such as *The Wrong Trousers* and *The Curse of the Were-Rabbit*.

And then along came computers. Although the cathode ray tube (CRT) is dated back to 1885, it was not until the 1950s that these were connected to early computers in order to create images on the screen. The term “computer graphics” was coined in 1960 by Boeing’s William Fetter, with the first primitive video game, *Spacewars*, developed the following year at MIT. The next couple of decades saw enormous development, and it is interesting to look at modern systems and realise that many of the advanced techniques we are using today, in modern CPU architectures and graphics systems, were in fact developed back in the 60s and 70s. In those days many of these developments were largely theoretical, and when practical, were used on very expensive and large machines. Modern computer technology has brought these innovations truly to life.

Graphics on a computer fall into two distinct types of image: raster- and vector-based images. If you scan a page of text or a drawing, or if you take a digital photograph, you create a raster image. The word raster refers to the grid-like structure that makes up the image. This is a number of rows consisting of individual picture elements (pixels). Each pixel is basically a dot (perhaps a small square might be a better description) effectively of uniform colour. The number of these pixels in each row and the number of rows gives the resolution of the image — a representation of the amount of detail held. The important point is that the amount of detail is limited — if you zoom in on one part of the image, eventually you will see only individual pixels.

Vector images are very different. With these, the image is held in a mathematical format. A coordinate system is used to represent position within the image, and this is used to define points and lines — a line simply connects two points. Other more complex geometric structures are simply combinations of lines — a circle for instance, is a large number of short lines connected together; the greater the number, the smoother the circle.



Early graphics drawing programs held very simple information for vector images — not much more than the coordinates for the various primitives and colours for the areas formed by the various shapes and line.

In modern systems, of course, there is very much more information held for each element in the image. However, the principle remains the same. There are two important issues with vector images: they can very easily be edited, as the coordinates are simply numbers, and there is effectively no limit to the amount of detail that can be held — the only limit being the maximum values available for the coordinate system. When they come to be used, it is normal that a vector graphic is translated into some form of raster image, either directly onto a screen, or into a file format. This process is called rendering, and when a vector image is rendered to create a raster image file, a resolution has to be specified for the final image. It may well be the case that, if a low resolution is required, then some fine details in the vector original will not be visible; the higher the resolution used, the more such detail can be represented.

The application to animation is clear: as the coordinates are simply numbers, changing in various ways the coordinates of the points defining objects becomes easy. This can be done programmatically, according to a large variety of different rules. As long as these rules can be programmed into the system, objects in a scene — we are now assuming 3D scenes in which there are three coordinates for each point rather than two — can be animated one frame at a time, and each frame rendered automatically.

This is what is done by 3D software such as Autodesk's 3ds MAX or Maya, or LightWave 3D from NewTek, to name just a few: these programs enable the creation of 3D models of scenes and objects. These can be useful in their own right. Modern systems allow for highly realistic image creation, and just still images maybe all that is needed for many purposes — such as an architect's drawing of a proposed building or an engineer's gear-wheel. One point about rendering: pre-rendered scenes are rendered with the modelling software, such as MAX. You might do this for an architectural fly-through or film animation (*South Park*, for example, is created using MAX). The alternative is real-time rendering; here the scene is created using modelling software, but the rendering is done by perhaps very different software, in real-time. This is the case with games.

The way in which objects are constructed in a scene in software such as 3ds MAX can be considered as an extension of the methods of vector graphics. The most basic elements are

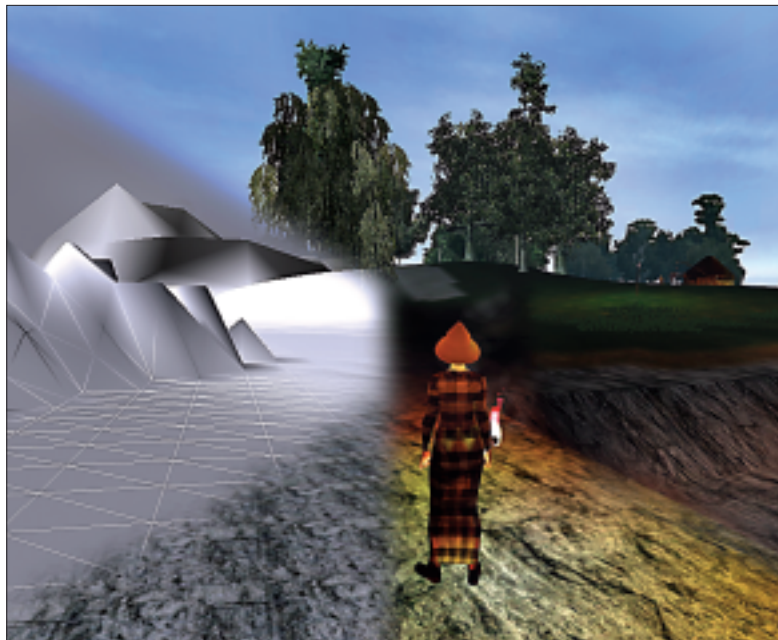
points (vertices), each with three coordinates, and the most basic surface feature is a triangle, defined by three such points. Although there are other ways of describing surfaces, and we'll touch on one of these later, we can consider the surfaces of all objects to consist of a patchwork of triangles. The more complex the surface, naturally the greater the number of triangles that will be needed.

You can create a complex object by building up one triangle after another — and sometimes getting down to low-level detail like this is necessary — but it is usual to construct models from basic primitives. One example: consider a gear-wheel; you could create a simple 2d (vector) line drawing of the cross section of the gear, either in the modelling software itself or import it from some CAD or other 2D drawing software. The shape is then extruded — it is given a third dimension by the software, stretched up, one could say, to give the 3D gear-wheel. In that automatic process, all the necessary vertices and triangles will be created by the software.

Modelling programs also allow for the creation of simple primitives directly —



Inside the basilica, again before and after rendering. Notice how, without proper lighting techniques in the edit window, the lighting appears flat and without character



This partially rendered image shows how simple geometry can be enhanced by the use of texture and bump maps

spheres, cubes, cylinders, pyramids, etc. These can then be combined together using Boolean operations, either additively or subtractively. An example: the gear-wheel will need a hole drilled in the centre for it to fit on a shaft. After the gear-wheel has been created, you then create an appropriately sized cylinder, position it in the centre of the gear-wheel, and subtract it from the gear with a Boolean operation. Again, this is done automatically, many new triangles are created and the gear wheel now has the appropriate hole – the two objects have been replaced by just one. Building up complex structures in this way tends rapidly to create large numbers of triangles, many of which are unnecessary. It is often useful to go in and do some low-level editing, and many applications provide some type of simplification or tidying-up procedure. The gear-wheel now needs some colour.

There are usually many factors associated with a surface – even with individual triangles – that give the final look when it is rendered. The most obvious is colour, but this is not as simple as one might at first think. The colour of an object when viewed depends on the light that is reflected from its surface. The process of colouring an object during rendering is called shading. The reason for this term is simple: consider a ball illuminated by a light on only one side. The ball will not have uniform colour all around, but the side facing the light will be bright, and the side away from the light will be dark, be in shadow. To render this properly, the colour needs to be shaded around the ball, from bright on one side to dark on the other. There

are many different software techniques for shading, which we do not need to go into here.

Also, the colour of the light that hits the object in the first place may itself not be pure white, and the two main ways in which objects reflect that light are referred to as diffuse and specular. Think of a piece of brass for our gear-wheel or other shiny metal. The general colour of the brass is due to diffuse reflection, but the polished metal also reflects similarly to a mirror – this will give rise, when lights and bright objects are present, to specular highlights visible on the brass surface. There is more to colour than this, but those are the basic principles.

Next, consider a polished piece of wood. This will have a general diffuse colour, possible specular highlights if it is well polished, and also a pattern due to the grain of the wood. The pattern is often produced in modelling by using a raster image – in this case, perhaps even a digital photograph of real wood. Such an image is called a texture map, and within the software it needs to be specified just how the image is applied to the object surface. For example, with a building you might well have a texture map of a few bricks, perhaps a square section, and this will need to be repeated – tiled – over the surface many times. In another example, the airline logo on the side of an aeroplane needs to be used just once, with a particular relative size and exact position.

This process of applying the image to the object – and there are many variations possible – is called mapping, and it is worth spending time to study all the methods and try each of them out when learning modelling. This process of applying textures and other maps is one of the key techniques in creating realistic models. Patience and attention to detail are vital, and will be well rewarded.

The grain in a piece of wood as just described is simply a texture map, but there are many other types of map that can be used. For example, the surface of a piece of gold will reflect objects behind the camera (the viewpoint from which the image is rendered). These reflections can be created by techniques such as ray-tracing – described later – or by the use of a reflection map. The software will add the reflected image to the main texture of the material from the reflection map.

There are many other types of map used, and the latest version of MAX provides for a total 19. But perhaps the next most important is the bump map. Here, the colours in the map are interpreted by the software as either bumps or indentations in the surface. The coordinates of the vertices are not changed by the map – there are of course other tech-



niques which do this — but the effect of bumps and indentations are created when the object is rendered. Bumps and depressions reflect light differently, and this is used to give the required effect. The rock in the lower right of the image of a lady standing on rocky ground in front of trees is a good example here. There is a texture map to give the colours and patterns in the rock, and a bump map to give the rock a rough-looking surface. In that image, the area to the left has not been rendered, and you can see the basic triangles from which the scene is constructed. Without bump mapping, a very much larger number of triangles would be needed to give a similar effect.

Another way of creating these effects is procedural mapping. Here, a mathematical function, or procedure, is used to create the required effect, instead of a raster image. This would not be appropriate for the logo on the side of an aeroplane — there is really only one way to do that — but it would be very suitable, for, say, the patterns in granite, or the ripples on the surface of water. One advantage of procedural mapping is its programmability. Just by changing the basic parameters — numbers — the resulting map changes; e.g. the granularity of the granite, the colour of and contrast between the grains. Also, these parameters can be changed throughout an animation to give special effects. So, a procedural map can be fine tuned in ways that are impossible with normal image-based maps. Mind you, instead of a single image, whole animations or videos can be used as a texture map, giving endless possibilities.

The two other vital components in any scene are cameras and lights. The camera is a fairly obvious concept, and is the viewpoint from which the scene is rendered. Naturally, you have considerable control over various parameters associated with any cameras — the effective focal length, position, angle of tilt, and so forth. All of these can also be animated.

The lighting in a scene is one of the most difficult things to get right, and deserves close study for anybody serious about modelling and animation. Basic lighting consists of ambient light — a general light present, such as the light from a cloudy sky — and then specific lights placed in a scene. Again, there is some considerable variety in the control you have over these lights, but this is not quite enough for realistic effects. A scene using standard lighting techniques simply looks rendered. Those images that are the most realistic use advanced techniques such as ray tracing and radiosity.

Both of these methods employ the physics of light. In ray tracing, each ray of light is

followed back from the viewpoint to its origin, in order to determine its colour and intensity. For example, looking at a painting on a wall, following back to a point on that painting, there will be a particular colour in the painting itself; the light falling on it may be composed of ambient light streaming in through the windows covered with yellow curtains, and this light will be reflecting off the pale blue walls of the room. The point here is that the colour and intensity of any ray of light depends on many factors, simply due to the fact that light is reflected from many surfaces, passes through some transparent materials, each of these subtly affecting the final colour. Ray tracing takes as many of these factors into consideration as possible. This method is also particular good when reflective surfaces such as mirrors are involved.

Radiosity also uses basic physics to combine together the effects of multiple light sources and surfaces, but it does so in a general sense, and not from the point of view of a camera. The results are added to the scene itself, rather like a general bitmap that is applied all over. Effects such as shadows, light coming through yellow curtains, and so forth, are handled well by this method, but it is only really suitable for diffuse surfaces, and not reflective surfaces — if the camera moves, the reflection will change, and so you will need to use a reflection map in such instances.

The big problem with radiosity is that if an object in the scene moves, then the results of the radiosity calculations are broken. These can take quite some time to compute — it is an iterative process, and the quality improves the longer the time you give the system. So, this method is suitable for applications such as an architectural fly-through of a building or other structure. The radiosity calculations are done just once, and then the camera is animated and moved through the scene. The calculations needed for radiosity are generally more compute intensive than ray tracing, and so when objects in the scene are animated, ray tracing is the preferred method.

The description that we have given here is from the point of view of software such as 3ds MAX. But there are other ways of representing objects in a scene. Maya is particularly good with what is called NURBS content. NURBS stands for non-uniform rational B-splines, and this is a method whereby curves and surfaces are represented mathematically rather than by collections of triangles; you can think of the comparison here between image-based maps and procedural maps. This is a procedural way of representing surfaces.

Animation In India

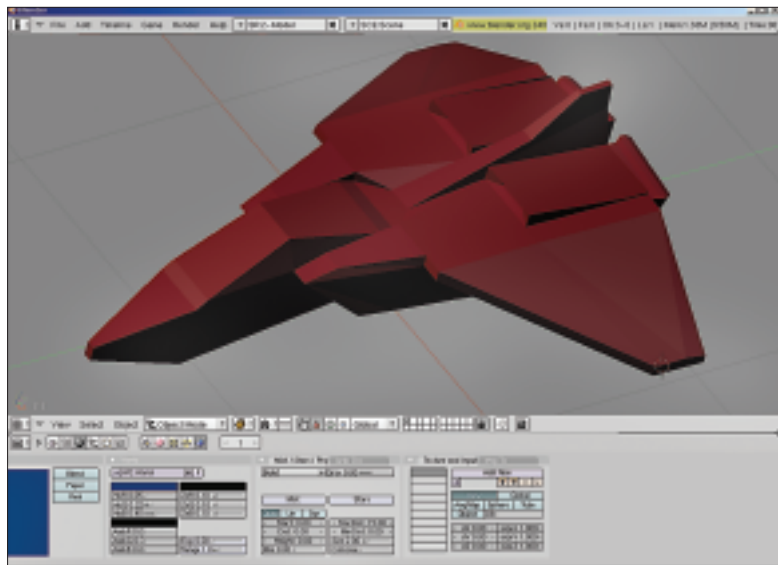
The quality of the finished product has improved so dramatically during the last few years that you have probably seen some CGI in a movie and did not realise that it was computer generated. As a result, the demand for 3D modelling and animation around the world has boomed. It is not just for the likes of dinosaurs in *Jurassic Park*, and new applications are cropping up all the time: games and other computer simulations, titles and intros for TV programs and films, advertisements, educational animations — even some airline safety videos are animated rather than using real actors. Particularly with Bollywood, there is a significant local demand for modelling and animation, but with this worldwide boom, thanks to the lower cost structures in India, a large amount of work is flowing into this country.

The total animation industry here is thought this year to be worth close to Rs 1,600 crore, and to be growing at 15 to 20 per cent per year — some parts of the market are thought to be growing at around 30 per cent. The problem is that we have a major skills shortage. One estimate suggests that this year the demand for animation professionals in India is around 300,000 — a huge increase over previous years, and the various training centres can hardly keep up.

So, there are great career opportunities here, and clearly the large number of training courses available are trying to meet the huge demand. However, although attending a course is important, it is not enough, and you simply need to get a great deal of practice in both modelling and animation. If you do end up working for an animation company, you will most likely need to use 3ds MAX or Maya. So, to get some practice, you should nip down to the local market and pick up a copy. Well, maybe not — this software is very expensive, but there are alternatives available at no cost at all, and these can be quite suitable for developing experience and skills in modelling. Going for a job interview with a satisfactory pass in some course is all very well, but how much better to present an impressive animation or model that you have developed yourself in your spare time.

Blender

The best place to start might very well be the open source modelling and animation package Blender ([www.blender.org](http://www.blender.org)). This is available in both 32- and 64-bit Windows and Linux versions and also for Mac OS X and Solaris. This has rich functionality, on a par with software such as MAX and Maya, although it also has a rather funky user interface — but that is



A 3D model in the open source program, Blender

typical of much open source software. The package is very well documented, with hundreds of pages of tutorials and documentation available for download and more information available on the Web site. The downloadable PDFs are very useful, but lacking some features of the software. Perhaps the Web site is kept more up-to-date.

The modelling uses standard meshes (primitives constructed from triangles), curves and surfaces using NURBS, and meta objects. The latter refers to a procedural method for defining surfaces; they are simply mathematical definitions. There are five basic types: ball, tube, plane, ellipsoid and cube. You can construct more complex objects by editing and combining these together, and then eventually convert to a standard mesh of triangles when satisfied with the basic model. Interestingly, meta objects interact with and influence each other when in close proximity, and there is a parameter called stiffness that determines just how strong these effects are. Basically, the surfaces that are close to each other move towards each other — they bulge out — and then combine in a fluid and uncomplicated manner (none of the artefacts than can develop when Boolean operations are performed on meshes). These effects can also be negative, where one surface pushes another away (without them actually touching).

This adds yet another type of control which may be suitable for certain types of model where polygon meshes or NURBS are not. Moving objects close to each other, the connections between them appear in real-time, and so this is a very fast method for developing certain combined effects — with Boolean operations you may have to repeat a process several times, undoing it each time,

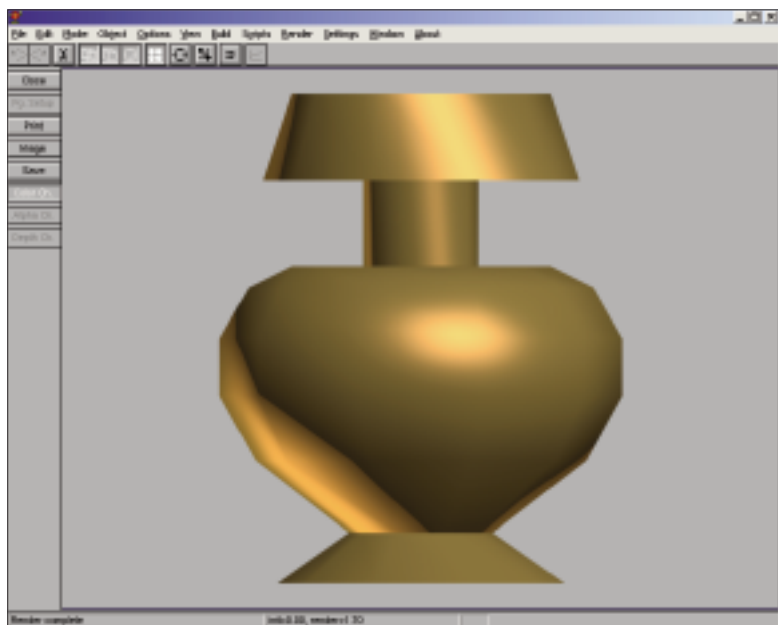
before you get it right. 3ds MAX users might be interested to know that files created in Blender can be exported to 3ds format and opened in MAX. The couple we have tried worked successfully, and so this makes this functionality available to MAX users. Some effects can be created using this method that would be quite difficult using MAX.

As far as lighting is concerned, Blender includes both ray tracing and radiosity for advanced lighting techniques.

### Anim8tor

Anim8tor ([www.anim8or.com](http://www.anim8or.com)) is a small free modelling and animation program (less than 2 MB!), with surprisingly good functionality, although far less than programs such as MAX and Blender. All you need do is run it from the desktop — there is no need for installation, or the installation of other modules as with Blender (that needs the Microsoft C++ runtime and Python). The current version number is 0.95, so clearly this software is still under development.

It is certainly very suitable for beginners, or those with not quite so demanding requirements for their models and animation. It would, for example, be very suitable for titles and simple animations for non-broadcast video productions, or for inclusion with business presentations. Documentation is provided on the Web site, and is also available for download. The downloadable manual is available in several languages other than English (Czech, Italian, Chinese, French, Portugese and Spanish) but it seems that only the English version matches the current progress in the software.



A simple model rendered within Anim8tor

There are also several tutorials on the Web site, some of which contain downloadable versions of the simple models that they describe. The site suggests a particular one (modelling an eggplant) as a good basis for learning the basics of modelling with a mesh, and it lives up to the claim quite well. A very good place to start.

Currently, there is no support for NURBS or other more sophisticated surface modelling techniques — this is strictly mesh-based modelling, but with the basic primitives such as spheres, cubes and so on.

According to the author, the most work needs to be done on the renderer, but the most important features are present for creating materials: ambient, diffuse and specular texture mapping, plus also emissive (when the surface itself radiates light), transparency and bumps. Considering that the software also supports some level of ray tracing, it is surprising that so much can be packed into 2 MB.

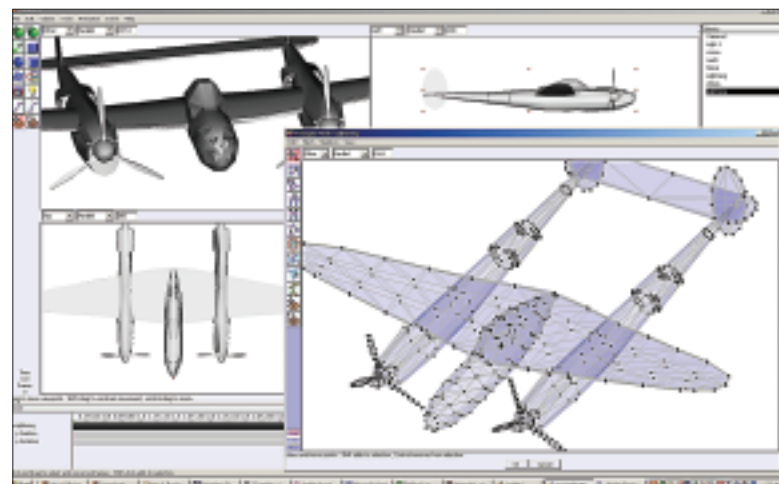
For compatibility with other software, Anim8tor can import the older 3ds formats from Autodesk 3D Studio, and also files from Lightwave and Wavefront. It can also export to 3D Studio and Wavefront formats.

### Art Of Illusion

Available for Windows, Mac OS X, Linux and Unix, the open source Art of Illusion ([www.artofillusion.org](http://www.artofillusion.org)) falls between Blender and Anim8tor in complexity. Surprisingly, it is written in Java, and is available free of charge under the General Public License. There is extensive documentation available on the Web site, that can also be downloaded, but unfortunately this is not in a straightforward PDF format, but as a large jumble of HTML files. This makes it difficult to search through, and also difficult to find your way around, until you find the contents page and realise that it is the main navigation point.

Also available are good step-by-step tutorials, which can also be downloaded. These are again collections of HTML files, but highlight the key areas quite successfully: basic modelling, working with meshes, Boolean operations, procedural textures, and so forth.

This software enables the usual mesh-based modelling, with cube, sphere and cylinder primitives. Not an impressive list for such otherwise sophisticated software, but it also includes useful editing techniques, spline-based meshes and Boolean functionality; no NURBS, however. Another interesting modelling technique that is provided is that of the skin. Here, you define a series of curves or other shapes — rather like a skeletal structure — and the software creates a triangle map skin that fits around these.



Art of Illusion. Here, a model is to be edited at a vertex and triangle level. An extra editing window has been opened by the software

Interestingly, the software opens up a second window when you want to go in and edit a model at the vertex and triangle level. When you start the program, it opens up a standard set of four modelling windows. These can be set easily as views from the right, left, front, and so on, and when you want to switch to a single view for closer work, there is a simple hotkey that toggles between the two views. This seems even easier than the MAX icon method, even to this nearly two decade 3D Studio veteran. Some thought seems to have gone into the general usability of this product.

Art of Illusion supports the usual texture maps, including reflection, transparency and bump mapping. It also uses procedural mapping, including 3D procedures, in which objects are affected perpendicularly to the surface. In the simplest terms, this can be considered to provide more sophisticated techniques along the lines of bump mapping — but much more powerful.

It also supports advanced lighting techniques: ray tracing and global illumination. Strictly speaking, global illumination is usually considered to be a generic term for all such methods such as ray tracing and radiosity, but in this context, the authors are referring to a technique similar to radiosity.

Unfortunately, you can only import files from Wavefront — so you will need Anim8tor to convert your 3D Studio files in order to import them, just as we have done with the illustrations used here.

We have included here three typical examples worthy of attention, across the range of functionality, but there are other free tools available on the internet, and it is worth searching to see what else might suit your purposes — OpenFX, for example, is certainly worth a look. ■

*edward.henning@9dot9.in*

The gaming images in this article were provided to *Digit* by Kerry Fraser-Robinson, founder of Red Bedlam Ltd ([www.redbedlam.com](http://www.redbedlam.com)), developers of the UK's first true 3D MMORPG, and one of the leading developers of virtual world middle-ware





## Belkin n527e

The n527e from Belkin is an exclusively gamers' keyboard – it does away with the rest of the board and retains just 15 fully customisable keys with a toggle to change between three keymaps. Some nice touches include a soft pad to rest your wrist on, tactile feedback from the keys, and a programmable 8-way thumbpad with a detachable joystick. Frag away for Rs. 3,227 only.

## Klipsch CS-700

The good guys at Klipsch picked up a bunch of accolades for their 2.1 CS-700 home theatre system. The system features a HDMI (High-Definition Multimedia Interface) 1080i output, along with a progressive scan technology to render entire frames at a time for churning out that high-quality, crisp video from DVDs. Supports all major formats, has a USB port for playback from USB sticks and PMPs, as well as the KlipschCast technology to transfer wirelessly high definition audio. Definitely worth every paise of the Rs 46,732 pricetag.



## TrekStor iBeat Organix

What happens when a German company that specialises in portable storage and MP3 players meets a Russian-Canadian billionaire who owns a Formula 1 team? You get the iBeat Organix, made of 18K gold, studded with 63 diamonds that add up to a carat, a few aquamarine gemstones thrown into the chain for good measure, two headphone jacks, 2 GB of memory, and a price of Rs 9,35,584.

## Nokia 5800 XPressMusic

The 5800 XPressMusic is Nokia's answer to Apple's iPhone. Featuring a large 3.2-inch touch screen display, the XPressMusic comes with features like an exclusive multimedia bar and stereo speakers with surround sound. The phone runs on the Symbian 9.4 OS, and can interface with 3G, HSDPA and WLAN. This phone is a steal at a tentative price of Rs 18,384.



## JBL Creature

JBL has a knack of making unconventionally designed speakers. The JBL Creature line is available in Red, Blue, Black, Aluminum and White, and their form defies description. There are pics on the Net where one of these is made to look like Darth Vader. Housed inside is a Tangential Strain Relief system for low distortion bass, and a neodymium magnet for that extra power and sensitivity. The speakers are meant for PMPs, laptops or desktops and are available for Rs 3,695.







## Wild Planet Spy Video Car

The people at Wild Planet keep making children's fantasies come true. The remote controlled Spy Video car has a range of 75 feet, an infra-red sensor, and a headset to view live video. The black version is available for Rs 4,210, but there is a limited edition translucent red version available for Rs 46,732.

## Alienware Area51

The flagship product of the Alienware line, the Area 51 is a gaming desktop for enthusiasts. We won't go into the specs of this one, same as you won't bother too much about what's under the hood of a Ferrari. We will instead talk about the looks, it is available in twelve colours, with a lighting system on the desktop that is programmable with effects and transitions. There are 3 million different looks you can give to the machine. The specs are customisable; the price goes upwards from Rs 70,122.

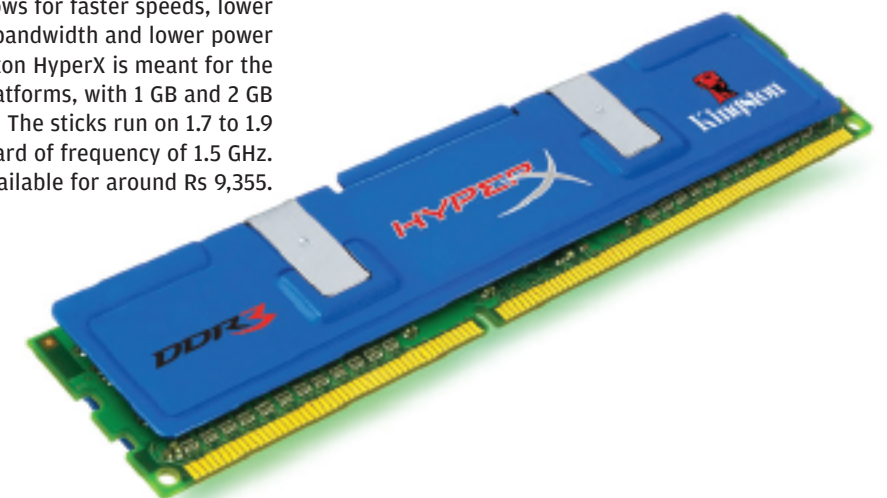


## Oregon Scientific ATC-1000

The ATC-1K is a video and still camera for those who want to record their extreme activities. Strap it onto the helmet, the handlebars, the limbs or any other unusual location, and record away at 640x480 resolution at 15 fps. It works on 4 AAA batteries, stores the video or photos on a standard memcard, comes with editing software and a cable to interface with a television, for Rs 11,601.

## Kingston HyperX DD3

DDR3 technology allows for faster speeds, lower latencies, a higher bandwidth and lower power consumption. The Kingston HyperX is meant for the enthusiast platforms, with 1 GB and 2 GB configurations available. The sticks run on 1.7 to 1.9 volts, but with an unheard of frequency of 1.5 GHz. The 2 GB kit is available for around Rs 9,355.



## Harman Kardon Soundstick II

The Soundstick II is a set of three speakers for the desktop with a sleek translucent plastic finish. It has a set of unique features with a capacitance touch interface and computer-optimised multi-band parametric equalisation to please the audiophile in you. Unfortunately it just about manages mono – no we're just kidding, it costs a mere Rs 5,145, and no, we are not kidding about that



Michael Browne

Last months' graphics card test was all about raw speed, blistering frame rates and pixel crunching power. Those cards were suitable for those looking at premium graphics performance and were willing to shell out for it. There's an adage – you pay for what you get. So hardcore gamers and anyone wanting a blazing fast video solution, whether for winning benchmarks or bragging rights, would be shopping for a GeForce GTX 280 or a Radeon HD 4870. Those looking for something cheaper would make do the GeForce 9800 GTX range of cards. But what about the casual gamer, the HTPC user or someone who isn't interested in gaming at all, but wants an entry level graphics card that speeds up his PC in general?

It's for you that we've conducted this test. Far away from 8x Antialiasing and *Crysis* there exists a world of moderation. Where PC users are looking to upgrade from bottleneck riddled integrated graphics to a better

**So you want DX 10 cheap eh? One of these will satisfy**

multimedia experience, the kind that can only arise from using a discrete graphics card. As you no doubt know, not only does a graphics card free up CPU utilisation and memory utilisation by adding a discrete GPU and video memory to the equation, but also aids any kind of multimedia activity. In fact, a discrete GPU will benefit your PCs performance more than a CPU that is say 50 per cent costlier. So if you have the choice of spending Rs 15,000 on a fast CPU or Rs 10,000 on a moderately fast CPU and Rs 5,000 on a graphics card, you should ideally opt for the latter. If we could clear one misconception it would have to be this arcane concept that 70 per cent of PC users have, that is a graphics card is solely for gamers. In India this percentage is

more like 90 per cent. There was a time when graphics cards were ridiculously priced; to the extent that anybody shopping for a PC for anything other than gaming would drop the idea totally. While the Indian prices aren't on par with US rates yet, we've noticed somewhat of an equalisation effect in force. Prices usually drop a few months after a product launch. This time round we've seen something that hasn't occurred in the past.

For the first time, prices of all graphics cards in general have fallen. Earlier a high-end card used to cost around the Rs 30,000 mark. Now with the entry of the Radeon HD 4870 and the GTX 260, truly powerful cards are available for as little as Rs 18,000 to Rs 25,000. And these aren't after price cuts; these new products debuted at these prices! Due to this, the mid-range now consists of some juicy offer-

ings at throw-away prices. The GeForce 9800 GTX is a good example. The mid-range is now the Rs 9,000 to Rs 15,000 mark – with a few exceptions. As a result the entry level has got even juicier. Another factor contributing to the value existing in this segment is the performance of the entry level options. Previously the phrase "entry level" was used in disdain by anyone even remotely interested in gaming, and with cards such as the GeForce 7300 GS and Radeon X1300 SE hovering around, we couldn't fault people thinking on these lines. After all, adding a graphics card should do *something* for graphics, right?

This time around, the entry level segment contains some meaty options for gamers in the form of NVIDIA's GeForce 9600 GT / GSO GPUs and ATI's Radeon 3850. The GeForce 9500 GT and 9400 GT bring up the rear for NVIDIA, while ATI has the Radeon 3650 cards. ATI did

send us a Radeon 4650 and 4550 to test, but for some reason we could not get these cards to work under DX 10 – we feel this is a driver issue, and the latest version of Catalyst (8.9) was unable to work these cards with 3D Mark Vantage or *Crysis*. Therefore we regret to inform you that we had to exclude these cards from the test. But look out for a *Bazaar* review as soon as we can get our hands on a working driver.

#### GeForce 9600 GT / GSO

*Shoestring performers*

Ever since its launch the 9600 GT has been a winner. With just 64 stream processors (SPs) this GPU featured a 256-bit GDDR3 memory interface and could actually match the 112 SP bearing GeForce 8800 GT. This GPU is based around a 65 nm fabrication process which means any card based on this GPU will run quite cool and a single slot cooling solution will

**If you have the choice of spending either Rs 15,000 on a fast CPU or Rs 10,000 on a moderately fast CPU and Rs 5,000 on a graphics card, you should ideally opt for the latter**

suffice. The 9600 GSO is a weird part. Its specifications cause us to wonder what exactly NVIDIA was thinking. On one hand they gave it 96 SPs – a bump up from the 9600 GT. On the other hand the memory bus width was butchered from 256-bits to 192-bits. This doesn't seem to make sense, as both these changes are counter-productive of each other. Since both these cores aren't too power hungry, they need a single six pin power connector.

#### Features

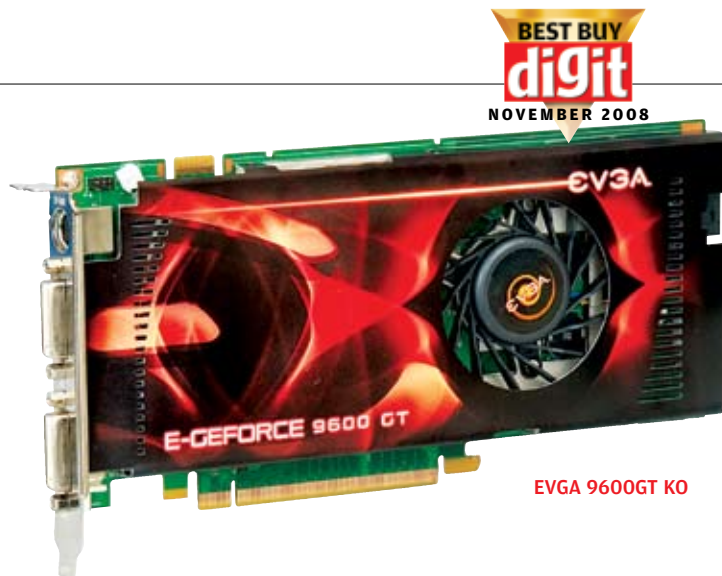
There were three 9600 GT cards and one 9600 GSO. Palit sent us both a 9600 GT and a 9600 GSO. Both cards had custom cooling solutions that really kept temperatures below what the stock cooling can achieve. Although these cooling solutions do take up an additional slot; making these cards dual slot solutions.

# DX10 ON A BUDGET



MSIs 9600 GT Zilent was unique – it had no fan, only a large heatsink with embedded heatpipes. Although HTPC users will appreciate the lack of a fan (read silence) the bulk of the cooling solution means you can't install this card inside a typically compact HTPC cabinet. EVGA was the only vendor to send us a card with NVIDIA's reference cooler – although this solution is adequate for the 9600 GT, there was a hike of around 10 degrees centigrade on the GPU core temperature when the card was stressed with benchmarks. All these vendors supplied the necessary cables to get you started and the *de facto* DVI to D-Sub connector. Palit was the only vendor who thought it worthwhile to bundle a game – their 9600 GT SONIC 1 GB came with *Tomb Raider Anniversary Edition*. This card also had HDMI and Display Port connectivity on the rear panel – a huge plus for anyone looking to hook this up to a large screen display. An optical out for audio was also provided – this is something

**With two DVI connects, an HDMI port and a Display Port the Palit 9600 GT SONIC 1 GB is fully loaded. An optical out port is also provided for audio**



EVGA 9600GT KO

new, that takes advantage of the inbuilt 7.1 audio decoding that all NVIDIA GeForce 8 and 9 series cards support.

#### Performance

All these cards feature GDDR3, although Palit's 9600 GT SONIC had 1 GB of video RAM, while the other two 9600 GTs had 512 MB each. The Palit 9600 GSO SONIC has 384 MB of 192-bit RAM. All the 9600 GTs had their cores clocked at a lively 700 MHz while the 9600 GSO had a core clock of 600 MHz. As expected

the 9600 GTs performed very closely to each other with very little to choose between them. The 9600 GSO trails some way behind in most benchmarks except in *Crysis* and *Company Of Heroes* which are shader intensive games. Here, presumably its lack of memory bandwidth is made up for by the extra SPs on the GPU, although it cannot overtake the trio of 9600 GTs. In terms of raw speed Palit's 9600 GT SONIC 1 GB was the fastest card amongst the foursome; EVGA trails by a hairsbreadth.

### How We Tested

#### Test Configuration

**CPU** – Intel Core 2 Duo Extreme X6800 (2.93 GHz)  
**Motherboard** – ASUS Rampage Extreme (Intel X48 Express Chipset)  
**RAM** – 2 x 2 GB OCZ DDR3 1600 MHz  
**HDD** – WD Raptor 80 GB (10,000 RPM, SATA)  
**Windows Vista Ultimate 64-bit**  
**Monitor** – Samsung SyncMaster 997DF

Below are the benchmarks we used, along with a brief description, if necessary.

#### Crysis

The most feared game for its ability to kill even the most powerful cards. One of the best looking games ever built, with great shader quality and amazingly realistic environments and effects, as well as incredibly detailed characters and gameplay. Visually stunning.

#### Unreal Tournament 3

Using the next gen *Unreal Engine 3*, UT3 is a game not to be missed. Its faster than its predecessors, and visually splendid too.

#### S.T.A.L.K.E.R. Shadow Of Chernobyl

The X-Ray engine by GSC gameworld – an open ended explor-

ative experience, this game has incredible detailing, expansive maps and an eerie kind of ambience, especially when roaming its environs at night. The bleak, scarred landscape is brought to life with some beautifully done shaders and texturing. A superb looking game.

#### Company Of Heroes: Opposing Fronts

One of the best looking RTS games, brilliant detailing, and very realistic enemy AI. An absolute gem of a game with eye candy to kill for.

#### World In Conflict

Perhaps the only RTS game that is the equivalent of *COH* in terms of visual appeal, this one has large scale, highly detailed battles.

#### F.E.A.R Perseus Mandate

Atmospheric, dark and gloomy and still unforgiving on older cards, *F.E.A.R.* is still the best in the business when it comes to close quarters firefights and scaring your lights out with some incredible visual effects. Great shadows, realistic combat, and very immersive.

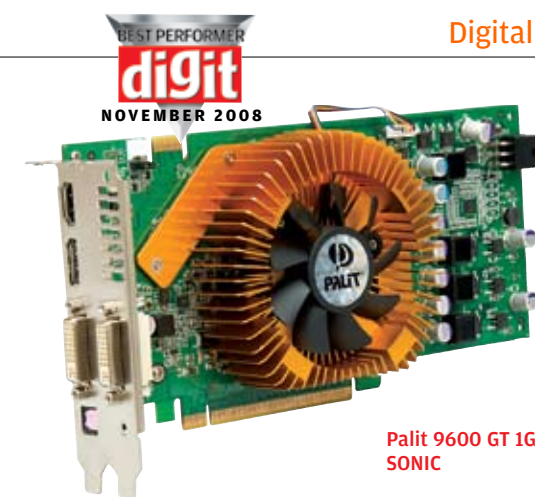
#### 3D Mark Vantage

Future Marks new 3D benchmarking standard, very taxing on older cards. Showcases DX10 shaders very well.

#### GeForce 9500 GT

*Kill the middleman*

NVIDIA's GeForce 9500 GT – the replacement to the GeForce 8500 GT is basically an entry level solution that should be kept away from all but the most cash deprived gaming PCs. This card is meant for a multimedia PC or an HTPC – these usage patterns suit its limited 3D performance better. Based around 32 SPs and a 128-bit memory interface the 9500 GT is a single slot card that does not require additional power over and above what the PCIe bus can supply. These cards are 65 nm parts so heat isn't an issue. We were surprised to see all the 9500 GT-based cards were full profile ones. In our



Palit 9600 GT 1GB SONIC

opinion an HTPC should ideally utilise a half profile card since most HTPC cabinets are really tiny.

#### Features

We had a round figure of ten 9500 GT-based cards. Calibre

had the most attractive looking 9500 GT; their card has a neat looking heatpipe cooling solution that is reasonably compact and utilises a small fan. The only downside is that the card is noticeably heavier than the stock cooling solution. In terms of cable and connect bundling Palit and POV were the two main culprits – their bundling was rather skimpy. Sadly none of the vendors thought it important to bundle any games with these cards. Since this cuts into their margins; it's understandable why such exclusions are made for what are perceived as value cards. The Calibre 9500 GT has a display panel bundled that gives important information on the clock speeds of the card.

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Entry-level Graphics Cards										
Brand Model Name	EVGA 9600GT KO	MSI 9600GT ZILENT	Palit 9600 GT 1GB SONIC	Palit 9600 GSO SONIC	Calibre 9500GT	GIGABYTE 9500GT OC	Palit 9500 GT SUPER	Palit 9500 GT SUPER 1 GB	POV 9500 GT 512MB DDR2	Sparkle 9500GT
										
GPU Name	9600 GT	9600 GT	9600 GT	9600 GSO	9500 GT	9500 GT	9500 GT	9500 GT	9500 GT	9500 GT
Price (Rs)	7500	13000	8750	6500	6250	8500	4250	5350	4250	4100
Total Score (Out of 100)	79.59	77.55	80.00	67.76	37.75	28.47	23.17	23.38	23.13	24.27
Features (Out of 30)	23.88	23.26	24.00	20.33	11.33	8.54	6.95	7.01	6.94	7.28
Performance (Out of 70)	55.71	54.28	56.00	47.43	26.43	19.93	16.22	16.37	16.19	16.99
Features										
Core Speed (MHz)	700	700	700	600	600	650	550	550	550	550
Memory Speed (MHz)	1900	1900	2000	1600	1800	1800	800	800	800	800
No Of Stream Processors	64	64	64	96	32	32	32	32	32	32
VRAM Type	GDDR3	GDDR3	GDDR3	GDDR3	GDDR3	DDR2	DDR2	DDR2	DDR2	DDR2
Amount of VRAM (In Megabytes)	512	1024	1024	384	512	512	512	1024	512	512
Memory Bus Width (In Bits)	256	256	256	192	128	128	128	128	128	128
GPU Fabrication Process	65nm	65nm	65nm	65nm	65nm	65nm	65nm	65nm	65nm	65nm
No of DVI Ports	2	2	2	2	2	2	1	1	1	1
Dual Monitor Support (Y/N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
HDMI (Y/N)	N	Y (Adapter)	Y	N	N	Y (adapter)	N	N	N	N
Accessory / Connector Bundle	S-Video to component adapter, 4 pin power adapter, DVI to D-Sub adapter	S-Video to component adapter, 4 pin power adapter, DVI to D-Sub adapter	4 pin power adapter, DVI to D-Sub adapter	S-Video to component adapter, 4 pin power adapter, DVI to D-Sub adapter	S-Video to component adapter, 4 pin power adapter, DVI to D-Sub adapter, Composite Video Cable	DVI to D-Sub adapter	NA	NA	NA	S-Video to component adapter, 4 pin power adapter, DVI to D-Sub adapter
Game Bundle	N	N	Tomb Raider	NA	N	N	N	N	N	N
Performance										
Crysis										
1280 x 1024 (Max Detail, 4x AA)	26.26	25	26.44	24.56	11.1	7.34	6.03	6.45	6.09	6.49
1024 x 768 (Max Detail, No AA)	34.21	33.4	34.46	32.66	14.66	11.09	9.12	9.21	8.99	9.2
Unreal Tournament 3 (Deimos)										
1280 x 1024 (8 xAF, 4x AA, Max Detail)	93	93	93	85	50	40	33	33	32	33
1024 x 768 (4x AF, No AA, Max Detail)	103	102	102	96	72	57	49	51	48	49
S.T.A.L.K.E.R. Shadow of Chernobyl										
1280 x 1024 (4xAF, 4x AA, Max Detail)	116.93	111.37	117.61	92.93	56	44	35.13	34.64	31.61	36.43
1024 x 768 (4x AF, No AA, Max Detail)	159.85	151.34	159.37	130.72	80.22	63.58	51.68	50.35	54.97	53.85
Company of Heroes: Opposing Fronts										
1280 x 1024 (4x AF, No AA, Max Detail)	119.3	113.4	112.9	106.1	56	48.3	40.4	41.2	41.4	40.6
World In Conflict										
1280 x 1024 (4x AF, 4x AA, Max Detail)	27	27	28	19	14	9	7	7	7	8
1024 x 768 (4x AF, No AA, Medium Detail)	52	54	52	45	31	43	46	46	46	39
F.E.A.R (Avg FPS)										
1280 x 1024 (4x AA, 4x AF, Max Detail)	100	96	101	72	46	34	26	27	26	28
3D Mark Vantage (GPU Sco re)	4175	3940	4183	3723	1767	1417	1118	1028	1132	1137

Performance

OnlyCalibre,GigabyteandZOTAC fiddled with the GPU cores of their cards – while Calibre boosted clocks from the default 550 MHz to 600 MHz, both Gigabyte and ZOTAC went with healthy overclocks of 100 MHz over stock speeds. One very important fac-

tor affecting these cards’ performance (as we discovered) is their memory subsystems. Since these are low end chipsets all vendors have fiddled around with memory options. Some have offered DDR2 memory which adversely affects bandwidth and therefore overall performance. Only three

vendors supplied fast GDDR3 memory with their cards – XFX, Calibre and ZOTAC and these cards were the fastest in this category. In fact the difference that GDDR3 makes is startling – and makes a strong advertisement for advocating its use over DDR2 memory.

GeForce 9400 GT

Not for gaming

The GeForce 9400 GT is a value chipset intended to replace the ageing GeForce 8400 GS which has done a stellar job of keeping the entry-level segment firmly in NVIDIA’s grasp.

Anyone looking for a graphics card that can handle the demands of a multimedia PC or an HTPC will definitely not want something costly. The GeForce 8400 GS can be had for as little as Rs 1,800. For a graphics card with DX 10 support, 16 SPs and 128 MB of dedi-

cated video memory we feel this isn’t a bad deal. The 9400 GT adds a little more performance to the 8400 GS while reducing the already miniscule power requirements. Although people interested in gaming should not look at these cards we reckon they can handle most of the



Entry-level Graphics Cards										
Brand	XFX PV-T9FG-UDF3	Zebronics 9500GT	ZOTAC 9500GT	ZOTAC 9500GT AMP	GIGABYTE 9400GT	POV 9400GT	Sparkle 9400GT	XFX PVT94G-YAL3	ZOTAC 9400GT	ASUS EAH3850 SMARTOC
Model Name										
										
GPU Name	9500 GT	9500 GT	9500 GT	9500 GT	9400 GT	9400 GT	9400 GT	9400 GT	9400 GT	HD 3850
Price (Rs)	6000	3900	4666	5333	5900	3500	3400	4500	3666	8775
Total Score (Out of 100)	29.27	17.96	24.52	36.57	17.62	15.30	16.73	17.13	16.11	49.58
Features (Out of 30)	8.78	5.39	7.36	10.97	5.28	4.59	5.02	5.14	4.83	14.87
Performance (Out of 70)	20.49	12.57	17.17	25.60	12.33	10.71	11.71	11.99	11.27	34.71
Features										
Core Speed (MHz)	550	550	550	650	550	550	550	550	550	668
Memory Speed (MHz)	1600	532	1800	1800	800	666	800	800	800	990
No Of Stream Processors	32	32	32	32	16	16	16	16	16	320
VRAM Type	GDDR3	DDR2	GDDR3	GDDR3	DDR2	DDR2	DDR2	DDR2	DDR2	DDR2
Amount of VRAM (In Megabytes)	256	512	512	512	512	512	512	512	512	1024
Memory Bus Width (In Bits)	128	128	128	128	128	128	128	128	128	256
GPU Fabrication Process	65nm	65nm	65nm	65nm	NA	NA	NA	NA	NA	55nm
No of DVI Ports	2	1	2	2	2	1	1	1	1	2
Dual Monitor Support (Y/N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
HDMI (Y/N)	N	N	Y (adapter)	Y (adapter)	Y (adapter)	N	N	N	Y (adapter)	Y (adapter)
Accessory / Connector Bundle	S-Video to component adapter, 4 pin power adapter, DVI to D-Sub adapter	S-Video to component adapter, 4 pin power adapter, DVI to D-Sub adapter	S-Video to component adapter, DVI to D-Sub adapter	S-Video to component adapter, 4 pin power adapter, DVI to D-Sub adapter	S-Video to component adapter, 4 pin power adapter, DVI to D-Sub adapter	S-Video to composite cable, DVI to D-Sub adapter	S-Video to composite cable, DVI to D-Sub adapter	NA	S-Video to component adapter	S-Video to component adapter, 4 pin power adapter, DVI to D-Sub adapter
Game Bundle	N	N	N	N	N	N	N	N	N	N
Performance										
Crysis										
1280 x 1024 (Max Detail, 4x AA)	7.53	4.65	7.32	9.43	4.1	3.86	4.12	3.98	4.19	14.14
1024 x 768 (Max Detail, No AA)	11.28	7.04	7.3	13.45	5.89	5.45	5.6	5.84	5.68	21.1
Unreal Tournament 3 (Deimos)										
1280 x 1024 (8 xAF, 4x AA, Max Detail)	45	24	43	51	23	22	23	23	23	70
1024 x 768 (4x AF, No AA, Max Detail)	64	36	64	73	35	31	34	34	34	84
S.T.A.L.K.E.R. Shadow of Chernobyl										
1280 x 1024 (4xAF, 4x AA, Max Detail)	50.72	24.97	25.4	58.55	26.88	24.64	26.34	26.59	26.72	61.45
1024 x 768 (4x AF, No AA, Max Detail)	73.79	36.54	36.4	83.29	38.56	36.48	38.72	38.03	38.13	83.59
Company of Heroes: Opposing Fronts										
1280 x 1024 (4x AF, No AA, Max Detail)	45.3	30.8	32.1	57.7	26.1	23.4	25.7	25.2	25.1	65
World In Conflict										
1280 x 1024 (4x AF, 4x AA, Max Detail)	8	8	12	14	11	6	8	10	6	15
1024 x 768 (4x AF, No AA, Medium Detail)	53	23	21	33	29	22	25	27	23	53
F.E.A.R (Avg FPS)										
1280 x 1024 (4x AA, 4x AF, Max Detail)	42	17	39	48	24	23	24	24	24	58
3D Mark Vantage (GPU Score)	1546	743	1382	1859	683	641	680	669	677	3341

older games easily. In fact in case you play games like Team Fortress or Warcraft 3 online; you'll find this card can handle such games easily. The fact that the 9400 GT can easily handle HD and Blu-Ray content and speed up Vista's Aero interface are serious pluses.

Features

There were five 9400 GT based cards altogether; Gigabyte, POV, Sparkle, XFX and ZOTAC each sent us one. We were pleased to see all the vendors aside from XFX providing decent connector bundles with their cards. Nobody provided any games.

Only Gigabyte and ZOTAC provide HDMI adapters which can be used to connect one of the two DVI ports to a large screen display – good for an HTPC.

Performance

All these cards came with their cores clocked at 550 MHz. Their

memory was clocked at either 666 MHz or 800 MHz. What was interesting was that each card had a huge 512 MB of video RAM. Not that this does much, since a meagre 16 SPs cannot provide enough pixel crunching power to keep the memory subsystem busy. We





figure a 256 MB version of these cards should suffice. In terms of raw performance the 9400 GT isn't too hot. Four fps in Crysis isn't exactly a gamers dream. Equally unplayable was World In Conflict, while UT 3 is barely unplayable.

Radeon HD 3850

Memoirs of Yesteryear

ATI's Radeon HD 3850 is the Agrizzled veteran in this comparison. This card has been around for some time, ever since it's faster sibling the Radeon HD 3870 was unable to steal the lime-



Entry-level Graphics Cards				
Brand Model Name	Palit HD3850 Super	PowerColor HD 3850	Sapphire HD3850	GeCube 3650
				
GPU Name	HD 3850	HD 3850	HD 3850	HD 3650
Price (Rs)	5950	6900	6900	4650
Total Score (Out of 100)	58.95	69.66	65.36	20.91
Features (Out of 30)	17.69	20.90	19.61	6.27
Performance (Out of 70)	41.27	48.76	45.75	14.64
Features				
Core Speed (MHz)	670	720	668	725
Memory Speed (MHz)	1660	1800	1656	800
No Of Stream Processors	320	320	320	120
VRAM Type	GDDR3	GDDR3	GDDR3	DDR2
Amount of VRAM (In Megabytes)	512	512	512	1024
Memory Bus Width (In Bits)	256	256	256	128
GPU Fabrication Process	55nm	55nm	55nm	55nm
No of DVI Ports	2	1	2	2
Dual Monitor Support (Y/N)	Y	Y	Y	Y
HDMI (Y/N)	Y	Y	Y (adapter)	N
Accessory / Connector Bundle	S-Video to component adapter, 4 pin power adapter, DVI to D-Sub adapter	S-Video to component adapter, 4 pin power adapter, DVI to D-Sub adapter	S-Video to component adapter, 4 pin power adapter, DVI to D-Sub adapter	S-Video to component adapter, 4 pin power adapter, DVI to D-Sub adapter
Game Bundle	N	N	N	N
Performance				
Crysis				
1280 x 1024 (Max Detail, 4x AA)	16.92	18.83	17.74	6.01
1024 x 768 (Max Detail, No AA)	24.68	27.1	24.68	8.95
Unreal Tournament 3 (Deimos)				
1280 x 1024 (8 xAF, 4x AA, Max Detail)	80	82	80	32
1024 x 768 (4x AF, No AA, Max Detail)	82	86	88	46
S.T.A.L.K.E.R. Shadow of Chernobyl				
1280 x 1024 (4xAF, 4x AA, Max Detail)	80	85.62	78.9	26.69
1024 x 768 (4x AF, No AA, Max Detail)	107.6	113.01	105.5	37.84
Company of Heroes: Opposing Fronts				
1280 x 1024 (4x AF, No AA, Max Detail)	82.5	90.4	81	25.9
World In Conflict				
1280 x 1024 (4x AF, 4x AA, Max Detail)	19	34	32	8
1024 x 768 (4x AF, No AA, Medium Detail)	53	66	70	36
F.E.A.R (Avg FPS)				
1280 x 1024 (4x AA, 4x AF, Max Detail)	75	83	77	20
3D Mark Vantage (GPU Score)	3633	3956	3609	829

light away from the 8800 GTX and its ilk. Although at first glance its core specifications seem to put it into a league of performance cards the reality wasn't so for ATI – sadly the HD 3870 failed, and so did the HD 3850 from its allotted task to steak the GeForce 8800 GT's thunder. With

a GDDR3 memory interface and a whopping 320 SPs the Radeon HD 3850 has seen a huge fall from grace...and price. Cards based on this GPU are actually terrific bang for buck. The only demerit is these cards run hotter than the GeForce 9600 GTs, of course they're older chipsets as well.

Features

We got four Radeon HD 3850 based cards – one each from ASUS, Palit, Sapphire and PowerColor. ASUS and Sapphire provide DVI to HDMI adapters. The other two i.e. Palit and PowerColor actually provide an HDMI port on the rear panel of their cards. PowerColor

provides a D-Sub port too, at the expense of one DVI port. All vendors supply all the necessary cables and connectors though nobody bothers with any games.

Performance

ASUS uses DDR2 RAM on their HD 3850 and give you an extra 512 MB. All other vendors use faster GDDR3 memory and make do with 512 MB. PowerColor overclocked their card to a 720 MHz core; all other vendors kept their cards at the default 670 MHz. As expected the ASUS HD 3850 was noticeably slower than the other cards because of its slower memory. This shows that just having more RAM isn't a guarantee of performance – the memory should be clocked fast

too. This also proves that today's games are bandwidth hogs. It's also possible that the extra frame buffer isn't being used by those 320 SPs. Besides Crysis and World In Conflict this card can handle all the games we tested it's performance under. We noticed these cards are noticeably slower than the 9600 GT and 9600 GSO GPUs.

Radeon HD 3650

Not so golden oldie

The HD 3650 was intended as a mid-range offering after ATI had mediocre success with the Radeon HD 2600 XT. As a DX 10 part the HD 3650 has 120 SPs, which may seem a lot, but as we've seen before the num-

Entertainment system killer...the HTPC?

By now you must be sick to death about us spewing expletives about just how good an HTPC really is and how everyone interested in a cinematic experience at home should get one. So why is an HTPC special? If you assemble one which components in your home theatre system become obsolete? Can an HTPC better a home theatre system? The fact is that an HTPC is meant to deliver great bang for buck for those looking to up to Rs 1,00,000 on a media source. By source we mean the DVD/Blu-Ray player. Obviously you'll still need killer surround sound and a large screen LCD or Plasma display capable of 1080p natively. Anything less these days is a waste of popcorn; not to mention time.

Suppose you have a set of 5.1 speakers and a 55-inch plasma screen. Or maybe you went overboard and bought a 1080p projector and a projection screen with a 120-inch display area. Now you need a player. Here's where the HTPC seriously kicks any sources bottom – you simply cannot match an HTPC for performance and versatility. If you simply want to watch Blu-Ray content, a Blu-Ray player costing around Rs 20,000 will do the trick. But what about when you want to watch an HD movie that is not encoded by any format recognised by your player? Or you have an HD file that's encoded at a non-standard HD resolution like say 1440 x 720 pixels. Your player can only play 720p/720i (1280 x 720 pixels) or 1080p / 1080i (1920 x 1080 pixels). So you're stuck. What if you download a really good movie that's in some non-standard format or resolution? You can do nothing because your player will not play it.

A computer, with its infinite software decoding capabilities can help you out of this situation. Windows Media Player, VLC, Real Player and PowerDVD working in conjunction with each other can play almost any format and any resolution. A simple dual core processor, 1 GB of RAM and anything later than a GeForce 8 series card or Radeon HD 2xxx series card will easily do the trick. HTPC cabinets along with media centre remote units are available for as low as Rs 6,000. Install a Blu-Ray drive and you can play Blu-Ray content of your optical drive as well, else you can always rip movies and store them. Such an HTPC can also double as a download box – though you will need a larger hard drive, maybe two. An HTPC with a decent graphics solution can also be used to game occasionally. HDMI is a must for large screen entertainment as most displays have this standard. We suggest you give an HTPC a try, before throwing cash away on other video sources.

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ber of SPs isn't always indicative to performance especially when comparisons between brands are made. Based on a newer 55 nm fabrication process this GPU stays quite cool, and should be suitable for multimedia and HTPC users.

### Features

GeCube was the only vendor to send us a card based on the core. This card came with all the necessary cables and connectors although we missed HDMI connectivity. The bundle was minus any games.

### Performance

We were interested to compare this card with NVIDIAs GeForce 9500 GT and 9400 GT offerings. Although it's one generation older and ATI has already replaced this GPU with the new Radeon 4650 and 4550 GPUs (which we just couldn't get working) we wanted to see if the Radeon 3650 could hold its own. While it is a slightly superior offering to the GeForce 9400 GT it doesn't hold a candle to the faster 9500 GTs. It's superiority to the 9400 GT based cards is noticeable in 3D *Mark Vantage*, *World In Conflict* and *Crysis*; all of which are heavily stress shader performance. At Rs 4,650 it's no gamers' card, and even at that price you will find much better options for gaming from amongst the GeForce 9500 GT range. What it is, is a super cool running card that hardly consumes any power – perfect for non-gamers who need the goodness of discrete graphics.

### And Our Choice For You Is

Our *Best Performer* was Palit's 9600 GT SONIC 1 GB – the fastest entry level card priced at Rs. 8,750. However, the EVGA 9600 GT steals the limelight when it comes to value for money. For a mere 0.5 percent or so less performance this card is a whopping Rs. 1250 or 20 percent cheaper. EVGA has struck gold with their 9600 GT. Gamers looking to build good gaming rigs that don't rip your pocket should definitely consider the EVGA 9600 GT. MSIs 9600 GT Zilent was only slightly slower than the other two 9600 GT solutions but costs pretty penny (Rs 13,000); steer clear of this one. If you're looking to play online games like MMORPGs and such, the EVGA 9600 GT should be your choice; its not very power hungry and should easily run most games at medium resolutions. For connectivity options Palit's 9600 GSO SONIC is hard to beat – with DVI, D-Sub, HDMI and Display Port connects this card has all bases covered. ATI doesn't make a very strong name for itself here but if you're a fan of the brand PowerColor's HD 3850 is your best bet for a decent gaming experience. Priced at Rs 6,900 it's also a little cheaper (though quite a bit slower) than offerings from EVGA and Palit.

For a budget of around Rs. 5,000 it's hard to ignore ZOTAC's 9500 GT AMP! Edition. At Rs 5,333 this card will easily play older games and is very suitable for someone wanting to try his hand at gaming. Alternately Calibre's 9500 GT offers a little more performance

and a cool display unit for a small premium of around Rs 900. Anyone looking for something an HTPC class card should look at the GeForce 9400 GT cards. We recommend either ZOTAC or Sparkle as brands. ZOTAC has the advantage of offering an HDMI adapter, while Sparkle has a slightly cheaper card which is also the cheapest graphics card in our labs this month.

### To Wrap Up

These are interesting times. While the entry level cards generally do not cause much of splash we've already seen decent performance throughout the spectrum of even dirt cheap cards. Anyone looking at using Windows Vista or using their computer as an HTPC should seriously consider including a graphics card into the budget. Sadly we couldn't get working drivers for the HD 4650 and 4550 cards we received from ATI, and the 4670s have not yet hit our market. NVIDIA too, is lagging with providing us with new entry level offerings based on their GTX 2xx architecture. With more and more users jumping on the *general purpose* PC bandwagon we feel the need for graphics cards in this country is only going to burgeon. Then there's the unknown equation of DX 10.1 and DX 11 lurking on the yet unseen horizon. Thankfully, if you're reading this, you aren't really a hardcore gamer, and future antics of Microsoft aren't really going to affect your fun any. Ditch the DVD player – the age of the HTPC is here. ☒

michael.browne@9dot9.in



### Contact Sheet

### Graphics Cards

Brands	Company	Contact No	Email	Website
ASUS	ASUS Technology Pvt. Ltd.	022 - 6766 8800 / 18002090365 (toll free)	Media_india@asus.com	http://in.asus.com/
Calibre	Abacus Peripherals Pvt. Ltd.	40914600 / 40914613	megha@abacusperipherals.com	www.abacusperipherals.com
EVGA	TIRUPATI ENTERPRISES	9339207519	mail@tirupati.net	www.tirupati.net
GeCube	TIRUPATI ENTERPRISES	9339207519	mail@tirupati.net	www.tirupati.net
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MSI	MSI	011-41758808/09	marketing@msi-in.com	www.msi-india.com
Palit	TIRUPATI ENTERPRISES	9339207519	mail@tirupati.net	www.tirupati.net
Point Of View	TIRUPATI ENTERPRISES	9339207519	mail@tirupati.net	www.tirupati.net
PowerColor	AMD Far East Ltd	9820643424	amit.jaokar@amd.com	www.amd.com
Sapphire	Aditya Infotech	9311282911	Sanjay.gogia@adityagroup.com	adityagroup.com
Sparkle	Abacus Peripherals Pvt. Ltd.	40914600 / 40914613	megha@abacusperipherals.com	www.abacusperipherals.com
XFX	Rashi peripherals Pvt.Ltd	022-67090909	response@rptechindia.com	www.rptechindia.com
Zebronic	Zebronic	044-26616201/42042265	enquiry@zebronic.info	www.zebronic.net
ZOTAC	ZOTAC International (MCO) Ltd.	011- 46665666	sales@zotac.com	www.zotac.com



# Colour Management in Adobe and Corel Products

**Terry Relph-Knight**

Aside from any OS supported colour management such as the ICM in Microsoft Windows XP or WCS in Vista, at the heart of any user controlled colour management system is some form of image editing software. Most frequently, for Microsoft Windows users this will be Adobe Photoshop (now at version CS4). A good and rather cheaper alternative is available from Corel. Linux users have the strangely named GIMP (GNU Image Manipulation Program) which does now include some colour management functions.

This article takes an in-depth look at colour management in both Adobe and Corel products. Without relating these colour settings to colour management principles, it can be difficult to understand what they do and the choice, number and combination of user settings can be totally bewildering. Comparing the approaches of two competing image editing products is also very helpful in understanding how colour management works in practice.

## Adobe And Corel Products

Digital still images are either bitmap or vector based, with bitmaps being used for photographic images and vectors for design graphics and text. Adobe are perhaps best known for their bitmap based photo editing software – Photoshop, while Corel are known for their vector based graphics design program – CorelDRAW. Both products are powerful image manipulation tools and because of the number of supported features have quite a steep learning curve. Many graphics design professionals use both programs and move image files between the two. A clear knowledge of the colour management in each product is required to be able to do this successfully.

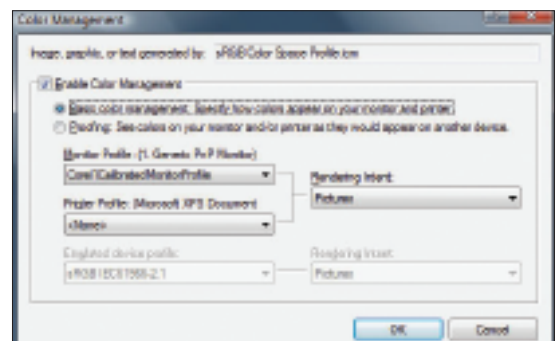
In addition to their flagship products both companies market a range of image and graphics design bitmap and vector based software that also incorporates colour management.

For example Illustrator is Adobe's vector graphics design and editing program. Although Corel include a bitmap photo editor, Photo-Paint X4, with the CorelDRAW Graphics Suite X4, they also sell Paint Shop Pro, a stand-alone bitmap photo editor. Because some of these products started life in development by other companies and were bought up by Adobe and Corel, the way that colour management was implemented was not entirely consistent across the product range. For example Paint Shop Pro does not use the excellent flow chart diagram found in CorelDRAW to represent the colour work flow, but rather three menu branches – Color Management, Color Working Space and Monitor Calibration all of which access their own control panel windows. This menu branch is reached from the top line application menu through clicking File > Color Management (or using the [ Alt ] + [ F ] + [ G ] control keys).

Adobe have made more effort to integrate colour management across their product range. The Adobe Creative Suites include Adobe Bridge, a program that automatically synchronises colour settings across applications.

Unfortunately, in a perhaps misguided attempt to simplify colour management, Corel have chosen to use non-standard names for their Rendering Intent settings in Paint Shop Pro. These are referred to as Pictures, Proof, Graphics and Match.

Adobe Photoshop and Illustrator both run on the Apple Mac OS as well as on Windows while the Corel products are Windows only.



The Corel Paint Shop Pro Color Management control panel adopts the same approach as Adobe Photoshop with a number of drop down menu options although it does not offer as many choices. Further options may be found in the Color Working Space control panel

## The Reference Colour Space

So that accurate image colour relationships can be maintained as image data moves from capture (input) to an edited image ready for reproduction (output), image editing software uses an internal colour space as a reference for colour space translation calculations. This intermediate reference space is used because this minimises the number of device profiles and transforms required to translate from any input to any output.

Gradually over the years reference colour spaces and colour conversion transforms have moved towards better representations of perceptual linearity and towards greater accuracy. Perceptual linearity means that the individual coordinates that represent each of the measured colour shades the average human can discriminate are equi-distantly spaced within the colour space volume. As with all digital representations colour volumes are quantised, in this case into a number of points on a 3D grid. The spacing of the grid is determined by the bit depth used to represent it. For example if eight bit values are used for the height width and depth of a cube the cube will have 256 divisions on each axis and contain 16,777,216 equi-distant defined points. If the colour coordinates of all of the discernible shades coincided exactly with these grid points, 8 bit coordinates would be sufficiently accurate. However depending on the colour space used they may not be.

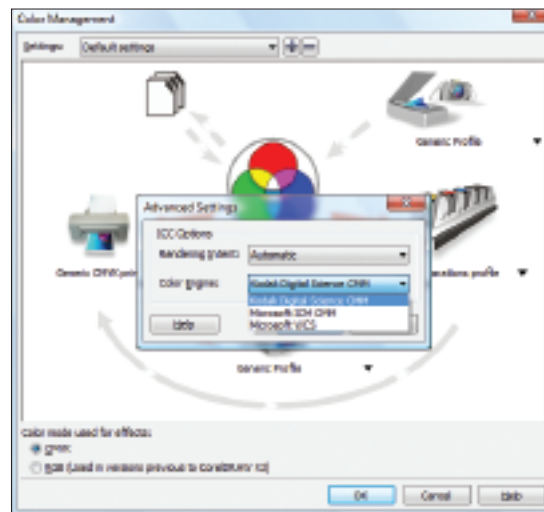
As described in a previous feature the earliest colour model in use is the CIE XYZ (1931) and this is based directly on measurements. The original measurements were made using a sample group of only seventeen people, although the results have since been confirmed using larger sample groups. Within the XYZ colour space some areas of colour discrimination of the human visual system are packed closely together and other areas are widely spaced. For example the greens occupy a large portion of the space while yellows occupy only a small portion. Based on the original XYZ measurements, CIE L\*a\*b\* (1976) is one attempt to create a more perceptually linear colour space. Adobe products use CIE L\*a\*b\* as their reference space while CorelDRAW Graphics Suite X4 uses sRGB.

The embedded colour management in Microsoft Windows from Windows 95 up to XP also uses the sRGB colour space for reference. This colour space was originally created by Microsoft and HP as a reference space for colour images on the world wide web. It is based on the typical device colour space for a CRT monitor. In this sense it is an idealised device dependant colour space and has quite a small gamut.

## Colour Engines

The colour engine or Colour Management Module (CMM — Corel define this as Color Matching Module) is the piece of software that makes the calculations required to convert a colour image from one colour device and its associated colour space to another. These conversions are performed via the reference colour space. To make the conversion the colour engine uses the reference space, the source and destination colour space, the associated input and output device profiles and the users choice of rendering intent. Because of the complexity of the calculations involved and a variety of methods for exactly how the transformations are performed, there are a number of different colour engines in use.

Some image editing software provides a choice of which colour engine or CMM to use. For example by left clicking on the central colour icon in the colour management control panel in CorelDRAW (X3 or X4) the



The CorelDRAW Color Management control panel with the Advanced Settings for Rendering Intent and Color Engine selected. Three choices of Colour Engine are shown

user has the choice of either the Kodak Digital Science or Microsoft ICM 2.0 CMMs. With Microsoft Vista there is also the additional choice of — Microsoft WCS. In Adobe Photoshop, opening the Color Settings control panel from the Edit menu ([ Shift] + [ Ctrl] + [ K] ) with the More Options button selected, under Conversion Options — Engine, allows the user to choose either Adobe (ACE) or Microsoft ICM. Differences in the algorithms used in different colour engines, coupled with the use of different reference colour spaces can result in visible differences in edited images when the same source file is processed by different image editing software.

## Moving Colour Images Between Adobe And Corel

There some limitations on file format support between the competing products. The native file formats are: PSD for Photoshop, CDR for CorelDRAW and PSP for Paint Shop Pro. Paint Shop Pro X2 can save files in PSD format and CorelDRAW can save in AI Adobe Illustrator format. Adobe

Photoshop formats are more restricted, although it can save in one of the standard image formats such as JPG or TIF which Corel programs can open or import.

CorelDRAW cannot open JPG files, these must be imported using the File > Import menu choices. For an image to have the same colour appearance in CorelDRAW that it has in Photoshop the colour work flows must be set up with the same colour spaces and profiles.

## Microsoft And Colour Management

Starting with Windows 95, in versions of Windows preceding Vista, Microsoft introduced the Image Color Management (ICM) and later ICM2, colour models, which are ICC based.

With Windows Vista, Microsoft, in cooperation with Canon, introduced a new colour model called the Windows Colour System (WCS). Microsoft say the ICC approach (i.e. the system used by just about every company except Microsoft, including Adobe and Corel) is fundamentally flawed, that problems with previous colour management systems are due to not using a perceptually accurate colour model, and that Vista with WCS provides this necessary perceptual accuracy (see Article References 3). Although by default WCS still uses sRGB (IEC 61966-2-1) as its reference colour space it does allow the use of other colour spaces, such as scRGB (IEC 61966-2-2 ). Colour accuracy is greater in scRGB because, although it uses identical color primaries and white/black points as the sRGB color space, it uses 16-bit floating point (half precision) linear values instead of the gamma compressed 8-bit integers used in sRGB. Microsoft call the colour engine used by WCS the Color Infrastructure and Translation Engine (CITE). It uses improved transform algorithms based on the CIECAM02 perceptual model to perform the colour calculations (see Article References 4).

## Setting The Colour Controls

In Adobe Photoshop the the colour management controls are accessed from Edit > Color Settings (or [ Shift] + [ Ctrl] + [ K] ).

Adobe Photoshop and Corel Photo Shop have a setting for Working Space. This sets the default colour space that any un-tagged image files will be converted into when opened and also will be saved as. There are separate settings for RGB and CMYK files. Depending on the Policies settings, opening image files that are tagged with a colour space that is not the same as the working space can trigger an options warning.

Below the CMYK setting are choices for Dot Gain. Dot gain relates to the absorbency of the paper used for printing. Dots represented as a certain size in the image file tend to grow in size



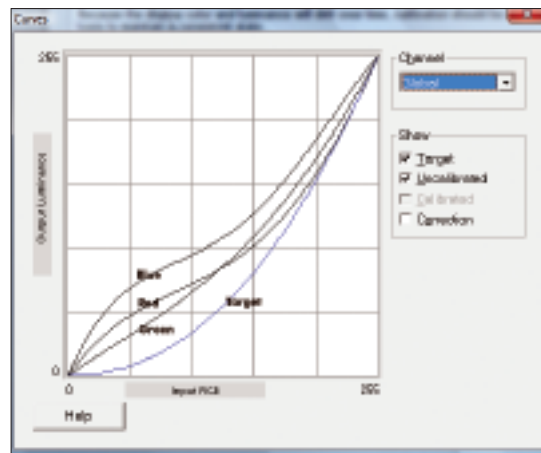
By default the CorelDRAW Color Management control panel shows all profile choices set to 'generic' with only the profiles converting from the internal space to the two printer types and from the desktop printer to the display, turned on

flow. In CorelDRAW X3, in X4 and in the associated Photo-Paint, the menu selection Tools > Color Management, launches a control panel displaying a graphical representation of the colour work flow (pressing the Alt o, Alt c key combinations also opens this window). The internal colour space is shown at the centre with five icons representing scanner or camera input, printing press output, display screen, desktop colour print output and file input/output surrounding it in an equally spaced ring. Drop down menus below each icon allow selection of profiles, while arrows running between the internal colour space and the device icons allow selection of different colour paths. Clicking on the arrows toggles the appropriate profiles on and off. Further arrows running between the two print icons and the display icon allow settings for soft proofing. Left clicking on all of the icons except the scanner/camera opens an Advanced settings control panel associated with that icon.

## Display Calibration And Profiling

To be able to maintain any control over colour it is absolutely essential that the computer display is calibrated and correctly profiled. The display is the users visual window and reference on what's happening to colour at various stages in the colour editing process.

Calibration involves setting the display to known levels of brightness, contrast and colour balance. This is achieved through



This graph shows the un-calibrated R, G and B response curves for a laptop LCD display. Not only are these a long way from the desired target, but they also don't track each other. The desired target curve is represented by the blue line



using a suitable calibration device such as a colorimeter and adjusting the physical controls on the display until the measurements reach the required levels. This sets the display to a known and repeatable state so that successive profiles are always created from the same starting point.

The input to output transfer characteristics of displays vary, two examples of the same model LCD or CRT monitor may not produce exactly the same brightness or colour when driven by identical video signals. Most computer monitors do not have individual colour channel linearity controls. Uncorrected monitors not only deviate from the ideal desired transfer curve, but are also likely to have different transfer characteristics for each colour channel. If the Red, Green and Blue channels do not track together the display will exhibit unwanted, shade dependant hue variations. Poor RGB tracking is most apparent where obvious colour tints appear in monochrome images with a wide range of greys.

### Software Display Calibrators

Although the approach has been abandoned in Adobe Photoshop CS4 and Adobe now specifically recommend using a third party hardware

based display calibrator, earlier versions of Photoshop included a software only display calibrator and profiler applet called Adobe Gamma. The Photoshop install places this in the Windows Control Panel and also installs a short cut in the Start folder to the Adobe profile loader.

### Boot Time Display Profile Loaders

The display colour response is not corrected by making adjustments to the display itself but by applying corrections to the graphics card. Usually these corrections are loaded by a profile loader applet loading the correction values from the display profile into the colour Look Up Table (LUT) on the graphics card at boot time. These corrections are therefore global, affecting everything displayed, following boot up.

Most colour profiling applications are supplied with a profile loader applet which is installed during installation of the main program. A short cut to the profile loader is placed in the Start folder and is therefore called during operating system boot. Under Windows Vista these can be found via Start > All Programs and opening the Startup folder. Any profile loaders should be listed here.

If several applications with colour management that support profile boot loaders are installed on the same PC there can be some confusion. The LUT will eventually be loaded by whichever loader and profile is loaded last in the boot sequence and this may not be the desired profile. Users should manually edit the Start folder and remove all loader short cuts except to the desired loader. Ideally this should be for a hardware display calibrator and its associated software.

### Hard Copy Colour Proofing

In theory the ideal colour proof work flow is to print proofs on the printer that will be used for production runs. In the case of commercial press printing this is impractical because the presses involved are not designed to print just the few pages required for colour proofing. In the past hard copy press print proofs were produced using a (DuPont) Chromalin, (Kodak) Matchprint or similar proofing system. Unfortunately the word 'Chromalin' is often used like the word 'Hoover' is used as a generic term for vacuum cleaners and if you ask a printer for a Chromalin proof that may not literally be what you get.

By the time pages reach the printing press the edited page layouts have been split into the component C, M, Y and K (known as 'separations') used to print the finished pages. To make a Chromalin proof, the separations, either in digital file form, or as page spread size photographic negatives are used to produce positive colour exposures of the four colours on four sheets of plastic. These sheets are then aligned

and bonded together to form the final colour proof. Other photographic proofing systems use the separation negatives to produce a colour photographic print on photo print paper. The digital files or negatives used to make the proof are also used to make the printing plates for the press, so in principle there is an exact correspondence between the proof and the press print.

The problem with all these colour press proofing systems is that they do not use the inks and paper that will be used in the final print run. They will show errors such as registration problems or obvious colour errors introduced at the separation stage, but will not necessarily produce exactly the same colour appearance as the final printed output. This is particularly obvious with proofs printed onto photographic paper, as the white of the photo print paper normally won't be the same as the white of the paper used in the press.

Hard copy colour proofs are relatively expensive and time consuming to produce, commercial press operators or print service bureaus apply a charge for each colour proof (in the UK, £45 to 50 each for A4 proofs). So publications will normally only request hard copy colour proofs for images of particular importance.

### Soft Proofing

Soft proofing attempts to use either a computer display or a desktop colour inkjet or laser printer to emulate the performance of the final output media, i.e. a printing press.

It is cheap, convenient and fast. However the term 'soft proofing' is also used to refer to colour proofs, such as PDF files sent by email, that do not attempt accurate colour reproduction, but serve merely as general proofs for checking layout, text and overall appearance.



The CorelDRAW Color Management control panel with the base settings for soft proofing selected. Both the display and the desktop printer will show the image as it would appear on a commercial printing press. In this example all the individual profiles have been left at the starting generic setting

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The Corel Paint Shop Pro 50% brightness profiling display. The slider values are adjusted until the solid centre colour appears to be the same brightness as the line patterns on either side

ated brightness scale is used to calibrate the brightness and contrast settings then a series of solid colour / alternate line patterns is displayed. The center solid patch is adjusted in brightness by eye until it matches the brightness of the alternate lines. Required corrections are then derived from these relative settings and used to construct a profile. Corel Paint Shop Pro Photo X2 has a similar utility, but improves accuracy by providing adjustment at 5 different brightness levels. Adobe Gamma only corrects at a single brightness level. These 'eyeball' calibrators are perhaps better than nothing, but are not as accurate as the current hardware calibrators.



True soft proofing relies on the gamut of the display or desktop printer being larger than the gamut of the printing press.

This allows the colour engine in the colour management software to shift and constrain the image colour values inside the confines of the display or printer gamut so that the image appears as it will when printed on the press.

Out Of Gamut Colours

As mentioned in a previous feature because the gamut of most printers is smaller than that of capture devices such as cameras and scanners, some colours may be lost when converting from the captured image into the print device colour space (see also Intents). Colour editing software usually has a setting which will highlight out of gamut colours.



These three images of an audio CD cover design demonstrate soft proofing with the out of gamut warning turned on. Out of gamut colours are shown by the green highlight. The original image is on the left, the proof for printing that image on a desktop printer is in the middle and the proof for a commercial press is on the right

Comparing Soft Proofs With Prints

In practice, when final printed output is compared side by side with the screen, soft proofing to a display often appears to be only partially successful. This is because, assuming the display has been calibrated and profiled correctly, the image will be displayed with the chosen white point (for example 6,500K) at a certain brightness (often 80 cd/m2) while also being affected to some extent by the ambient illumination reflected from the screen. In contrast the hard copy proof will be illuminated by the available light and this will almost certainly not be of the same colour temperature as the screen, nor will the proof reflect at the same brightness.

For the best correspondence between display soft proofs and final output the display should be set up alongside a viewing booth, with both the display and the booth illuminated by the same fairly low level of neutral ambient light. The colour temperature, and brightness of the display must be adjusted to be as close as possible. If the booth has a brightness control this may be the easiest way to balance the brightness to that of the display.

The display colour temperature should be set to match that of the lamps in the booth;

5,000K for D50 lamps and 6,500K for D65. Unfortunately the stated CT of viewing booth lamps isn't particularly accurate. It may be necessary to set the monitor CT to something other than one of the standard settings to match the booth exactly and to re-calibrate and re-profile the display for this setting.

Desktop Printers And Colour Management

Desktop colour printers, particularly inkjet are designed as 'RGB' printers. The operating system sends print data as RGB and the printer driver and printer perform the necessary conversions to print the image correctly using CMYK inks. When images are printed from an image editing application that provides user controls for colour management a choice must be made over whether either the colour management in the application, or in the printer driver should be used. It is a common mistake to use both, which results in unpredictable colours in the final print. Only very recently have printer drivers started to include warnings indicating that both management systems may be in use.

The best approach is to select the correct printer profile in the colour controls for the image editor and to turn off the colour management in the printer driver. Unfortunately in many desktop printer drivers it is often difficult to determine exactly how to disable their internal colour and image controls. For example in the current Epson driver it is necessary to select Printer Preferences, click the Advanced button, select ICM and tick the Off (No color adjustment) box.



Selecting ICM and ticking the Off box, on the Advanced page of the Epson print preferences driver control panel, turns off colour management by the driver

Conclusion – Defining Your Work Flows

Perhaps the best way to approach colour management is to first define the work flows you will use.

For example a photographer might only ever work with bitmap images and will mainly work in RGB up until the printing stage. If these are to be only small run prints rather than printed as part of a publication on a commercial press then is no need to prepare separations, most of the work flow can be in RGB and the CMYK conversions either left to the desktop printer and its driver. A hobbyist photographer might choose to set their camera for sRGB output. Depending on the camera sRGB might be the only choice. A professional photographer is more likely to choose RAW mode, a mode which outputs the image data as registered by the CCD sensor, without any intermediate processing by the camera electronics. Using this mode often requires the use of a dedicated RAW mode driver supplied by the camera manufacturer.

A graphics designer will often import digital photographs, but will manipulate and combine these with vector graphic elements. Graphic design work is usually intended for publication via a commercial printing press so it is sensible to choose to work with the effects in CMYK (this is CorelDRAWs default mode) and to soft proof using the commercial press profile.

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## Apple iPhone 3G

### Over-hyped novelty, or a flawed jewel?

Apple's design sense has always been splendid; the iPhone 3G doesn't break conformity. The first time you look at it; you'll think iPod Touch on a high-fat diet. It's better looking than its predecessor (the iPhone 2G). The black model we received was beautifully finished; thankfully the rear resists normal smudging and scratches. It's not a very thick device but feels large to hold; although with a 3.5-inch screen this isn't exactly a design flaw. Build quality is excellent. Quality of buttons and switches on the device are top-class. Even the SIM tray fits flush; attention to detailing is very good.

The buttons on the sides, top and the headphone jack are chromed, and the black bezel and chrome trim add further visual appeal. Apple's menu system is excellent with the single *main menu* button being perfectly functional. The 3G's appeal lies in its blatantly simple and usable interface and the sheer joy and funkiness of a touch and finger swipe navigation system that works flawlessly. The proximity sensor and low-light sensor work flawlessly.

The iPhone menus work well, but the on-screen keypad is a little small and you will make a few incorrect key taps for a month or so, which won't please SMS junkies. The phones number pad is huge though; and you'd be a clod to goof up dialling numbers. SMS' sent and received to and from a single number show up as a single entry with the last

message exchanged as a preview; the rest of the messages are displayed in small green conversation boxes that become visible on selecting the relevant entry; a novel concept that takes getting used to. There is still no way to delete or select multiple messages. For some, the text entry box may also appear too small for practical use. If you try to edit a message after typing it out; the inbuilt magnifier helps as it magnifies the spot where your finger touches, but cursor navigation within the text body remains a tricky affair. You also cannot save a typed out SMS as a draft, and the inbuilt email option allows you to save multiple email IDs and password information for quick use; though the on-screen keyboard raises its ugly head again to spoil the party.

Its Safari web browser is



very basic — no support for Java or Flash. Copy/Pasting is also not supported — a serious omission. We also noticed that the touch interface works with fingers only, not a stylus or fingernails — ladies beware. If you think you can get a Bluetooth keyboard to make up for the on-screen keyboard, think again; the iPhone's Bluetooth works with headsets only — no keyboard, and no file transfers.

The bundled GPS and Google Maps work well in tandem — better than Nokia Maps. Apple's inbuilt scheduler and calendar work well; as good as any PDA. A lot of games come preinstalled, but there's no serious office application with document and spreadsheet support. Some of these applications slow down the phone — big time; though for the most part it's fairly responsive.

The iPhone is a decent phone when it comes to signal quality — it's a little behind Nokia's best phones in this regard. Voice quality is pretty good but the volume is a little low. Sadly the loudspeakers' quality is very bad — like a cheap CDMA unit — and a lot of distortion occurs when a voice call is put on loudspeaker. The headset looks like Apple's earbud headphones but incorporates a small microphone unit that is compact enough to be easily missed. Voice quality on this handsfree unit is absolutely top notch; and the volume level is fantastic.

The claimed battery talk time is ten hours; not true, we measured

this to be more like five hours.

MP3 quality is very good; no other phone comes close. It has a gorgeous screen for video. Just make sure to ditch the bundled earplugs for music. Eight or 16 GB of inbuilt storage is enough for most; if it isn't, you should remember that expansion is not an option. The camera is a mediocre 2 megapixels, and isn't this phone's forte — you can't even record video!

Sadly, the iPhone only comes as part of a service provider's scheme — you cannot buy it unless you're an Airtel or Vodafone customer. Our device was provided by Airtel and is available for Rs 31,000 and Rs 36,100. The first 500 MB of data usage from Airtel is free, after which you pay a nominal charge of 30 paisa per 50 KB.

This is a phone that is far from perfect; For the record, there are many better phones out there which offer a lot more functionality. Where Apple scores is in adding a little human touch to their device.

#### Specifications

3.5-inch screen, 480 x 320 pixels, 8/16 GB storage, inbuilt WiFi and A-GPS, 2 MP camera, weight — 133 g

Contact: Apple

Phone: 080 - 25744646

E-mail: [indiasales@mac.com](mailto:indiasales@mac.com)

Web site: [www.apple.co.in](http://www.apple.co.in)

Price: Rs 31,000 (8 GB),

Rs 36,100 (16 GB)

RATINGS	
Features	★★★★★
Performance	★★★★★
Build quality	★★★★★
Value for Money	★★★★★
Overall	★★★★★

## Samsung Innov8

### Somewhat Innov8ive phone from Samsung

While most of the crowds are attracted towards the likes of the HTC Touch and the all new iPhone, there are some who still truly believe in powerful phones with physical buttons. There has been some anticipation and the Samsung I8510, or the Innov8 as it is better known, is finally here.

The design looks somewhat like the Nokia's powerful N95 with a similar slider design. The slider is wobbly at times. The design isn't unconventional, but it isn't very stylish either. An array of touch-sensitive buttons line the panel below the screen. There are two dedicated buttons on this panel that make multitasking to the next and the previous running application really simple.

The operating system on this phone is the Symbian S60 3rd edition. The phone comes with a whopping 16 GB of inbuilt memory. If that isn't sufficient space for you, then a Micro SD slot is also available to expand this.

Audio quality and reception is good. Using the keypad under the slider works well although the keys themselves don't have the nicest feel to them.

The screen is good; the colours are good; so are the viewing angles and the refresh rate. This is great because the phone has video support for the commonly used DivX format. Movies run smoothly



without any signs of framing whatsoever.

One of the largest selling points of this phone has to be the 8 MP resolution camera. The inbuilt flash works alright. Image quality from the camera is not very good. The images seem artificially enhanced to look very attractive. With a smaller sensor than standard point-and-shoot cameras, it is not possible to capture great quality at 8 MP.

A basic video sequencing application comes installed

which allows you to make your own video compilation by queuing up videos and photos with transition effects in between. The audio quality of the speaker on the phone is good and there is hardly any distortion with the volume set to maximum. It must also be said that phone isn't very loud either.

As expected from any phone over Rs 15,000 or so, WiFi is present and so is GPS. The phone also comes with software — Route 66 and some other GPS tracking utilities. Google Maps is also one of the custom software installed on the phone. There are also some other software and games such as the mobile version of FIFA 2008 and a bike racer

called Asphalt 4.

The fast paced games don't run as well

as you'd like them to but they're still about playable.

The performance maybe decent but the phone gets warm when you run a few videos or play some games on it. The other problem is that playing games on the keyboard is a little difficult. You also have to get used to the touch-sensitive buttons below the screen — when you've slid your finger to select the item you want and you move the finger away to click on a button, it slides to the next item.

Overall, it's a good phone with loads of features that you might not need or use. It isn't very impressive though, especially for something that is one of the costliest phones around priced at Rs 43,250. It's nothing something that will anyone's jaw drop either. There is no doubt, that the iPhone will grab a lot more attention than the Innov8 and that is available for around Rs 31,000. The iPhone would appear to be a better buy for people just wanting a stylish phone that also happens to be very usable even though it's just a touch-phone. If you want a phone with a proper keypad, loads of features and the ability to install one of the many Symbian applications available online, then the Innov8 although expensive will fit your spot.

#### Specifications

2.8-inch screen, 16 GB inbuilt memory, 8 MP camera, inbuilt GPS, Symbian S60 3rd edition, 1200 mAh battery. Dimensions: 106.5 x 53.9 x 17.2 mm, Weight: 136 g

Contact: Samsung

Telecommunication India

Phone: 011 — 41511234

E-mail: [joydeep.r@samsung.com](mailto:joydeep.r@samsung.com)

Web site: [www.samsungmobile.in](http://www.samsungmobile.in)

Price: Rs 43,250

RATINGS	
Features	★★★★★
Performance	★★★★★
Build quality	★★★★★
Value for Money	★★★★★
Overall	★★★★★



## Apple PMPs

### Falling like apples from trees

Apples PMPs are known the world over and need no formal introduction. We have with us the latest iterations of their four product lines; the iPod Shuffle, iPod Nano, iPod Classic, (called Classic 6G), and the iPod Touch 2G.

The iPod Touch 2G is noticeably slimmer than its predecessor and has a curved back; this contour adds sleekness but some may not like



the way it feels. Apple added a loudspeaker; a feature that was sorely needed. Volume buttons are also a much needed addition, although they feel tacky and seem cheaply built. Overall, we were disappointed with the look of the new device — it seems to lack the class that the original had, and the glaring black volume buttons are hard to use. The volume of the loudspeaker is woefully inadequate for even silent environments. The screen size and characteristics remain unchanged. The new Touch feels a little lighter also, and we found out that this might be due to Apple using a slightly smaller capacity battery. While some will praise the new slim shape and reduced

weight others will curse the reduced battery life — we noticed a reduction in playtime of a couple of hours.

On the application front, small applets like Stocks, Weather and Google Maps have been added, which were available as paid software downloads with version 2.0 of the Touch firmware. The new Touch is available in eight and 16 GB versions; there is no 32 GB version as of now.

The Touch interface remains its splendid self, as does its wonderful PMP abilities. Music quality remains the same, and we tested the Touch with our audiophile grade headphones and tube amp — wonderful! Video playback is the same as the previous Touch — superb — although we figure a bigger screen would really spice up video playback.

The iPod Classic has always been desired for its enormous storage. The new Classic drops in a 120 GB HDD in lieu of the 80 GB version on the earlier Classic. However, there's no replacement for the colossal 160 GB version; 200 GB anyone? The 2.5-inch display is largely unchanged and is sharp enough for movies. The Classic is available in two colours — silver and black. Build quality remains



the same and the new Classic retains its tank-like dimensions and in-hand feel. In terms of add-on features there isn't much more than the previous version. Sound quality is superb, although the Classic has very slightly rounded off highs — something which is revealed in the Touch. Note that most users won't even notice this, unless you use audiophile grade headphones like Sennheisers HD 650 or Grados RS-1 and a good headphone amplifier.

The new Nano is dubbed as the Nano *Chromatic*. This is because it's now available in many more colours including new ones like yellow, orange and violet in addition to the classic ones. The new Nano is more like the Nanos of old rather than the previous model which was nearly square and is being called the Nano *Widescreen* now. This



Nano is oblong; and the body is curved ditto the glass screen, which fits flush into this curve. By far this seems the funkiest change in terms of shape from amongst the new models. The Nano has got a 2-inch display that looks ultra crisp, and the inbuilt

accelerometer allows the screen to orient sideways. This also allows you to shake the Nano to skip a track; although this is nothing novel yet the inclusion of this feature is welcome. In terms of sound quality the Nano impresses; although it's a hairsbreadth behind the Classic and the Touch in terms of detailing at the top end of the sound spectrum.

The new Shuffle is downright cute. Available in five colours and a neat looking clasp that fastens anywhere



be it your belt, shorts or pocket. There's a bundled dock which allows connecting the Shuffle to your PC for syncing. The LED battery indicator has three status levels green, which means there's lots of juice, amber which means low battery and red which indicates the show is nearly over. The buttons on the Shuffle are top class in terms of build quality. Available in 1 GB and 2 GB versions the Shuffle is for those who want to take their groove with them anywhere. Sound quality is surprisingly good — those who think the Shuffle is any less for its diminutive size, think again. Although people looking to use the Shuffle will almost never need audiophile grade sound, you will not be disappointed as a casual user.

At Rs 13,000 the iPod Classic gives the word *Goliath* a whole new meaning. It's a great deal for someone looking to cart around a huge MP3 collection. If you do not need to lug around 50 odd GB of music you may want to look at the iPod Touch 2G. At Rs 12,800 it's got a large screen, unbeatable touch and finger swipe interface and lovely music playback. For the young and funky, or those looking to spend less, the new Nanos will excite. The eight GB version costs Rs 8,200. The 2 GB Shuffle costs Rs 3,200; this is about right for an entry level MP3 player. People may be tempted to look at cheap options that have screens, but the Shuffle will have better sound quality. Period.

Contact: Apple  
Phone: 080 - 25744646  
E-Mail: [indiasales@mac.com](mailto:indiasales@mac.com)  
Web site: [www.apple.co.in](http://www.apple.co.in)

## Microsoft Life Cam VX 5500

### A webcam of many faces

The new Microsoft Life cam VX 5500 stands out with its intuitive design and beautiful looks that can compliment any notebook or desktop computer.

The VX 5500 has a VGA resolution of 640 x 480 that is good enough to take care of all the conferencing you plan to do. The overall video quality is good and you will not face any problem even in low light conditions. We would have loved to have manual focusing on this, but sadly there was none available — you will have to keep the camera at the right distance to keep it in focus. The VX 5500 sports a Uni-Directional microphone, so sounds are picked up from anywhere in the room — good or bad depending on the ambient noise. The microphone features

acoustic noise and echo cancellation.

The VX 5500 has a slim and flat folding stand that makes it easy to store and transport, and the same stand allows you to clip it on to your LCD monitor. Microsoft also adds a touch of color to this webcam with interchangeable faceplates. White blue and red face plates are bundled, but that's about it for choice — you can't buy more.

Installing the VX 5500 might be a slight hassle for people who don't have an active Internet connection, as its software installation utility will not install the VX 5500 until it downloads the latest software driver version for the webcam.

Designed for the latest



utility peripherals. However, remember that it doesn't have features like manual focusing and motion detection, which other manufacturers (Logitech and Creative) are incorporating in their webcams in the same price range.

#### Specifications

VGA Resolution CMOS sensor, Flat folding design, USB 2.0, Noise cancelling microphone

Contact: Microsoft Hardware  
Phone: 9886328580  
E-mail: [geethakb@microsoft.com](mailto:geethakb@microsoft.com)  
Web site: [www.microsoft.com/india/edd/](http://www.microsoft.com/india/edd/)  
Price: Rs 4,522

RATINGS	
Features	★★★★
Performance	★★★★
Build quality	★★★★
Value for Money	★★★★
Overall	★★★★

## BenQ MP771

### For Cramped-up Space

Projectors are finding their way into your living room as home entertainment systems. The latest innovation that is coming in projectors is short throw lenses and mind it the BenQ MP771 is a classic example of it. With its short throw lens this projector can project up to a 74-inch display from a distance of 1 meter.



Good thing for people who have really cramped up spaces in office or at home.

The BenQ MP 771 is compact, and uses a 280 watt Osram lamp, which company claims will last for almost 4000 hours under economy mode or 3000 hours under normal usage. You will need to change the lamp much before that of course, or suffer reduced brightness.

This projector has a native XGA resolution of 1024 x 768, but sup-

ports resolution from VGA (640 x 480) to SXGA (1280 x 1024). It features a 16.7 million color palette to give a richer color experience. We played a couple of movies and videos on it and it was able to reproduce superb colors with great contrast and sharpness. You can also tweak color saturation and hue according to your needs.

The projector has a small footprint. This projector has an impressive start up and shut down times; it took 1 minute to start the first time, and 32 seconds the next time. Shutting down is fast; just 29 seconds.

This projector comes with different video input ports like DVI, D-Sub, S-Video and Composite video, but at its price, were expecting it to have HDMI support too.

This projector scores with a great short throw lens and vibrant video reproduction, but lack of an HDMI port and a price tag of Rs 80,000 might make you want to look elsewhere.

#### Specifications

Native XGA resolution (1024 x 768), Resolution support of up to 1280 x 1024, Short throw lens, 2000 : 1 contrast ratio, 4:3 and 16:9 aspect ratio compatible

Contact: BenQ India  
Phone: 011-43531700  
E-mail: [sales.enquiry@benq.com](mailto:sales.enquiry@benq.com)  
Web site: [www.benq.co.in](http://www.benq.co.in)  
Price: Rs 80,548

RATINGS	
Features	★★★★
Performance	★★★★
Build quality	★★★★
Value for Money	★★★★
Overall	★★★★



## Intex B133Z-E2110

No business being a business laptop

The new B133Z-E2110 from Intex is a good looking light-weight laptop. With its brushed metal finish black body and silver outlines, this laptop scores some points in the looks department. Intex has kept the laptop light-weight and portable.

The glossy display stands tall at 13.3-inches, and reproduces some brilliant and vibrant visuals, which are visible from most angles. As far as input devices are concerned, this notebook has a small keyboard, and those with large fingers will have trouble using the function and scroll keys. The trackpad, however, is quite sensitive and a joy to work on. You don't even need to feel for the left-click button.

To make it portable and light weight, Intex includes a smaller 4-cell battery in this laptop, and this is only capable of running it for an

hour. This is terrible, because you would think that battery life is of the utmost importance in a business notebook.

In terms of configuration, the laptop features an Intel T5750 processor running at 2 GHz with 2 GB of DDR2 RAM. The laptop doesn't come with an installed OS, so if you're a Linux junkie, this is a good thing; terrible for Windows users, because you have to shell out extra for an OS — or maybe not!

In terms of performance, this system is rather slow and is good enough for basic office work such as word processing, presentations and Web browsing.

You can connect to the Net via WiFi, LAN and 3 USB ports to choose from if you want to hook up your USB data card.



### Specifications

Intel T5750 processor, 2GB RAM, 160 GB HDD, 8X DVD RAM drive, Bluetooth, Wi-Fi, 3 USB ports.

Contact: Intex Technologies Ltd.  
Phone: 1800116789  
E-mail: info@intextechnologies.com  
Web site: www.intextechnologies.com  
Price: Rs 37,900

RATINGS	
Features	★★★★
Performance	★★★
Build Quality	★★★★
Value for Money	★★★★
Overall	★★★★

The laptop performed badly in our tests, scoring just 2854 marks in PCMark 05, and a mere 373 in 3DMark 05.

We're very reluctant to recommend this laptop to business users, because of the pathetic battery life. The performance scores were understandable, and this laptop is good enough for everyday office tasks, but only if you keep it plugged in. This defeats the purpose of it being light and portable.

## Creative VADO

Pocket sized video

Anybody who sees the Creative VADO for the very first time will confuse it with a portable media player. Don't. This sleek and stylish metallic silver body hides a portable video recorder. It allows you to capture videos easily and quickly.

To start with, the Creative VADO comprises of a non-auto focus camera, with which you can record videos at a resolution of 640 x 480. It features 2 GB of memory, and this is non-expandable, which is a serious turn-off. At its resolution, though, this translates to about 2 hours of video recording.

Just like any other cam-



recorder, the VADO also gives two options to record video, both at the same VGA resolution. When using High Quality mode, you can capture about 1 hour of video. In Standard Play mode you can get about two hours of video. Battery life is good, so you will run out of memory way before you run out of charge. Obviously, at VGA

resolutions, recorded videos look pixellated, and you can make out the difference between High Quality and Standard Play recording modes. The convenience of being able to pull something out of your pocket, start recording and then put it away just as easily.

The VADO allows recorded content to be transferred via USB, and you don't need to lug around cables, because it has a retractable connector. Using a bundled utility, uploading video to YouTube is as easy as pushing a button.

Overall, if you're not looking for great video quality, and want to shell out Rs 7,000 for convenience of point and record, the VADO will keep you happy.

### Specifications

VGA resolution camera, 2GB onboard memory, Rechargeable battery, USB 2.0 compatible, Direct YouTube uploads.

Contact: Creative Technology Ltd  
Phone: 9352034111  
E-mail: nishant\_mathur@ctl.creative.com  
Web site: http://in.creative.com/  
Price: Rs 6,999

RATINGS	
Features	★★★★
Performance	★★★★
Build Quality	★★★★
Value for Money	★★★★
Overall	★★★★

## Kingston Data Traveler HyperX pen drive

Speed comes at a price

Flash memory-based drives are evolving at a fast pace. While the capacities have gone up considerably, data transfer speeds are also a lot better than before, in general.

Some of the very best drives come from memory manufacturers themselves, and Kingston's HyperX is one of them.

This drive gets its looks from the blue-black HyperX memory modules. It has an aluminium and rubber casing, and this gives it strength and a good grip-

ping surface. You're unlikely to drop it, but if you do, the sturdy build will ensure that your data stays safe. The connector is retractable, so just slide it out when you want to use it.

The drive we got for review had 8 GB of storage space; but it's the performance that interested us more. In HD Tach benchmark this drive showed an access time of 11.9 ms, while the read and write speeds stood tall at 29.6 and 19.8 MBps. In our data transfer tests, we were able to copy 1 GB of sequen-

tial data in under a minute. Assorted data (1 GB, 441 files) took about a minute and 46 seconds. We were shocked to find that CPU utilisation jumped when transferring.

Speed comes at a price though, and for this drive, it seems to be CPU utilisation and price. At Rs 11,000 for the 8 GB model, this drive is not cheap. You also have 2 and 4 GB versions for cheaper, but considering that you get a 16 GB Data Traveller from the same manufacturer for about one-third the price, this drive seems like a luxury. If you are rich, have an obsession with speed, and want to make every second of your super-fast paced life count, buy this drive. If not, you're



probably still looking at the price tag.

### Specifications

8 GB Storage space, Windows Vista ready boost Enhanced, 5 year warranty, Dimensions: 2.76 x 0.88 x 0.44 in

Contact: Kingston Technology Company Inc.  
Phone: 022-26592961  
E-mail: trista\_wang@kingston.com.tw  
Web site: www.kingston.com/india  
Price: 11,115

RATINGS	
Features	★★★★
Performance	★★★★
Build Quality	★★★★
Value for Money	★★★★
Overall	★★★★

## Creative ZEN Mozaic

Mosaic Art

The first time you see the Creative ZEN Mozaic, it looks like a flatter and larger version of ZEN Stone plus — similar body and rounded corners. At closer inspection you can see the difference. The ZEN Mozaic has got a matte charcoal finish all over and gray and white accented keys that look great on it.

As far as support is concerned the ZEN mosaic supports majority audio formats, MP3 and WMA to name a few. Along with that it can also play video content on it as well, though you will definitely have to wait for hours to convert the video with the bundled utility. We wish there was support for newer video formats like MP4 and DivX on this PMP.

The ZEN Mozaic has a 1.4-inch colour display screen

having a resolution of 128 x 160 pixels. The display is vibrant and colourful, and is good enough to display all information about a song. Due to its low resolution, video is not a good experience.

An FM player and a Voice recorder are also included, which is good for people who don't like to have too many gadgets.

The ZEN mosaic is a powerful little monster when it comes to music playback. The quality of the bundled headphones are a big let down. You will have to get yourself a good pair of cans if you buy this player, so remember to add that cost.

The battery life is good enough, and lasts about 6



well, but it's still not enough these days. Overall, the bundle is something that looks a lot better than it sounds.

### Specifications

Supports MP3, WMA and AVI formats, 1.4 in colour display, loudspeaker, FM radio

Contact: Creative Technology Ltd  
Phone: 9352034111  
E-mail: nishant\_mathur@ctl.creative.com  
Web site: http://in.creative.com/  
Price: Rs 5,499

RATINGS	
Features	★★★★
Performance	★★★★
Build Quality	★★★★
Value for Money	★★★★
Overall	★★★★

hours between charges. FM reception is bad, and the lack of an expandable memory slot is worse — you're stuck with the 2 GB provided. There are 4 GB and 8 GB versions available as



## MSI R4850

### Cool Performer

The MSI R4850 is similar to many other HD4850 based graphics cards that are now out in the market. The only difference is that MSI decided to deviate from the stock cooler design and gave it a bigger and better looking GPU cooler. So if you have a transparent cabinet, this card can add some eye candy with its shiny copper heat pipes.

First things first, the heart of the HD 4850 is a 55NM, RV770 chip that has 800 stream processors running at a 625 MHz. You would think that the card is something that runs hot, especially since other cards

that use ATI's reference design do so. This card however, has a custom cooler, and runs cool and quiet. We saw a difference of almost 10 degrees in the temperature as compared to the stock design, even with the air-conditioning turned off.

The MSI R 4850 was able to achieve good scores in our synthetic benchmarks and gaming benchmarks too, with a GPU score of 6670 in 3DMark Vantage which is a strict DX 10 based GPU benchmarking utility.

In games too, it performed rather well, scoring



90, 23, 97.2, 88.4 and 82 frames in *FEAR*, *World in conflict*, *Company of Heroes*, *STALKER* and *Unreal Tournament 3* respectively at a resolution of 1600 x 1200 at maximum detail. It was even able to achieve a frame rate of 18.67 in *Crysis*, which is a game we know will kill all cards.

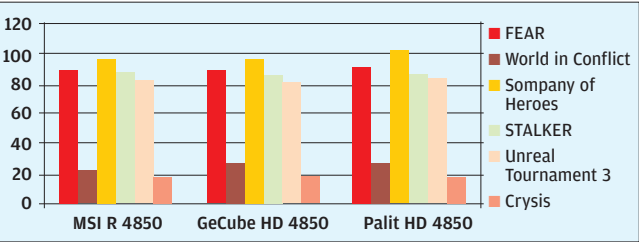
Overall, this card is a decent performer. It's about Rs 500 to Rs 700 more expensive than cards from other manufacturers (with custom coolers), so we suppose you're paying for the looks!

#### Specifications

625MHz Core / 1986 MHz memory clock, 800 Stream processors, 512MB VRAM, 2 DVI, PCIe 2.0 compliant

Contact: MSI  
Phone: 011-41758808/09  
E-mail: marketing@msi-in.com  
Web site: www.msi.com.tw  
Price: Rs 10,500

RATINGS	
Features	★★★★☆
Performance	★★★★☆
Build quality	★★★★☆
Value for Money	★★★★☆
Overall	★★★★☆



## OCZ Gold Edition DDR3 RAM

### Golden memory

We're soon going to see a transition from DDR2 to DDR3.

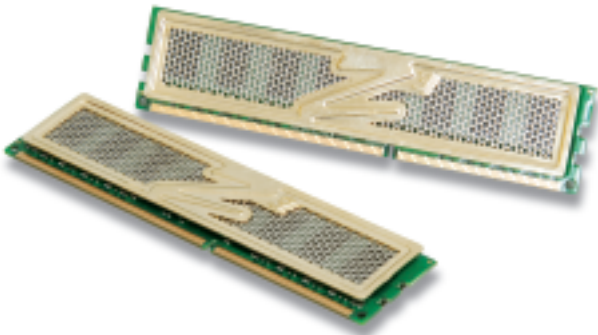
The gold edition DDR3 RAM from OCZ sports a 1333 MHz clock speed. The Honeycomb Grille pattern cooler on it, serves a dual purpose; not only does this make the RAM chips run cooler, it also makes them look cooler!

We tested this RAM on an ASUS rampage extreme (Intel X48 Express chipset) motherboard with Intel X6800 processor and an NVIDIA GTX 280 Graphics card. We were immediately able to see the difference: softwares and games loaded

a lot faster and returned better frame rates.

In our benchmarks, the OCZ RAM performed very well: SiSoft Sandra showed a memory latency of 97 ns — latency in common terms means the time taken to complete a request from the time it was generated. We were able to get a 3DMark Vantage score of 10,956 marks.

The OCZ Gold Edition DDR 3 RAM is a seriously fast little bundle, and there are even faster modules available from OCZ in the market. The price, however, is what will stop you from reaching too eagerly for your



wallet — Rs 15,000 for a kit of 2GB x 2 RAM. If you can actually afford this, buy it, you will not regret it one bit.

#### Specifications

1333 MHz clock speed, Unbuffered, Honeycomb Grille pattern cooler, features CL 9-9-9 -20 timing.

Contact: Tirupati Enterprises  
Phone: 033- 22251192  
E-mail: abhishek@tirupati.net  
Web site: www.tirupati.net  
Price: Rs 14,900

RATINGS	
Features	★★★★☆
Performance	★★★★☆
Build Quality	★★★★☆
Value for Money	★★★★☆
Overall	★★★★☆

## Microsoft Wireless Laser Desktop 6000

### The ERGO-AERO experience

The Microsoft wireless Laser Desktop 6000 tries to make computing comfortable with its ergonomic design, and also complements your need for style with its neat looks and great design.

The Laser Desktop 6000 comprises of a keyboard that is based on Microsoft's Comfort Curve Design; keys have been placed in an ergonomically approved curvaceous design to give your fingers the perfect position and comfort for long hours of work. The keyboard is Windows Vista Aero inspired, and that is why Microsoft has incorporated a few dedicated Vista Aero shortcut keys. The keyboard has a semi transparent border, much like the Aero windows in Vista.

Apart from the basic keys, the keyboard features loads of shortcut keys, with one-touch access to Windows Flip, Zoom, Mail Client and even 5 programmable keys that you can set according to your preference.

The included wireless mouse uses laser technology, which gives it a more precise control as compared to an optical mouse. The tilt wheel allows it to scroll both horizontally as well as vertically. If you are looking forward to a gaming solution, then this will not disappoint you with its responsive mouse, but you might find the keys to lack tactile feedback.

The Microsoft Wireless Laser Desktop 6000 operates at 2.4 GHz wireless radio frequency, allowing it to connect and operate smoothly



without any interference from other electronic wireless devices connected to your computer.

We found the combo to perform well even over large distances. Microsoft claims the operable limit of the hardware is 40 Feet, and is good enough to give you the freedom to connect it to your HTPC. It worked flawlessly for us at a distance of about 15 feet. Both devices operate on 2 AA batteries each, and Microsoft claims they will last for 4 months.

Overall a good set for about Rs 5,500.

#### Specifications

2.4 Ghz wireless technology, Ergonomic design, Preset and customisable shortcut keys for the keyboard.

Contact: Microsoft Hardware  
E-mail: geethakb@microsoft.com  
Phone: 9886328580  
Web site: www.microsoft.com/india/edd/  
Price: Rs 5,427

RATINGS	
Features	★★★★☆
Performance	★★★★☆
Build Quality	★★★★☆
Value for Money	★★★★☆
Overall	★★★★☆

## Western Digital 1 Terabyte Caviar Black Edition HDD

### It don't matter if you're black or white?

With newer Hi-Def video and audio formats becoming popular, games getting larger, and collections growing, you need more space, period. Western Digital plans to satiate your hunger for space with their new 1 Terabyte Caviar Black edition HDD.

This HDD is almost the

same size of a 500GB HDD, despite the increased amount of memory platters. They managed to keep the height low by using perpendicular recording.

The WD caviar comprises of dual processors for twice the data processing speed as normal drives, coupled with a massive 32 MB of buffer memory that ensures

that you get the maximum performance. Along with Acoustic management this



drive also features Power management that allows it to power itself down when the drive is not in use or reduce its speed to a lower RPM when lower levels of performance are required.

We tested the WD Caviar Black edition HDD for its performance in real world scenarios using HD tach and SiSoft Sandra, and it did well, but not that much better. It gave us a random access time of 12.3 ms, while the average read and write speeds came to 81.1 and 92 MBps respectively, with CPU utilization at a maximum of 4 per cent. SiSoft Sandra gave it a Drive Index of 80 MBps, and listed the access time as 12 ms.

To sum up, the WD Caviar Black edition HDD

does perform well in our benchmarks, but doesn't really stand apart from the crowd. At Rs 11,700, it's a decent buy for those who don't mind spending extra for a marginal performance boost and some additional features.

#### Specifications

32 MB buffer, Dual Processors, 1 Terabyte storage space, PMR recording technology

Contact: Western Digital  
Phone: 9321029204  
E-mail: amarjeet.singh@wdc.com  
Web site: www.wdc.com  
Price: Rs 11,700

RATINGS	
Features	★★★★☆
Performance	★★★★☆
Build Quality	★★★★☆
Value for Money	★★★★☆
Overall	★★★★☆



# Get To The Body Shop

## Agent001 Takes You Cabinet And Power Supply Shopping

If the combo of motherboard and CPU were said to be the sole of your PC then the cabinet and power supply (or PSU as it is called) duo would be the body. These are very important components but sadly ignored mostly due to ignorance on the part of both buyers and some vendors. Most people in India shop for a cabinet and a power supply the same way people buy potatoes; at least with potatoes some selection procedures exist; while for cabinets and PSUs they insist on the cheapest options available and a skimpy budget is allocated for the same. At the very most the consumer may ask the shopkeeper what the wattage rating of the PSU is, or how many fans does the cabinet come with. Vendors are, of course more concerned with profit margins and commissions so they don't always have your best interests in mind. However, as someone buying a PC, you should pay very close attention to both these components; because your shiny new processor, motherboard and graphics card will surely care. Inadequate power, dirty power, insufficient cooling, overheating and system stability are just some of the thoughts you should keep in mind.

As a technology enthusiast, I've seen, used and owned a number of PSUs, (or SMPS' as they're called), and cabinets. I've also seen el cheapo power supplies going *poof* and witnessed motherboard, CPU, RAM and HDD failure due to dirty power being supplied. The ill effects of overheating of CPUs, graphics cards, HDDs and even RAM as a result of substandard designs or product quality. The bottom line is in a country like ours bad electricity supply and overheating accounts for most of the PC failures which occur; the other major reason being mishandling.

Heating as you would know can be caused due to

two reasons; one, a particular component isn't getting adequately cooled, or two, improper air circulation which causes heat build up. In case of the former you had better watch out. The component that is overheating could get damaged and possibly damage other components as well. In the latter case, chances are you may not have problems for some time since no single component is overheating. But accumulated heat over time causes long term harm of reduced component life and could cause instability in general. No wonder server farms and mainframes run in low temperature air conditioned environments. However, even having an air-conditioner at home will not guarantee thermal bliss although it helps somewhat. The best way to eliminate heating is to use a well ventilated cabinet.

On to the role of the SMPS aka power supply. Not only does a power supply produce more heat when it cannot adequately power your PC's components, but it also reduces its life and lays the foundation for other problems. Suppose you have a 400 watt power supply and your PC

draws a steady 360 watts. This means this SMPS is working at 90 per cent of its rated load at all times. Given that most 400 watt power supplies can actually supply only 330 watts or so and you are in serious danger. Either the power supply will overheat and blow up, (I kid you not – this happens), or some of your components aren't getting the necessary power they need, which is akin to them being forced to do the same job with less energy. When I suggest a 650 watt power supply to a reader for a PC that I know will not consume more than 350 watts, I am taking into consideration the fact that stressing an SMPS with close to its maximum rated load is bad; also the higher the wattage the better the chance of the manufacturer using better materials to build it, although there's no hard and fast rule. Most manufacturers overstate wattage ratings, so two power supplies with rated outputs of 600 watts may well differ in terms of overall performance, heat generation, load capacity and even longevity.

When shopping for a cabinet or a power supply, please rid yourself of the mentality that these components don't do anything for performance and investing cash on them is just a necessary evil. Think of these binaries as twin protectors and facilitators of your PC, and it's always a good idea to keep at least 10 to 15 per cent of your overall budget for a PC on a good power supply and a well ventilated cabinet.

Some vendors will try to fool you by showing off the number of fans or vents a cabinet has – don't be fooled. Having more fans isn't always better. Airflow is *numero uno* priority here and two fans blowing air across each other or facing each other and blowing in opposite directions could actually be worse than no fans at all.



Your cabinet needs carefully manipulated airflow, designed to divert hot air out of the cabinet through its vents, and suck in cool air from outside – the goal is defined air paths, and *not* turbulence. Think of a wind tunnel, with controlled direction of airflow – designing such cabinets is a proper science and not everyone gets it right.

As mentioned don't be fooled by SMPS' power ratings; one decent tip is to note the weight of the unit – the heavier the better. This is because such units will have better quality and larger heatsinks and power capacitor units. With power supplies brands are quite important, more so than cabinets. Modular PSUs are helpful; since you only use the cables you need. This helps prevent cable clutter and optimises airflow. Opt for an SMPS with *Active PFC* (acronym for Active Power Factor Correction). Active PFC uses a dedicated circuit to maintain accurate power distribution. This method of power correction also reduces harmonics (interference) and corrects power delivery according to the AC input voltage. The older method for power correction is called *Passive PFC* and PSUs based on this should be avoided. In case you intend on setting up a gaming rig or have special requirements like SLI or CrossFire support, you need to look at available connections on the PSU. Some of the new graphics cards need eight pin power connects, and for a high-end multi GPU setup you may need up to four such connectors. Obviously power supplies having support for 3-way SLI and quad CrossFire will have matching power outputs to the tune of at least 1 kilowatt. Another noteworthy factor to consider when choosing power supplies is their efficiency which is measured as a percentage. The higher the percentage the higher is the efficiency of the unit. Look for power supplies rated at 80 per cent and above; these are also called 80+ units.

The position of cabinets and power supplies is much better than when I last went shopping for either which was around a year back. By this I refer to availability of bigger brands and certain models. Of course your choice of cabinet and PSU depends on the kind of components in your PC. A gaming rig needs a well ventilated cabinet and a powerful PSU; while an HTPC needs

a really small box-type cabinet and a compact PSU. Casual users may need something simple and affordable.

If you're looking to build an HTPC you shouldn't skimp on the quality of PSU and cabinet. For a case I recommend a really compact ITX form factor. The cube-shaped cabinets are really aesthetic and look very classy and unobtrusive and I prefer them to the slim HTPC cabinets as these are usually quite high and deep. Zebronic has a small ITX cabinet called *Tambi*. It features a handle on the front for easy cartage and space for a single ODD and HDD. There's a small fan provided at the rear for airflow, but this isn't suitable for a powerful HTPC and should be looked at only if you are building a sub-Rs 30,000 HTPC without a graphics card. This is a no-frills cabinet with reasonable build quality but limited expansion and cooling. Antec's *Fusion Remote* is available in black and black/silver. This is a beautiful looking and excellently built cabinet with media management software and remote bundled. It's got space for two HDDs and one ODD. Two adjacent, side mounted 120mm fans provide cooling. The *Fusion Remote* is priced at Rs 10,500 and is a great deal considering the feature set. Equally hot is the cube form factor Antec *NSK1380 EC*. This one has support for three HDDs, one ODD and four full-height expansion cards. Cooling is via a rear 120 mm fan. The *NSK1280 EC* comes with a 350W PSU that's 80+ rated. For Rs 7,500 this is good if you do not need a remote bundle or have your own. CoolerMaster's *Media 260* is another option. It's built well and the body has a lot of venting and includes media management software and a remote. Priced at Rs 8,000 this is a cheaper alternative to Antec's *Fusion Remote* although a PSU isn't bundled, so that will cost more. I recommend the Antec *Fusion Remote*.

For a generic good build I recommend CoolerMaster's 690 – this is a great cabinet that is very well priced at Rs 3,500 and looks superb. The black mesh on the front and top looks classy and doubles as a venting system. With support for five 120mm fans and two bundled the 690 is a wonderful cabinet for any kind of user. If you want something really beautiful, the CM *Cosmos S* is a work of art. With touch controls, all aluminium build, sleek out-of-this-world looks, excellent cooling options that includes a huge 200 mm side fan and a meshed side and front combined with

LED fans this *Cosmos S* is simply lovely. Priced at Rs 13,500 this cabinet demands a pretty penny, but will upgrade the look of your desktop forever. I recommend this for the extreme gamer and/or show-off. Antec's 900 is another terrific option for Rs 8,000. It's much lighter and seems flimsily built for that. A lot of venting and cooling means the 900 handles high-end (read hot) gaming rigs well.

For beefy power supplies look at Corsair's HX and TX series. The HX 620 is a superb option for Rs 6,800 and will power anything other than top-end multi GPU setups (GTX 280s and HD 4870s are too power hungry). Corsair's HX 1000 sits atop the PSU food chain and will handle anything this side of a 3-way GTX 280 plus overclocked quad core setup. Priced at Rs 13,000 the HX 1000 is for the extreme overclocker or gamer with killer rigs. Corsair's TX 650 is available for Rs 6,000 and represents the value entrant to the high-end PSUs. All these are superb options for powerful PCs. Corsair's VX 450 is available for Rs 2,500 and should handle mid-range gaming setups. In fact I recommend this PSU for anyone looking at a decent PC – cheaper PSUs aren't worth the heartache of damaged components later.

CoolerMaster has some good power supplies as well. Their *Real Power* series are noteworthy and should be considered as secondary alternatives to Corsair's units. For someone looking at something between Corsair's HX 620 and HX 1000, CMs *Real Power 850W* may just catch your fancy at Rs 8,500. Antec also has a lot of PSUs in their *Earth Power* series, their *Earth Power 650 watts* is a steal at Rs 6,000. Their *Quattro* series are even better, but too costly for the performance they offer. A new entrant in India, *Tagan* is a known PSU manufacturer and has a few decent options; although they're priced similarly to Corsair and considering the availability of the latter you can skip these entirely.


If I were looking at a top-end setup I'd go with the CM *Cosmos S* and the Corsair HX 1000 – a heavenly abode for your costly components. Given a budget of Rs 10,000 for me it doesn't get better than a CM 690 coupled with a Corsair HX 620. If you must save cash, the VX 450 is a good option for a mid-range PC with the CM 690 remaining my chassis of choice. ☐

agent001@thinkdigit.com




**Q** I want to buy a mobile phone. By budget is Rs 10,000. I don't want a flap mobile.

**Amit Naik**

 You haven't told me much about your specific needs. The N73ME is priced around the Rs 11K mark, and is a feature rich option. SE's K810i is a superb phone available for around Rs 7,500 and is excellent value for money. These are slightly older phones and are very well priced in comparison to their newer siblings.

**Q** I am buying a new PC. I want a 19-inch monitor and a fast graphics card. Please recommend components that complement my choice of components. I also need 2.1 speakers. This PC is solely for gaming. My budget is Rs 60,000. How is ZOTAC as a brand?

**Nikhil Sharma**


 ZOTAC is a new brand, albeit a good one. Their build quality is quite commendable from what I've seen. Although this configuration does exceed your budget a bit and I could have sug-

PC Config		
Components	Components	Price (Rs.)
Processor	Intel Core 2 Duo E8400	8,200
Motherboard	Abit IP35-E	5,000
RAM	Corsair 2 x 2 GB DDR2 800	4,400
Graphics Card	Palit Radeon HD 4870 SONIC	17,900
HDD	Western Digital WD5000AAKS	3,000
Cabinet	CoolerMaster CM690	3,800
Power Supply	Corsair HX 520	5,000
Monitor	Dell E228WFP	12,200
		59,500

gested a GeForce 9800 GTX based card in lieu of the HD 4870, I feel my choice is superb bang for buck and can challenge the GTX 280, (which costs Rs 32,000), in some cases. For a gaming PC the graphics card is by far the most important component and I'd give it precedence over even the processor. For speakers check out Altec Lansing's MX5021 – they're superb for the price of Rs 6,500.

**Q** I have a dual-core processor, 1 GB RAM, 160 GB HDD. I want to buy a graphics card, my budget being Rs 5000. Please suggest something.


**Sumant Kumar**

 Look at the GeForce 9600 GT chipset. Although this may cost more than the mentioned budget you could get a killer deal for around Rs 5,600 for this card. Value based brands include Palit, EVGA, ZOTAC and MSI. If you cannot up your budget the GeForce 8600 GT should suffice. Expect to pay around Rs 3,500 for this card.

**Q** I am confused between a Notebook PC or a Macbook. I have a budget of Rs 70,000. Which one would be more economical? If I go for a Macbook, will I learn to operate it in a weeks' time as I have never used it before. Also are there enough


service centres in India?

**Arun Kamath**

 I recommend a Windows-based notebook. If you want performance look at Dell's new XPS series. If it's a 15.4-inch you're after their XPS 1530 will please. You can configure it yourself at [www.dell.co.in](http://www.dell.co.in). Opt for a 7200 rpm hard drive, and at least 3 GB of RAM.


**Q** I want to buy good 2.1 speakers for my desktop computer. My budget is Rs 2500. Please tell me which one I should buy? I live in Kolkata. Also please tell me whether Altec Lansing speakers are available in Kolkata?

**Prabir Ray**

 Yes, Altec Lansing is available there, check with Rashi Peripherals, their distributor. For that budget look at Zebronics' SW8000 – a superb value for money purchase.

**Q** I have Rs 12,000 to spend on a combination of products. I thought I would buy a 2 GB pendrive, a portable Hard disk, a nice pair of earphones and an MP3 player. Now I'm confused on whether I should spend more on the player and downgrade my budget on the external HDD. Since I am not interested in video playback even a small screen would suffice. I would not like to buy an iPod Nano. In terms of specifications, I'd like a large battery life, nice sound quality and something that is physically small in size.

**Karmanya Aggarwal**

 First of all what is the size of your music collection? If it's in the range of 6 to 8 GB why not get a 16 GB pen drive for Rs 3,500 or so and ditch the idea of a portable drive altogether. Or you could get an external 160 GB 2.5 inch solution for around Rs 3,000 and forget the USB drive. An 80 GB drive will cost you around Rs 2,200 which means a 160 GB one is better value for money. For USB drives look at Transcend, Kingston and Corsair. Look at Western Digital for external HDD solutions.

I wonder why you are against the iPod Nano. It's one of the best PMPs around for its price and fulfils your criteria of being compact and lightweight. The 8 GB Nano is available for Rs 7,500. The Cowon D2 is also good – it's priced at Rs 8,500 but will give you only 2 GB of storage, unless you shell out more for expansion. Both are excellent options and the D2 is a feature-rich device. Choosing earplugs is the easiest. The EP630 is the way to go and is identical to the MX300 in terms of performance. These will cost you Rs 800.

The new iPods allow you to use them as a portable drive, and you can set aside space for this. The iPod Classic 80 GB costs around Rs 10,500. Choose from the alternatives I've given you – either way you cannot err. ☑

#### Ask Away!

Want a tech product, but don't know how to go about buying it? E-mail [agent001@thinkdigit.com](mailto:agent001@thinkdigit.com) with your complete contact details, and he might answer them here! Please note that Agent001 only answers purchase-related questions in this space.



## Hard Drive Space Issues

**Q** I have a Dell Inspiron 6400 with Vista Ultimate SP1 loaded on it. It runs an Intel Centrino Duo (1.73 GHz) with 1 GB of memory and a 120 GB HDD.

I have a few queries. Like I mentioned, I have a 120 GB hard drive. I'm able to use only 110 GB of the 120 GB. When I bought the laptop, it had Vista Home Premium and the local drive (C:) was a 110 GB and there was a backup drive of 10 GB. However even after formatting it completely and deleting the backup drive, I still don't get the complete 120 GB of space. I re-partitioned the drive as C (49.9 GB), D (29.9 GB) and E (31.7 GB). It adds up to 111.5 GB.

Is there anyway of using the remaining drive space as even the backup feature has stopped functioning now?

I used to run Disk Cleanup every week. It used to free up a maximum of 500 KB of space. Three months back, I installed Uniblue SpeedUpMyPC and Registry Booster. I stopped using Disk Cleanup. Now two days back when I started Disk Cleanup and scanned my 29.9 GB partition, it says that 159 GB can be freed when my entire drive itself is only 120 GB!

My friend too had the same issue after installing some software. And he did disk cleanup. All of his software got uninstalled and Vista crashed. I don't know what to do now.

I am sure that there are no viruses on my laptop as I download and install software only from trusted sites and I use the latest version of Kaspersky 2009. I keep it updated.

**Anand Ravindran**

**A** The problem with the drive space is because of the conversion of bytes to kilobytes and megabytes and so on. A kilobyte is actually a 1024 bytes not a 1000. All this adds up to a big number when you calculate capacities such as 120 GB. For example, an advertised 750

GB drive is actually close to 698 GB. The same is the case with your 120 GB drive.

If your Disk Cleanup is showing strange hard drive space values, try running a `chkdsk` on all the partitions. To do this, click on `Start > Run`. Type `chkdsk C: /f` and click OK. You might be needed to restart. Do the same step for all the partitions and the incorrect space issue might get solved.

## Laptop Not Performing Well

**Q** I had purchased an Acer Aspire 4520 laptop. It came with an AMD Athlon 64 X2, an NVIDIA 7000m graphics solution. I upgraded its memory from 1 GB to 4 GB. I am using Windows Vista Ultimate 32-bit. The problem I have is that it is running slowly. Games still do not run smoothly, so is there any way to increase the performance?

**Sachin Wadnere**

**A** While the processor and the amount of RAM is sufficient for most applications, modern games required a solid graphics solution to run perfectly. The NVIDIA 7000m is not the best in its class and its no surprise it struggles to run today's games. Unfortunately, there isn't a lot you can do to change this.

## Display Problems

**Q** Here are my system specifications: Intel Pentium 4 1.7 GHz Willamette processor, Gigabyte GA-8SMML Motherboard, 512 MB PC133 MHz SDRAM, 160W SMPS, SiS 650 Chipset onboard video, SiS 7012 Onboard audio, PS2 Keyboard and mouse, HCL HCM580M 15-inch CRT Monitor, Samsung CD-ROM and Pioneer DVD -RW DL

I recently bought one more 512 MB 133 MHz SDRAM. When I powered on the computer after adding the RAM, the monitor remained blank and there was no beep from the motherboard. I had to restart it several times and then the computer booted. I tried using the two RAM sticks separately and they worked fine. However they do not seem to be working properly together. When I used them together again the monitor remained in its standby mode (Orange LED) even though the computer was ON. When I restarted the computer I received a message – "SiS 650 32 MB Video" and there was a one continuous long beep and it just hung there. The computer boots once in 5 or 6 times and the remaining times the monitor is blank or I receive the above message. I even tried using a Zebronic 450 Watt SMPS, but it didn't help. Please help. I am getting desperate day by day. Also my monitor displays everything in blue and after around an hour it comes back to normal color. When the monitor is shaken, it changes colour from blue to normal and then goes back to blue.

Also my friend wants to buy an XFX 7600GT AGP card. Will it work in a 4X slot? And how much would it cost? Please help.

**Shreyas Vaidya**



### Get Help Now!

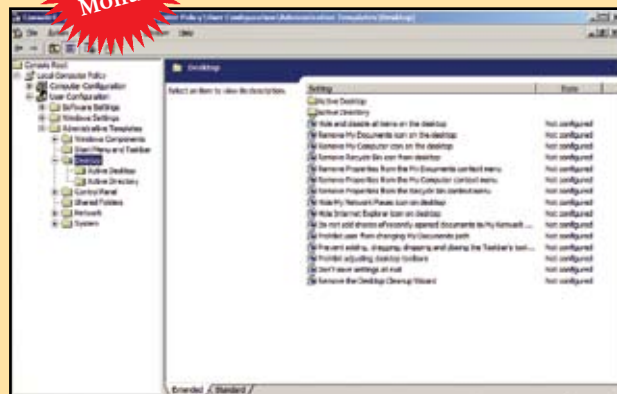
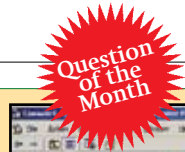
E-mail us your computing problems along with your contact details and complete system configuration to [sos@thinkdigit.com](mailto:sos@thinkdigit.com), and we might answer them here! Since we get many more mails per day than we can handle, it may take some time for your query to be answered. Rest assured, we are listening!



**Q** I have a Pentium 4 processor with 512MB of RAM and an 80 GB hard drive. I use Windows XP SP2 along with Avira and Spybot. Whenever I click on any drive or folder (including any removable drive) I get this response, "This operation has been cancelled due to restrictions in effect on this computer. Please contact your system administrator." I'm already logged in as administrator when this happens. I am able to run all executables on my desktop and able to open all documents on the desktop. The programs also work. I'm not able to save anything in any folder as it refuses to open the folder/drive in the "Save as" window.

Roy

- A**
1. Click Start > Run. Type MMC and then click OK.
  2. Click Console and then click Add/Remove Snap-in.
  3. In the Add/Remove Snap-in dialog box, click Add.
  4. In the Add Standalone Snap-in list, click Group Policy, and then click Add.
  5. In the Group Policy Object window, click Finish.
  6. Click Close, and then click OK.
  7. Go to Local Computer Policy > User Configuration > Administrative Templates.
  8. Click Desktop.
  9. In the right-pane, right-click Hide My Network Places icon on desktop, and then click Properties.



Using the Microsoft Management Console to fix issues with access permissions.TGA

10. Click Not Configured, and then click OK.
11. Expand Windows Components, and then click Windows Explorer.
12. In the right pane, right-click Prevent access to drives from My Computer, and then click Properties.
13. Click Not Configured, and then click OK.
14. Quit the Local Computer Policy MMC snap-in.

Jagdeep Virdi (TECH QNA Expert)

**A** Certain boards can have compatibility issues which mean that it is best to have the same brand of RAM used in both slots. You can try visiting the motherboard manufacturer's site for any BIOS updates that might fix the problem. Remember that flashing your BIOS is risky and can cause your motherboard to fail if not done correctly. You might have to buy a single RAM stick of a higher capacity if the flashing doesn't work. If you haven't cleaned your cabinet in a long time, you should try it as it might fix some of the problems. The long beep could be a missing or loose RAM stick. The problem with the colours changing is not because of a faulty monitor but a faulty display cable. You will need to have it replaced by the manufacturer.

The XFX 7600GT AGP is now an outdated card and can be difficult to find. You might have to settle with a second hand one. If you



Damaged display cables can create a prominent colour tint

## Installing XP Over Vista

**Q** I purchased a Dell Studio laptop, which came preloaded with Vista Ultimate edition on a single partition, with no separate OS installation disc. I have Windows XP Professional that I want to install on my laptop, on a separate partition. Please guide me. Is it necessary to integrate HDD drivers with XP setup before hand?

Mayank

**A** We have carried the solution to installing XP over Vista in last month's QnA



nLite will allow you to integrate drivers into the installation CD



HOW TO

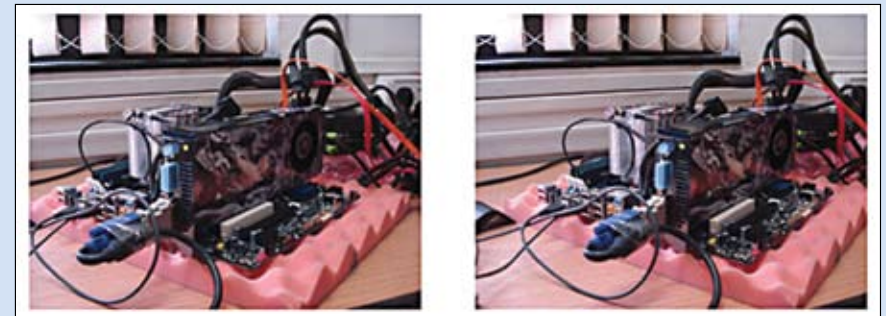
## Make anaglyphic photographs

### Take Your Own 3D Photographs Using any Camera!

An anaglyphic photograph is a 3D photograph. To view these kind of photos, you will require 3D glasses. There is a tutorial on how to make one of these at [http://howto.wired.com/wiki/Make\\_3-D\\_Glasses](http://howto.wired.com/wiki/Make_3-D_Glasses) or <http://tinyurl.com/3dglass>, one of them is pretty simple, all you need are red and blue markers and a CD case. If that is too difficult to arrange, just grab a piece of red cellophane and a piece of blue cellophane. Now to clicking one of those 3d photographs.

We will get the theory out of the way first. You can see real life in 3D because you have two eyes, that send two sets of images to your brain, which gives it a perception of depth. An anaglyph tricks the brain into perceiving depth on a picture. There are actually two images superimposed on one another in an anaglyph. One image is taken from the point of view of the right eye, and another from the point of view of the left eye. The image on each side is tinted with a colour, and the glasses filter out that colour while viewing, so effectively, you see two images from each eye on the single image, and suddenly, there is depth in the photo.

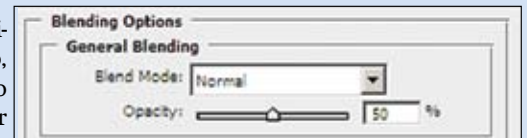
To take your own anaglyph, you can use any camera. Even the camera on your phone will churn out decent 3D photos. What is difficult is choosing a subject that gives the illusion of depth. There should be a few elements in the foreground, a few elements in the back-



Cross your eyes till you see a third photo between the two

ground, and the object prominently in the centre. Take a photo, then move the camera a little to the right or left and take another photo. How much you move the camera depends on the distance of the camera from the object. If you are taking the photo of a small object, you have to move only a little, say 10 cm or so. If you are taking the photo of a tree at a distance of about ten feet, you have to move the camera a distance of about two feet. If you are on top of a high-rise, and want to take an anaglyph of a cityscape, you might have to move about ten feet to the left or right to get that illusion of depth. Experiment a bit, take a lot of photos, and have patience if you don't get it in the first try itself.

Creating the anaglyph from the photos - there are many software that can automatically do this, one such software is available at [http://www.stereoeeye.jp/software/index\\_e.html](http://www.stereoeeye.jp/software/index_e.html). However, for this

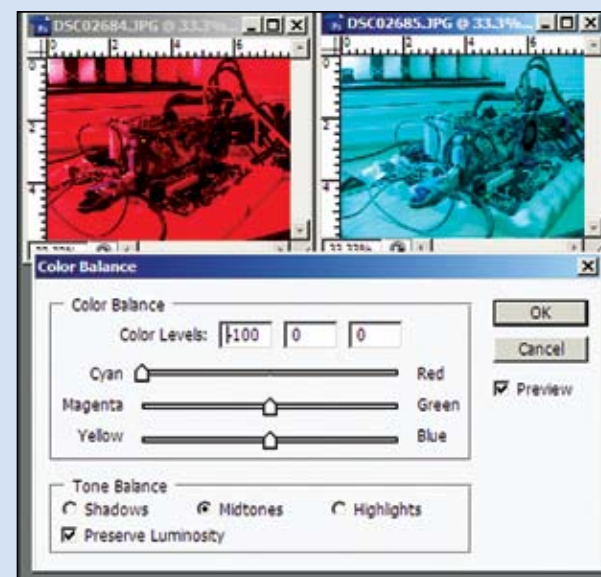


Blending photos for the final output

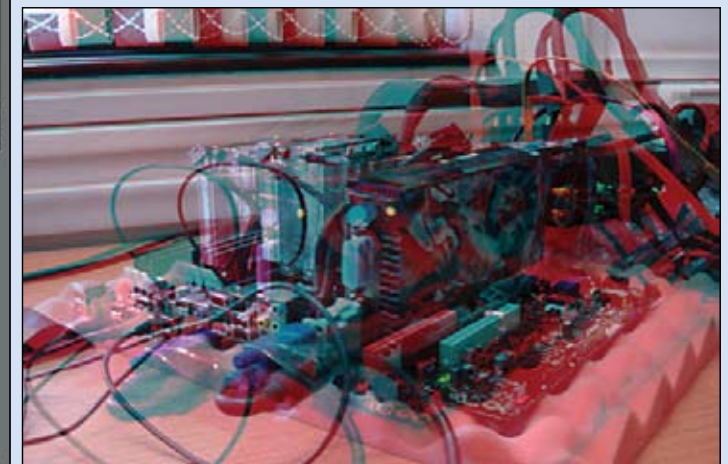
tutorial, we will show you how to make the photo using Photoshop.

Open up both the photos in Photoshop. For the right hand side picture, go to Image > Adjust > Color balance then slide the cyan/red slider all the way to red. By default this is done to the 'Midtones' radio button, do it for both 'Highlights' and 'Shadows'. For the left hand side picture, go through the same procedure, but slide the cyan/red slider all the way to cyan. Now drag any one image in a layer over the other image, then go to Layer > Layer Style > Blending options and slide the opacity slider to 50%. Save the image - and your anaglyph is ready.

To view a 3D image without resorting to 3D glasses, place them side by side as shown in the picture at the top of this page, and cross your eyes till you see a third image, with depth. Your eyes will focus automatically on this image.



Changing the colour balance in Photoshop



The finished anaglyph





section. It was the Question of the month. You should be able to get your answer. You might need to integrate your hard drive controller drives if the laptop is really new and the drivers aren't available on XP's installation CD. The problem with drivers usually happens with the SATA controller and you'll notice it the moment you boot into the XP CD. Your drives will not be detected in case that happens. You can use software called Nlite (www.nliteos.com) to do this.

### Display Gone Dead After Bootup

**Q** My system configuration is as follows: Motherboard: Intel D945GCCR, Processor: 1.8GHz Dual Core, Ram: Dynate 2 GB, Power Supply: PSTECH 450 W, Hard Disk: Seagate 160 GB, Optical Drive: Sony DVD Rw, Operating System: Vista Ulitmate Edition, Monitor: Acer LCD 17-inch Model No. AL1716

My problem is that until today morning my system was running perfectly but after two hours the system automatically restarted. Now it takes a lot of time to load Vista. I manually restarted the system. When i start the computer now, the monitor does not display anything but the fans in the cabinet are working. I've tried everything like removing the battery, changing the RAM and even the power supply and monitor. But it can't display anything.

**A** The problem could be with a couple of things — mostly your hard drive and the power supply. The slowdown could be explained by some issues with the drive. If there is a display when you first power up your PC, then it is to do with the power supply. If the display doesn't come on when you turn on your PC, then a power supply could be to blame. Listen for any beeps as well. If there are any beeps, refer to your motherboard manual to try and pinpoint to what the problem could be.

### I Think My Drive Failed

**Q** My system's DVD combo drive has a problem. Whenever I load a CD or DVD into the drive system hangs up and after sometime a message appears that there is no disk in the drive. When I insert a CD-R into the drive, it is detected but when I burn the CD with Nero, an error message appears during the burn process and disk becomes useless. Please help me.

I have an option to go for a DVD writer if the problem cannot be fixed. I have only IDE ports on the motherboard. I would like to buy a Lite-on DVD writer. I am from Kerala. Where can I buy one?

Akhil S Nath

**A** You might have a faulty drive. IDE drives are easily available are priced between Rs 1,100 and Rs 1,200. The LH-201A1P is a good model. If you have problems finding it, you can

also look at other brands such as LG. The LG GSA-H55 is another good drive.

### Virus problems with Windows 98

**Q** I use Windows 98 and I installed a trial version of Quick Heal and Norton GoBack. The antivirus software I have does not provide me with a native boot scan facility on start up. When I start my PC it shows the wallpaper but the other icons and the startup toolbars do not appear. Every time to start my PC, I have to revert with the help of Norton GoBack.

When I scan my computer, it shows seven scan warnings. I have tried to remove the antivirus software to reinstall but when I restart my PC the same problem appears. I have to again revert to all the previous settings over and over again. Please guide on my how I can remove the viruses stored in boot sector or repair system. I have lots of data on my PC. The virus has also infected a lot of the Windows system files. Please help. Thanks and regards

Shrinivas

**A** You firstly need to try and update your anti-virus with the latest updates so that the application can try and clean the viruses. If the antivirus comes with a bootable disk option, make one and try boot into a floppy or a CD and clean your drive with it. This is the best way to fix any boot sector viruses that you might have. You can also try connecting your hard drive to another computer if that has an antivirus installed. Scan your drive through the other computer with the antivirus. If no antivirus can clean your drive, then you should also back up all of your essential data on to the other drive as the virus might have done irreversible damage to the operating system. You will then need to format your drive and reinstall Windows.

### Drive At The End Of Its Life?

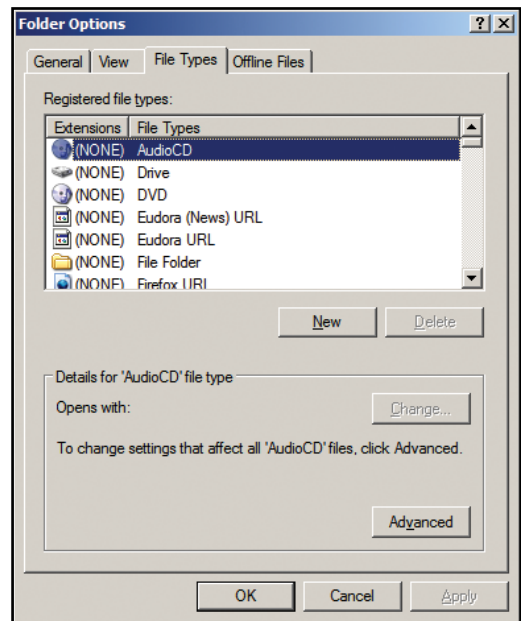
**Q** I own an 80 GB SAMSUNG SP0802N hard disk. Lately, I have installed two software - HDD life Pro 2.5.62 and Hard Dive Inspector 1.85 build #950. When I run both the software, they show some extreme messages. One of them says that the drive has no problem and the other says it is close to failing. Is it time to backup my data?

Chikku George Thomas

**A** Your Samsung SP0802N 80 GB drive is now close to ancient and it's definitely served well when many drives fail within a year or two at times. Both the software might be measuring the state of the drive through different methods, and that's why you are getting the contradictory messages. A drive this old could fail any moment, so it's wise to create a backup of your vital data on another drive or on DVDs to be safe.☑

### Nero Handles All My Executables!

**Q** I have Windows Vista Ultimate running on my computer but unknowingly I went and executed an executable file with Nero Backitup with the option ticked to run all programs with Nero backup. Now, every executable file in Vista starts with Nero so then I removed it and thought that the problems would undo itself but now none of the programs are working.



Explorer Folder Options can be used to fix file handling issues

**A** You can solve it with following steps:  
1. Go to My Computer  
2. Click on Tools in the menu bar  
3. Click on Folder options  
4. Click on the File Types tab  
5. In Registered file types, select extension EXE.  
Look at the type of associated program and see that it is Nero Backitup.  
6. Select extension and click on delete.  
7. Restart your computer

Jagdeep Virdi (TECH QNA Expert)

### DEP Errors With Windows XP2

**Q** I get a computer data execution error message popup when I click on any file, I want to disable it. Please help me.

**A** If you have XP SP2, then it may be "Data Execution Prevention" (DEP) error. Turn off DEP in the XP Control Panel

1. Click the Start button at the bottom left of your screen  
2. Click the Control Panel menu item  
3. Then, double-click the System icon.  
4. Click the Advanced tab  
5. Find the item marked Performance right under there is a button that says Settings.



6. Click the Data Execution Prevention tab.  
7. You will see two options in that window. Click the second option that says "Turn on DEP for all programs and services except those I select."  
8. When you are finished with that then click the 'Add...' button it should be visable at the bottom of the box. Then, you have to find where the file 'explorer.exe' resides on your computer most of the time it's something like this C:\WINDOWS\EXPLORER.EXE anyway add explorer to that list. It'll give you a warning just ignore it and click OK. Then, you reboot and if you try it everything should work just fine.

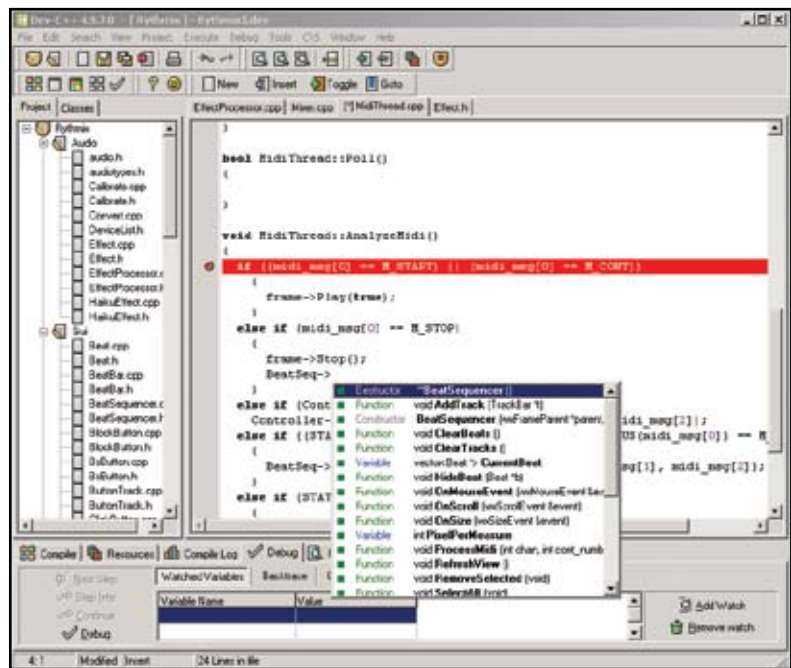
Jagdeep Virdi (TECH QNA Expert)

### Turbo C Crashes On Vista

**Q** My problem is that I am not able to do any graphical programming through my Vista operating system. Firstly, it does not support full screen and secondly when I run any program in the small Turbo C screen, it shows error NTVDM.exe and stops working. The screen flickers and goes blank. Is there any way to fix this? I use Turbo C and Windows Vista Home Basic.

**A** Try using the Dev CPP IDE and this should help fix your problem. It is an updated application with a host of additional features. It also uses the gcc compiler. The turbo c compiler has not been updated and support for it is not available. Dev CPP is a free compiler available online. I have not tried Turbo C in Vista.

Prasanth Philip (TECH QNA Expert)



Dev CPP is a great free IDE for C and CPP programming



Michael Browne

So you thought the megahertz war was over? Dead wrong; the battle for clock speed simply carried on over a different battleground — the multi-core one. In the time before the Core 2 Duo and Athlon 64 Intel and AMD were determined to out-clock each other and with little heed for whose architecture was actually superior they kept slugging it out. Intel was the major culprit of the two; their Pentium 4 CPUs scaled terrific speeds of up to 3.8 GHz and in the bargain provided users not only with a CPU but a free room heater as well. AMD finally used some grey matter and came back with the Athlon 64 range of CPUs. Thanks to brilliant design, greater IPC, (Instructions Per Clock), and a highly efficient memory controller integrated on the CPU die itself these processors enjoyed a peaceful dominion for some two years; and AMDs depleted coffers gradually filled up with the spoils; nobody in the desktop space with any common sense was even buying Intel anymore. These well-gotten gains were used by AMD to gobble up ATi Technologies in the hope of procuring good

**Meet the latest bad boys from AMD and Intel. They're fast, they're mean, and they're gunning for a place in your machine**

integrated graphics solutions for their platforms and for just a little while AMD was slightly remiss in its duty to develop the best CPUs around, which is obviously a function of cash-in-hand. This is a business where even slim opportunities are capitalised upon, and Intel is nobody's fool. Silent for nearly two years, smarting from the back-handed insult the Athlon 64s had delivered; nestled deep inside their research bunkers in Israel, a team of Intel engineers had prepared a little surprise they codenamed "Conroe"; an architecture that did away with the Pentium 4s *NetBurst Microarchitecture* totally and had a number of new, radical improvements. We know the CPUs based on this architecture as *Core 2 Duo*, a name that has become synonymous with the

term performance over the past two years.

Core 2 Duo methodically destroyed Athlon 64 overnight, and Intel was basking in the glow of enthusiast affection again.

One thing that the Core architecture did was delve deep into multi-core processing territory; from where the CPU industry has yet to return; and perhaps never will. Parallelism is the future and we're seeing dual-core processors fast becoming the *de facto* standard globally. Newer tri-core and quad-core CPUs are also becoming widespread; their main functional principle? Simple, more hands can do more work.

Sadly application support for these tiny computing marvels is sorely lacking; and applications have only just started featuring support for up to two processing cores. A select handful of applications have incorporated support for more than two cores. The reason for this dearth in application support is simply volumes; what's the use of spending resources developing and optimising a software application for a quad-core processor when only some five per cent of the total desktops around the world feature these processors? Such multi-core CPUs spoil

# War At The Core



Shrikishna Patkar

applications by giving developers the liberty to assume infinite processing resources, which leads to a whole new can of worms. Then there are those applications that benefit more from increased core clocks, a good example being 3D games in general. In fact any application that doesn't support more than a single CPU core will respond to higher clock speeds favourably. Obviously a quad-core CPU cannot maintain the same clock speed as a dual-core CPU; the laws of thermal dissipation just don't allow it. Similarly a single core will be able to main-

tain a higher stable clock speed than a dual-core; and will generate less heat at any given clock speed. Now there's a dilemma — what do you buy, if you were shopping for a processor? Do you look at performance primarily and go for a dual-core, (single cores are history now, so they're out), or do you invest in a quad-core; which surely would be more future proof, as applications will eventually become heavily multithreaded? Then there's the all important factor of cost. Do you spend Rs 10,000 on a 3.2 GHz dual-core or do you opt for a 2.5

GHz quad-core instead? There's no simple answer for this question. Some applications will run better on the quad-core, while others will favour the dual-core, so your choice of application dictates which processor would be better. Obviously you could hunt around for a 3.2 GHz quad-core, but then you would probably pay around Rs 25,000 for it; a hike of 250 per cent, for a performance delta of not more than 30 per cent. We've got a mix of dual-, tri-, and quad-core CPUs in this comparison; ten CPUs from AMD and five from Intel and we've

## How We Tested

We used the following components on our test machines:

Test Bench Components	
RAM	2 x 2 GB, Corsair Dominator DDR2 1066 MHz
Video Card	ASUS EN GTX 280 TOP (670 MHz core)s
HDD	WD Raptor 10,000 rpm, 80 GB SATA
OS	Windows XP Prof SP 2

For AMD boards we used the ASUS M3N HT-Deluxe Heat-Pipe Edition motherboard based on NVIDIA's 780a SLI chipset. Our Intel platform was based on an ASUS Rampage Formula motherboard based on Intel's X48 chipset. We use the best components possible to ensure these processors were not bottlenecked in any way. We also used identical test bench rigs for both systems to minimise the influence of components other than the processors. This ensures the most accurate results, since any change in performance can only be attributed to the processor. We did not rate features at all, these are largely unimportant for CPUs, since performance is a better indicator of how good a particular feature is or not. Our benchmarks were divided into two categories — Synthetic and Real World.

PC Mark 05 is a standard benchmark that tests all major subsystems of a PC. We noted only the processor score from the scores received. This score is arrived at by stressing the CPU with many tasks like encoding, extracting, physics, math calculations and simulations. 3D Mark 2006 tests a computer's CPU and graphics card. We noted the CPU score only, this benchmark runs a number of physics, AI, and render routines to arrive at the CPU score. wPrime is a multithreaded benchmark that stresses CPUs by computing the square roots of many numbers at once. We use the 32M setting, which computes the square root of 32 million numbers. The result is returned in seconds taken to complete the task; obviously the lower this value is, the faster the processor. ScienceMark 2.0 is a suite of benchmarks that consists of molecular simulations, encryption algorithms and other benchmarks that stress out your CPU. This benchmark is used for theoretical engineering and scientific computing. MemBench tests the speed of the CPUs L1 and L2 cache and the memory speed; we were interested in the latter. The Cryptography part

of the test uses Rijndael's method of AES encryption and tests your CPUs number crunching ability.

CineBench R10 is CineBench's latest benchmark that tests the CPUs rendering capabilities in rendering a fixed scene with fixed lighting. It is heavily multithreaded and you will see a quad core CPU distributing the rendering workload into four parts at the beginning. If one core finishes its workload early it jumps in and helps another core finish up. CineBench is an important theoretical benchmark for those intending to use their PCs for rendering. POV-Ray 3.7 is an acronym for Persistence Of Vision Raytracer; this is a free tool that can be used to create 3D scenes with light effects. We use an inbuilt scene called Chess 2 and this scene is rendered at a resolution of 800 x 600 pixels. The time taken to do so is duly noted in seconds, the quicker the CPU, the better it is.

For real world rendering tests we use Maya 8.0. We rendered a scene called Globalillum at a resolution of 640 x 480 pixels at production quality settings. This benchmark can be set to use one, two, three or more cores. Once again, the less the time taken, the faster the CPU is. WinRAR 3.8 is the latest compression tool from RAR labs. We use the inbuilt benchmark that provides us a score in kilobytes per second, obviously the higher this value the faster the CPU is at compression/decompression tasks. DivX Encode 6.8.0.19 is a popular tool for DVD ripping and video encoding. We used a 100 MB .VOB file and ripped this to a home theatre grade DivX file. The time taken to complete this is measured, and the fastest CPUs are the ones that do it the quickest.

Lastly we ran three games — *Doom 3*, *Company Of Heroes* and *Unreal Tournament 3*. These games were run at minimum resolutions and detail settings to make them as CPU bound as possible. This is done to reduce the role of the graphics card in the benchmark, obviously the role of the GPU cannot be eliminated, but it can be minimised.

Pre-setup we flashed the motherboards to their latest stable BIOS'. The latest drivers were downloaded from their respective sites. For the GTX 280 we used NVIDIA's drivers V 178.13. After installing all benchmarks, disk defragmenter was run to ensure minimal fragmentation. Each of the benchmarks was run thrice and a mean figure taken.

thrashed them through some of the most taxing applications around just for fun; and to aid you in choosing one.

For the benchmark gurus:  
**PC Mark 05 And 3D Mark 06**

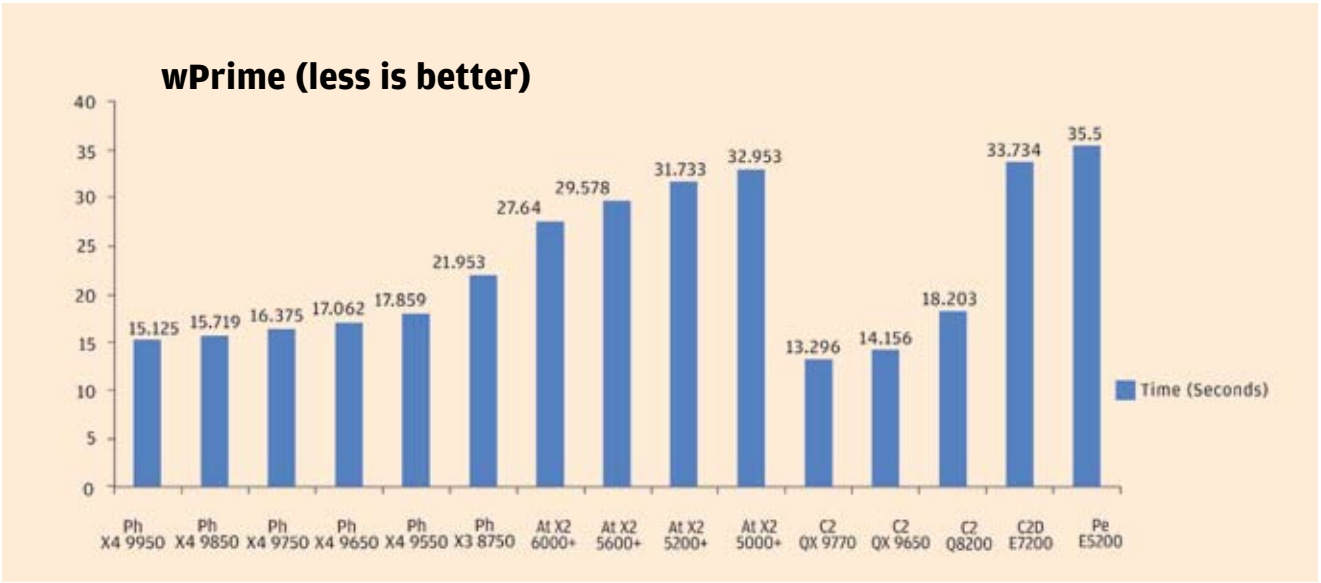
The answers are in the stars, as it's said. Intel's QX9770 and QX9650 CPUs reach for the stars with some superb scores; the QX9770 being the only processor to actually cross a CPU score of 10,000 in PC Mark 05. A mini battle takes place between the two similarly positioned quad cores; AMD's Phenom X4 9950 and Intel's Q8200 which are very close to other with a small advantage going to AMD. The Phenom

X4 9850 is very close to the Q8200 as well, but is a little slower. Interestingly the Phenom X4 9950 is cheaper than the Q8200 by Rs 985. What's interesting to note is the way these scores scale with the number of cores; very much like a stepladder. CPUs having an identical number of processing cores will perform similarly, the next factor affecting them being core speeds. As we move up from two to three cores, there is a larger hike in performance as seen in case of the Athlon 6000+ and the Phenom X3 8750 in 3D Mark 06. A much higher clock speed advantage for the 6000+ (3.1 GHz VS 2.4 GHz for the X3 8750) isn't enough to push it past its sibling. Intel's slowest offering

the Pentium E5200 is faster than both of AMDs slowest offerings but is also costlier.

Number crunching:  
**wPrime 1.55**

We were very interested to check these scores as this benchmark scales very well with multi core CPUs while being ultra sensitive to clock speed changes. It's a superb test for the math computational grunt of your CPU. Intel's QX 9770 and QX9650 are unstoppable in this test and both crack the sub-15 second barrier. But these CPUs cost more than four times the amount you pay for AMDs costliest CPU, which is not acceptable under any conditions.



Intel's Q8200 which is slightly costlier than AMDs X4 9950 is demolished by that worthy, in fact all the AMD X4 Phenom's outperform it. AMD is faster than Intel in general throughout this benchmark and even the cheaper Athlon X2 CPUs have fun dancing circles around the E5200 and E7200 CPUs from Intel.

For the scientist:  
**ScienceMark 2.0**

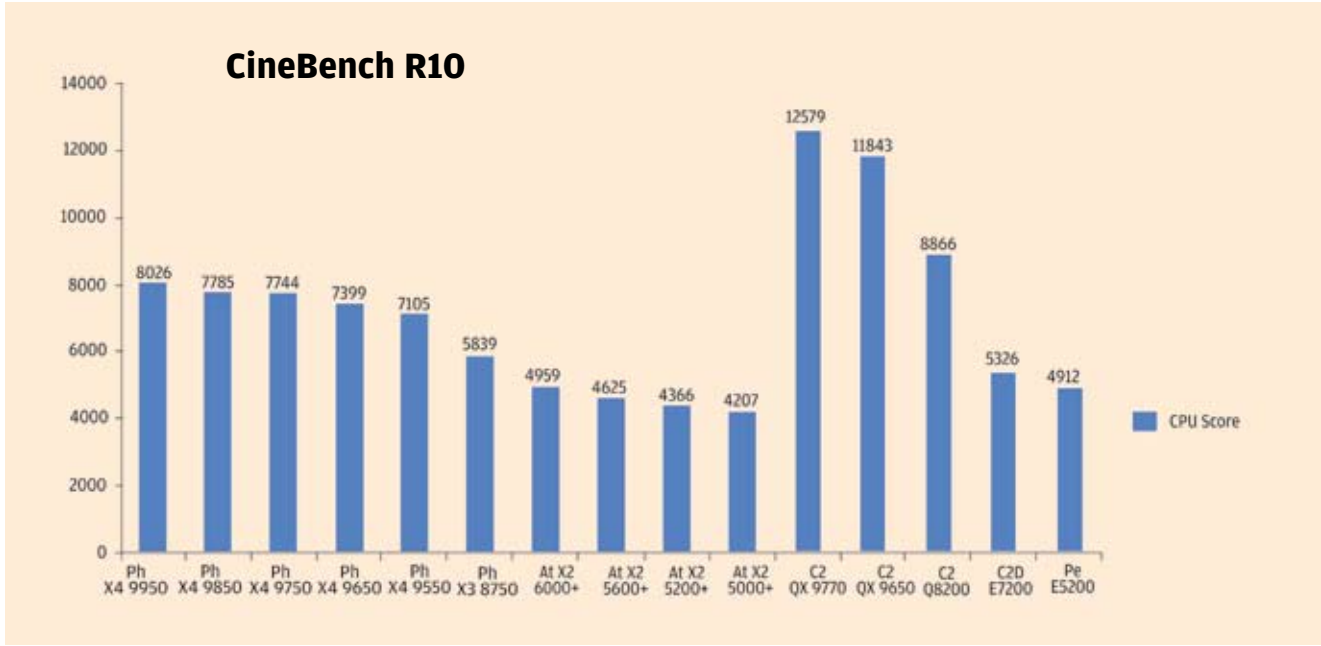
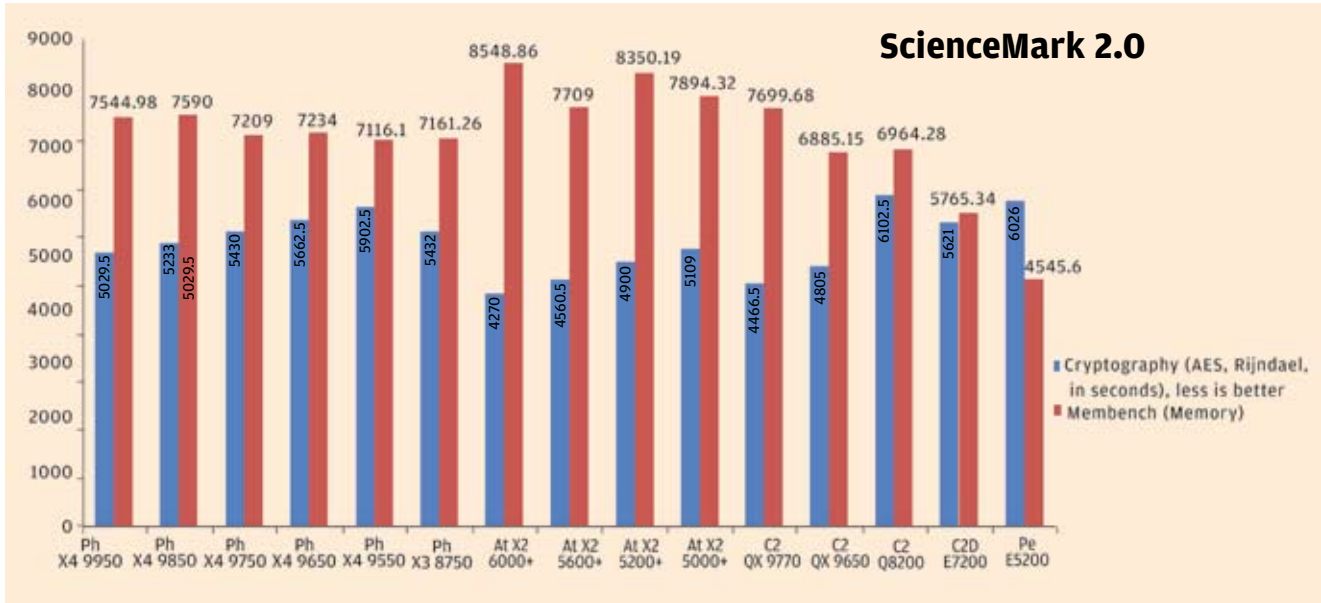
Sadly ScienceMark 2.0 doesn't seem to scale with the number of cores. This benchmark favours higher clock speeds more as a cheap high-clocked dual-core pro-

cessor (AMDs 6000+) steals the thunder from the likes of the QX9770 which is ten times costlier. Shockingly the fastest Intel CPUs are clocked at nearly the same clock speeds as the 6000+ which runs at 3.1 GHz; this means AMDs architecture is much better at dealing with ScienceMark's computations. We shudder to think what would happen to Intel in this benchmark if a Phenom X4 were to be clocked at around 3.2 GHz. The QX9770 and QX9650 are the second and third fastest CPUs in this test, after which its time for the 5600+ to strut its stuff; this CPU creams the Q8200 which costs more than twice

of the 5600+'s meagre price of Rs 4,600. In terms of encryption Intel's lower CPUs do not scale at all, their Core 2 Quad 8200 is identical to the Pentium E5200. The Q8200 itself is faster than the mighty QX9650 in terms of memory bandwidth.

The rendering standard:  
**CineBench R10**

CineBench R10 is designed ground-up for multi core CPUs. Because of the nature of this benchmark we naturally assume all those interested in any sort of image editing or 3D rendering works would closely look at





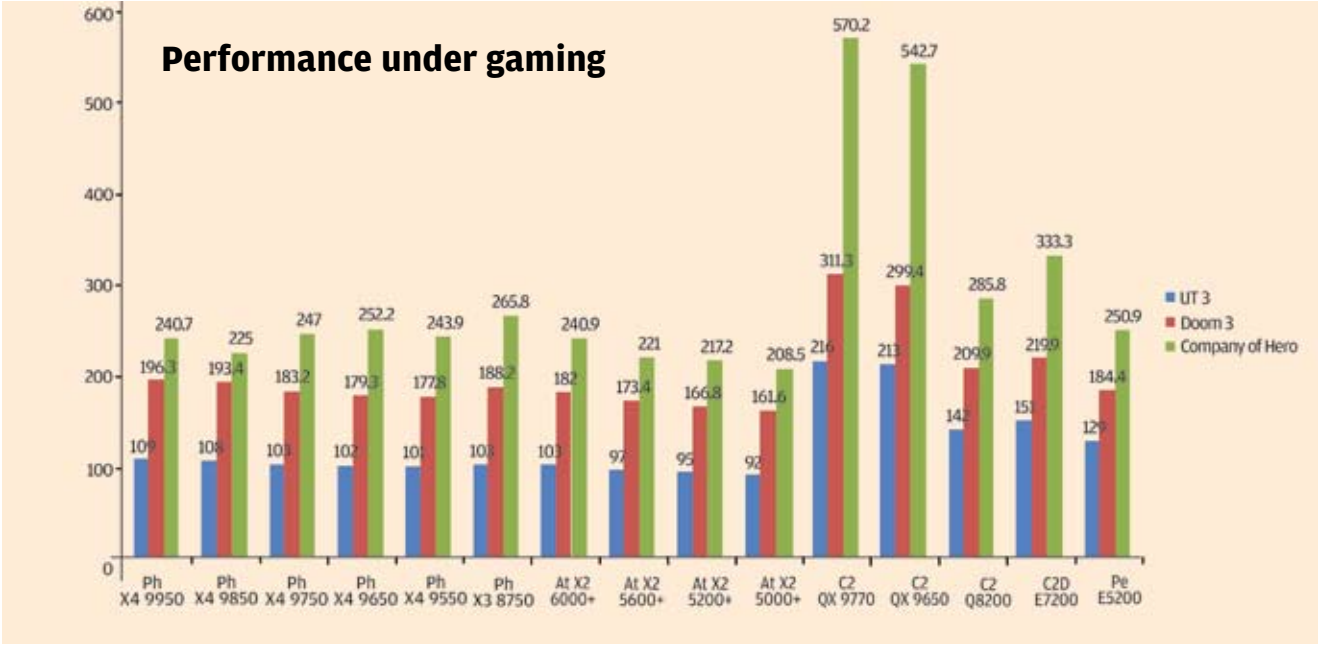
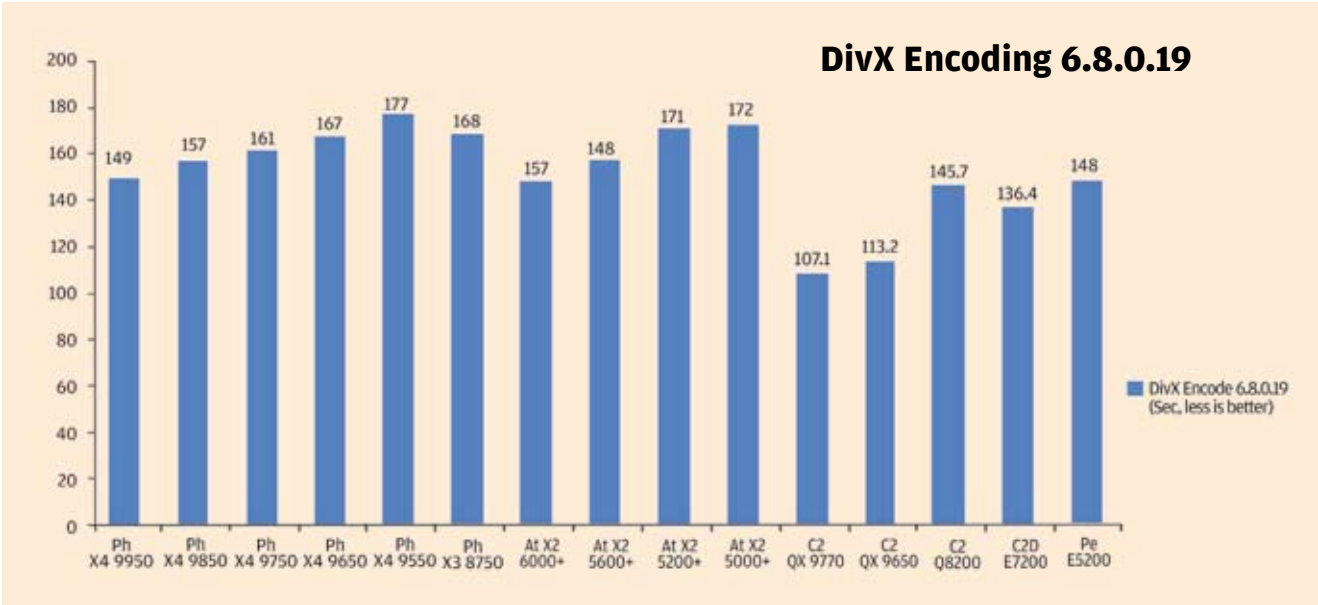
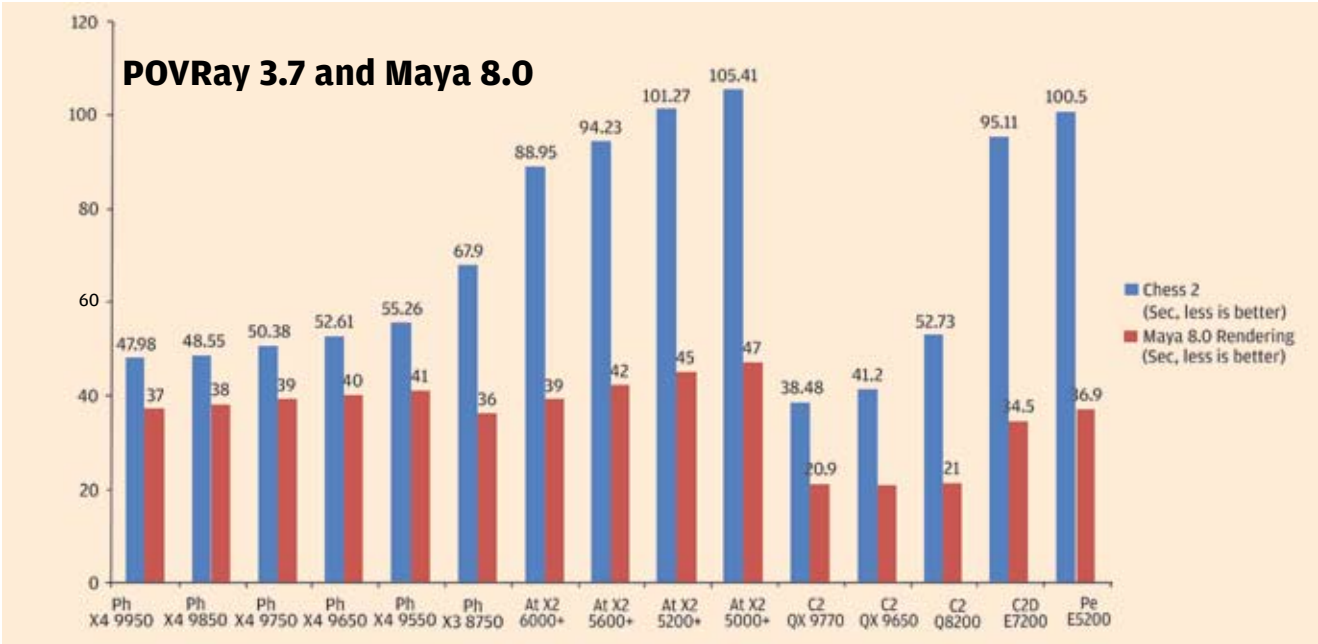
CineBench’s performance numbers. Intel’s three quad cores take the first three positions; the QX9770 and QX9650 are alone at the top and sail past the 10,000 point barrier, which proves too much for all the other CPUs. Even the Q8200 is ahead of the competition by a healthy 800 points or so. Intel’s dual cores are also faster than AMDs alternatives, except the X2 6000+ which edges out the E5200. Anyone looking to use CPUs for any sort of 3D content creation should take a look at Intel’s CPUs as their performance in CPU-intensive rendering features like reflections, ambient occlusion, lighting and

procedural shaders is unmatched. Obviously there is a price angle to be considered as well, but in general, an Intel quad-core will outpace any AMD CPU, as the Q8200 is one of the slowest Intel quad cores around.

More 3D content creation:  
**POVRay 3.7 Beta and Maya 8.0**

Both these rendering benchmarks stress just about any CPU out there. Maya 8.0 has very strong multi-core abilities not to mention it is one of the most popular 3D packages worldwide, along with *3D Studio Max*. POVRay has long been acclaimed for its ability

to stress a CPUs ability to render. Most animators and 3D render artists would want to take a very close look at these scores, along with the score of each CPU in CineBench R10. People with a budget will be looking for best bang for their buck; others will just want the fastest solution around. From the lack of skyscrapers in the Intel corner it’s very easy to tell these CPUs thrive on 3D rendering and content creation. The Intels Q8200 makes a sensible buy for anyone looking to use Maya, as it scores the same as the QX9650 which is much costlier. For some reason AMD doesn’t do well in Maya, even Intel’s low-end



dual cores are faster, this may be in case Autodesk has optimised Maya for use with Intel processors. Under POVRay, AMD’s fastest X4 Phenom’s can hold their own against the slightly costlier Q8200, although if it’s a price no bar situation then Intel wins with its QX9770 and QX9650 duo.

Compression and Encoding:  
**WinRAR 3.8 And DivX 6.8.0.19**

Under WinRAR 3.8 Intel’s QX 9770 and QX 9650 take first and second position followed all five AMD X4 Phenom CPUs. For some reason the 3.0 GHz QX 9650 is even faster than its 3.2 GHz sibling, the QX 9770. The Q8200 is too meek to play hardball with the big boys from AMD – and at 20 per cent less performance but a fifth of the price of the two costliest Intel CPUs, the Phenom X4 9950 makes the most sensible choice for those working with a lot of compression/decompression algorithms. DivX isn’t multi-core optimised at all; we saw CPU utilisation at a steady 25 per cent under Windows’ Task Manager’s Performance pane. This means that only a single core is working and in case of a quad-core CPU the other three cores are sitting idle. This version of DivX is also SSE 4 optimised, which means it is biased towards Intel’s Wolfdale and Yorkfield CPUs; which is why

the lack of multi-threading support came as a shock. We were surprised to see AMDs Phenom X4 9950 and X2 6000+ give Intel’s Q8200 a good run for its money. The two Extreme Edition Intel CPUs are untouchable; but for their prices they had better be.

For gamers:  
**UT 3, Doom 3 And Company Of Heroes**

Today games are the numero uno reason why most of us home users buy fast GPUs and CPUs. Everybody wants their games to look as close to real as possible and words like realism and immersiveness are becoming regular lingo for any gamer. Developers know this, NVIDIA and ATI know this and so do Intel and AMD. Unfortunately games like *Crysis* and *World In Conflict* stress out GPUs more than they stress CPUs and the fastest cards barely choke up 60 fps (30 fps for *World In Conflict*). Such benchmarks are therefore not very suitable for testing CPUs. From amongst our trio of games, *Company Of Heroes* was optimised for Intel CPUs and sometimes this becomes very visible with the tremendous increase in fps over the AMD CPUs. This should be taken with a pinch of salt however, because the difference will not be as noticeable at higher resolutions and higher

visual settings. For purposes of testing CPUs we intentionally keep settings and resolutions low to allow the processors to scale in performance.

*Company Of Heroes* threw up some weird scores – not only was a slower clocked AMD tri-core (the Phenom X3 8750) faster than the top-end Phenom X4 9950 but Intel’s Q8200 was significantly slower than the cheaper by half E7200. The QX 9770 and QX 9650 remain untouchable across all games. Sadly AMD loses out in *UT 3* – developer support does really matter, and for most game developers jumping on to the leading bandwagon seems the most prudent choice. *Doom 3* was a fantastic engine to benchmark and seeing Intel’s superiority here just cements their claims; developer support be hanged – the Core 2 Duos and quads are the best CPUs around for discerning gamers or anyone who wants maximum eye-candy in their games.

**Who Won, Who Lost?**  
Did we ever use the phrase *you pay for what you get* before? Intel just thrashes AMD at the top-end and the Phenom X4s have no answer to the QX 9770 and the QX 9650 when it comes to brute force processing. With 12 megabyte L2 caches and clock speeds of up to 3.2 GHz these CPUs are the fastest desktop processors available on



# The Nehalem Cometh

The fastest CPU on the planet, the QX 9770, is in severe danger. It faces competition; but not from the expected quarter i.e. AMD. Shockingly, Intel is doing to itself what they did to AMD two years ago with their Core 2 Duos. They promised a new CPU architecture every two years and true to their promise we got a large, inconspicuous looking parcel from Intel, USA. Opening it we were surprised to find a large black motherboard called the DX 58SO, nicknamed "SmackOver"; obviously based on their X58 chipset. Also in the bundle was a rather large CPU, clearly larger than any LGA 775 CPU. We also found a set of three 1-GB DDR3 1066 sticks. Now Nehalem supports tri-channel DDR3, so by now we were rubbing our hands in glee. Rummaging deep into the carton we unpacked a small box that contained an 80 GB Solid State Drive that runs off a SATA 2.0 interface.

Setting up the kit, we had a quick look at the DX 5850s BIOS which was laden with over-clocking features and all sorts of settings; enough to keep even hardcore overclockers exuberant. Interestingly the Nehalem runs off a 133 MHz FSB, while all Penryn CPUs use a faster 333 MHz bus. Thus the multiplier for these CPUs is very high. We found



The Nehalem Kit consisting of X58 motherboard, 3 GB of 1066 MHz DDR3 RAM and Intel 80GB SSD

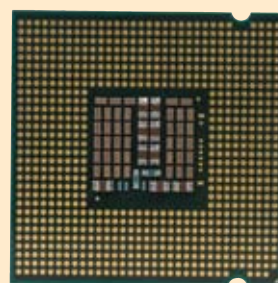


we had the Core i7 Extreme 965, which is a 3.2 GHz part and the top-of-the-line Nehalem processor — oh joy! There was no way to set the multiplier to run at 24x fixed. An option to turn on *Turbo Mode* promised to freeze the multiplier to any maximum value specified (in this case 24x) but this didn't work and the multiplier shuffled between 12x and 24x throughout our tests.

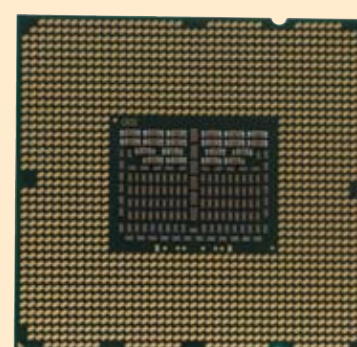
The reason for Nehalem having a slower bus is that the CPU

itself now has the memory controller integrated on its die; a first for Intel. Therefore a very fast bus is no longer needed to communicate with the Northbridge, which traditionally incorporated the memory controller for Intel-based systems. Nehalem should now (at least theoretically) enjoy very low latency access to memory resulting in improved memory utilisation, something which AMD has excelled at since their memory controllers became part of their CPU dies. This in itself is the biggest change and something that makes Nehalem totally different from the Core 2 architecture and

	i7 Extreme 965 (3.2 GHz)	QX 9770 (3.2 GHz)	Difference (In Percent)
PC Mark05 (CPU Score)	10897	10321	106
3D Mark 2006 (CPU Score)	6411	5238	122
Wprime (32 Million) (all cores / single core)	8.328	13.296	160
ScienceMark 2.0			
Cryptography (AES)	8.503	8.933	105
Membench	13165.14	7699.68	171
CineBench R10			
CPU Rendering (All CPUs)	15609	12579	124
CPU Rendering ( 1 CPU)	3845	3522	109
PovRay 3.7 (Real Time)			
Multi CPU Bench	91.17	87.63	96
Single CPU Bench	312.88	343.78	110
Chess 2			
Maya 8.0 Rendering (sec, all cores)	19.9	20.9	105
Maya 8.0 Rendering (sec, single core)	43.5	52.3	120
WinRAR 3.8 (KBps)	4109	2156	191
DivX Encode 6.8.0.19 (sec)	91.5	107.1	117
UT 3 (Deimos)	62	216	29
Doom 3	378.5	311.3	122
Company Of Heroes	606.6	570.2	106



Intel QX9770 on the left, Intel i7 Extreme 965 on the right. Note the increase in die size



something that was missing from Intel's repertoire for awhile now. Owing to this shift, all Nehalem CPUs are built around a colossal 1366 LGA socket, a huge hike in number of contacts from LGA 775. Nehalem also features an old trick from Intel - Hyper-threading; which hasn't been around since the third generation of Pentium 4 processor. Nehalem is available as dual- and quad-core configurations, which means four or eight hyper threaded cores. True to this Windows XP shows the i7 Extreme 965 as having eight cores.

Besides this Nehalem uses L3 cache, previously unheard of on desktop CPUs except for Intel's Extreme Edition Pentium 4s of old. This L3 cache is shared between cores, much like Core 3 Duo processors share their L2 cache. The L2 cache on Nehalem CPUs is now discrete per core; and each core gets 256 KB of dedicated L2 cache. The L3 cache is a whopping 8 MB, though still not as much as the 12 MB L2 caches on the Yorkfield processors. Nehalem is still not natively quad core. Due to the fact that the i7 has an integrated memory controller its external bus operates on a HT-like link at 6.4 GBps. This in itself means the numbers are incomparable to earlier Intel CPUs including the Wolfdale and Yorkfield processors.

We tested the Nehalem kit with the supplied DX 58SO motherboard, 1 x 3 GB DIMMs of DDR3 1066 MHz memory, Intel's 80 GB SSD and ASUS' GTX 280. Although a fair comparison isn't possible since we used a number of different components on our CPU test bench we did a few comparisons. The memory on the Nehalem system was running at 1066 MHz at

timings of 7-7-7-20, which is possibly slower than DDR2 800 MHz at 4-4-4-12; which means the QX 9770 has somewhat of an unfair advantage. Of course with read speeds in the region of 260 MB/s, SSD is a solid advantage for the newcomer, so we're calling it about even. With identically clocked core speeds both these CPUs slugged it out, but Nehalem seems to have a trick too many for the QX 9770 which gives up in despair. Only in UT 3 did we see a curious 62 fps drop- this has got to be a glitch with the game on this platform and updates from either Intel or Epic Games are sure to remedy this. The only other benchmark to favour the older QX 9770 is the multi-core benchmark in POVRay 3.7, where the i7 965 is some 3.5 seconds slower in completing the scene, this may be attributed to the overhead involved in hyper threading, because in the single core render test Nehalem is faster.

What was shocking was the difference HT made under wPrime; it's a whole 60 per cent faster; Nehalem chalks up 8.503 seconds, something a Core 2 Quad wouldn't do even at 4 GHz, and something most dual cores cannot dream of even at beyond 5 GHz! Likewise all applications show a healthy performance gain, WinRAR being the biggest beneficiary to the newcomers ego with a super 91 per cent increment in compression/decompression performance. The best thing is that this is a review kit, with initial BIOS updates and drivers; as the platform matures the i7 will get a lot faster. Faster DDR3 memory will also help. If that wasn't enough the top-end i7 Extreme 965 is expected to cost around Rs 55,000, which makes it cheaper than the QX 9770.



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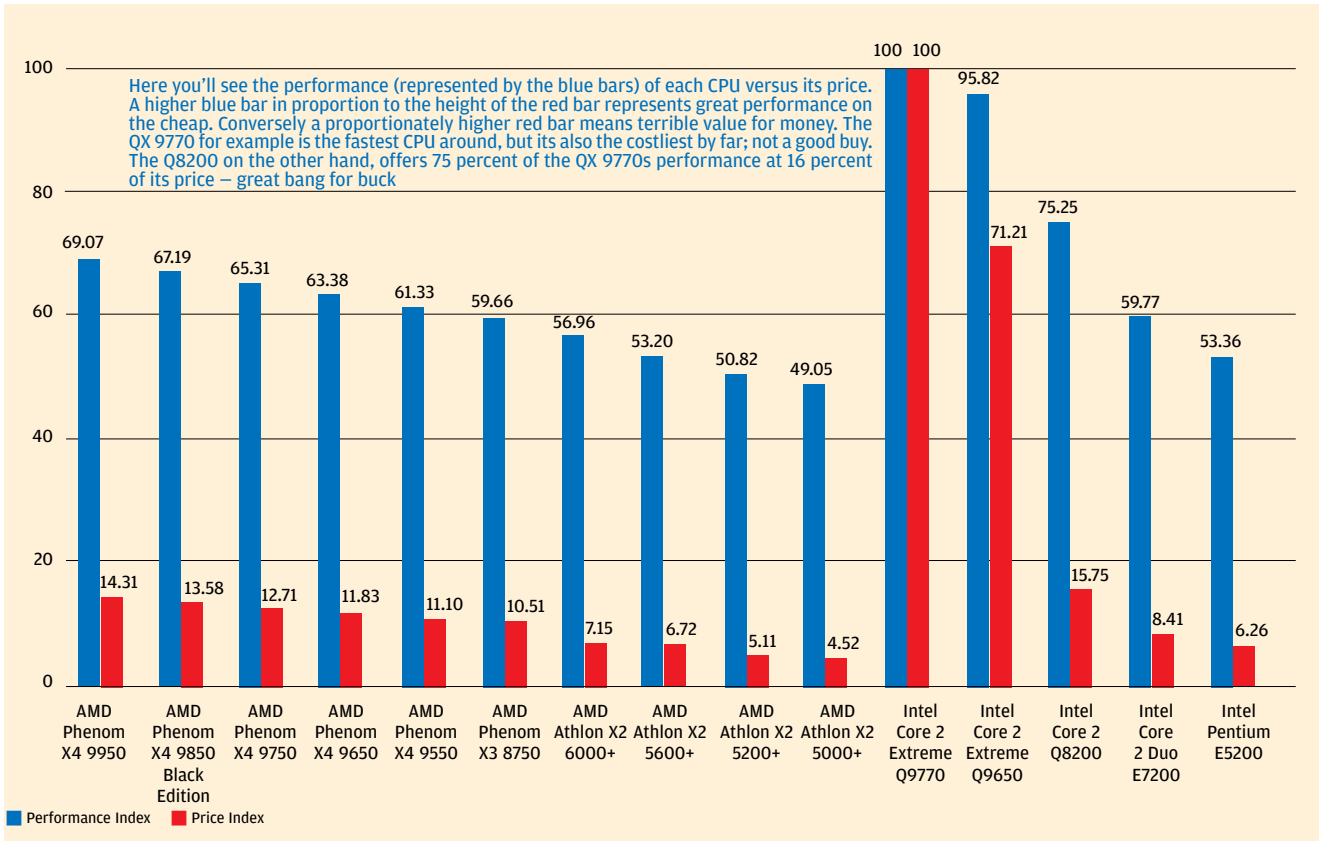
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CPUs															
Brand Model	AMD Phenom X4 9950	AMD Phenom X4 9850 Black Edition	AMD Phenom X4 9750	AMD Phenom X4 9650	AMD Phenom X4 9550	AMD Phenom X3 8750	AMD Athlon X2 6000+	AMD Athlon X2 5600+	AMD Athlon X2 5200+	AMD Athlon X2 5000+	Intel Core 2 Extreme Q9770	Intel Core 2 Extreme Q9650	Intel Core 2 Q8200	Intel Core 2 Duo E7200	Intel Pentium E5200
Price (Rs)	9800	9300	8700	8100	7600	7200	4900	4600	3500	3100	68450	48750	10785	5760	4285
Performance Scores (Out of 100)	63.13	61.41	59.69	57.93	56.05	54.52	52.06	48.63	46.45	44.84	91.39	87.58	68.77	54.63	48.77
Features															
Core Frequency	2600 MHz	2500 MHz	2400 MHz	2300 MHz	2200 MHz	2400 MHz	3100 MHz	2900 MHz	2700 MHz	2600 MHz	3200 MHz	3000 MHz	2.33 GHz	2.53 GHz	2.5 GHz
Number Of Cores	4	4	4	4	4	3	2	2	2	2	4	4	4	2	2
External Bus Frequency	2000 MHz	2000 MHz	1800 MHz	1800 MHz	1800 MHz	1800 MHz	1000 MHz	1000 MHz	1000 MHz	1000 MHz	1600 MHz	1333 MHz	1333 MHz	1066 MHz	800 MHz
Fabrication Process (in Nanometers)	65 nm	65 nm	65 nm	65 nm	65 nm	65 nm	65 nm	65 nm	65 nm	65 nm	45 nm	45 nm	45 nm	45 nm	45 nm
L1 Cache	512 KB	512 KB	512 KB	512 KB	512 KB	384 KB	256 KB	256 KB	256 KB	256 KB	256 KB	256 KB	256 KB	128 KB	128 KB
L2 Cache	4 x 512 KB	4 x 512 KB	4 x 512 KB	4 x 512 KB	4 x 512 KB	3 x 512 KB	2 x 512 KB	2 x 512 KB	2 x 512 KB	2 x 512 KB	2 x 6144 KB	2 x 6144 KB	2 x 2048 KB	3072 KB	2048 KB
L3 Cache (if any)	2 MB	2 MB	2 MB	2 MB	2 MB	2 MB	N	N	N	N	N	N	N	N	N
Performance															
Synthetic Benchmarks															
PC Mark05 (CPU Score)	7713	7410	7233	6829	6533	6462	6325	5851	5526	5313	10321	9674	7540	6498	6141
3D Mark 2006 (CPU Score)	3886	3812	3624	3493	3358	2912	2375	2221	2075	2005	5238	4984	3791	2350	2200
Wprime (32 Million) #	15.125 sec	15.719 sec	16.375 sec	17.062 sec	17.859 sec	21.953 sec	27.64 sec	29.578 sec	31.733 sec	32.953 sec	13.296 sec	14.156 sec	18.203 sec	33.734 sec	35.5 sec
ScienceMark 2.0															
Cryptography (AES Encryption, Rijndael) #	10.059 sec	10.476 sec	10.86 sec	11.325 sec	11.805 sec	10.864 sec	8.54 sec	9.121 sec	9.8 sec	10.218 sec	8.933 sec	9.61 sec	12.205 sec	11.242 sec	12.052 sec
Membench (Memory Bandwidth)	7544.98	7590	7209	7234	7116.1	7161.26	8548.86	7709	8350.19	7894.32	7699.68	6885.15	6964.28	5767.34	4545.6
CineBench R10 (CPU Rendering Test 1)	8026	7785	7744	7399	7105	5839	4959	4625	4366	4207	12579	11843	8866	5326	4912
PovRay 3.7 (Chess 2, Real Time) #	4798 sec	48.55 sec	50.38 sec	52.61 sec	55.26 sec	67.9 sec	88.95 sec	94.23 sec	101.27 sec	105.41 sec	38.48 sec	41.2 sec	52.73 sec	95.11 sec	100.5 sec
Real World Benchmarks															
Rendering:															
Maya 8.0 (Gobalillum.ma, 640 x 480, Prod. Quality) #	37 sec	38 sec	39 sec	40 sec	41 sec	36 sec	39 sec	42 sec	45 sec	47 sec	20.9 sec	21 sec	21 sec	34.5 sec	36.9 sec
Compression:															
WinRAR 3.8 (KBps)	1836	1813	1793	1762	1742	1521	1255	1180	1182	1137	2156	2188	1691	1238	1043
Encoding:															
DivX Encode 6.8.0.19 (sec) #	149 sec	157 sec	161 sec	167 sec	177 sec	168 sec	148 sec	157 sec	171 sec	172 sec	107.1 sec	113.2 sec	145.7 sec	136.4 sec	148 sec
Gaming:															
UT 3 (800 x 600, All Visual Settings Off)	109	108	103	102	101	103	103	97	95	92	216	213	142	151	129
Doom 3 (640 x 480, Low Detail)	196.3	193.4	183.2	179.3	177.8	188.2	182	173.4	166.8	161.6	311.3	299.4	209.9	219.9	184.4
Company Of Heroes (800 x 600, Min Detail)	240.7	225	247	252.2	243.9	265.8	240.9	221	217.2	208.5	570.2	542.7	285.8	333.3	250.9
# Lower Is Better															



the planet (for now). The QX 9770 is clearly a super high-end part. It features an FSB speed of 1600 MHz and an unlocked multiplier – overclockers rejoice. The bad – at Rs 68,450, you can actually build an entire PC with a GTX 260 graphics card for the price. At Rs 48,750, the QX 9650 is cheaper, but not affordably so; you could assemble a good gaming PC for the price. Ideally these CPUs will be sought after by only those who can afford to pay for them. Our Best Performance award goes to Intel’s QX 9770, the fastest CPU across the board; albeit the costliest. Despite some brave and rather heroic efforts from the likes of the Phenom X4 9950 and the X4 9850 Black Edition, Intel’s Q 8200 gets our Best Buy award. At Rs 10,785, it is fast enough to warrant you spending that much dough on it.

For our Editors Pick we were looking at something a little more affordable. At the same time we wanted something rea-

sonably fast and future proof. All this pointed towards a quad-core, but which one? At just Rs 400 more than the Phenom X3 8750 (a tri-core), AMDs Phenom X4 9550 is a bargain; its price – Rs 7,600. It will satisfy almost everyone but the demanding gamer or 3D content creator. This is one processor that has bang for buck written all over it. In case you can spend no more than Rs 6,000 on a CPU we feel Intel’s E7200 is your best bet. For those looking at a basic multimedia cum home PC on a shoestring, AMDs 5000+ is hard to beat – it’ll even play HD content easily.

What’s Next?

Parallelism, in bucketfuls; Nehalem is supposed to be scalable so expect to see even eight core versions in 2009. Optionally Intel could drop in a G45 graphic core in place of a single core and give you a fast seven core processor with inbuilt graphic

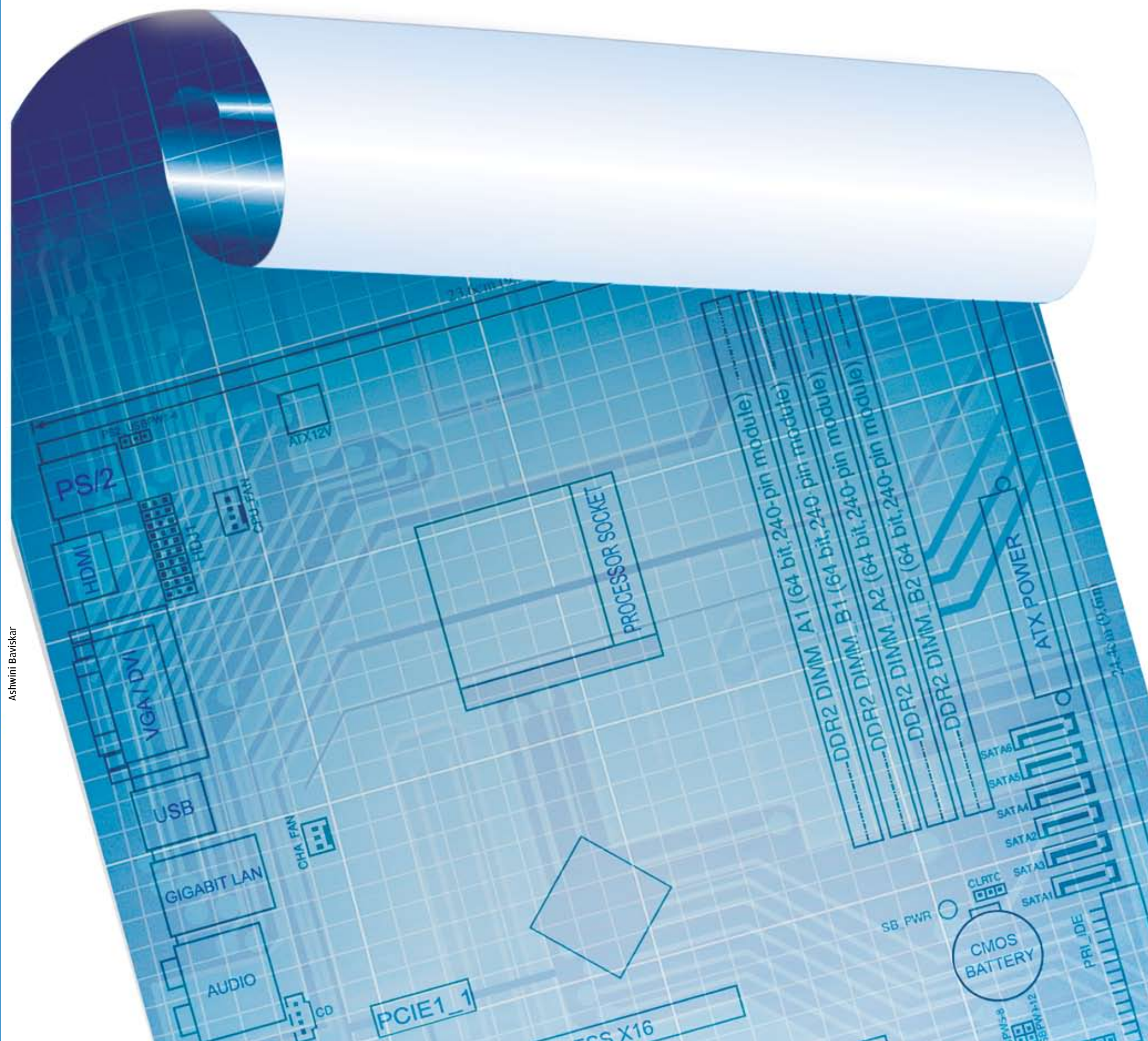
solution. Of course cheaper quad cores will emerge as well, as dual cores slowly become obsolete. Besides the X58 we should see new LGA 1366 platforms from NVIDIA. The fourth quarter will see the emergence of *Westmere*; a 32 nm version of the Nehalem architecture. Later, in 2010 we’ll see a new architecture in the form of *Sandy Bridge*. Then there is *Larrabee* lurking somewhere within Intel’s deepest labs; but Intel is close mouthed about their new GPU killer.

AMD isn’t hatching eggs either. After their Phenom X4s bombed badly they’re all set to pull up their trousers with *Deneb*. Deneb is 45 nm, and supposed to be 20 per cent faster than Intel’s Kentsfield; interesting eh? A pity they didn’t launch it earlier. Besides Kentsfield, Deneb now also has to contend with the shiny newcomer which is by far, the fastest desktop CPU we’ve ever tested. ■

michael.browne@thinkdigi.com



All great engineering feats start on paper. Why should building your PC be anything different? Now that you've chosen a CPU, let us help you choose your foundations – your motherboard...



Ashwini Baviskar

If it's been a few years since you bought your last computer. You're probably getting fed up of your computer's painfully slow and unstable habit of running applications. You decide that you've had enough, and you it's time to build from scratch again. Traditionally, the first item on your list is the processor, the graphics card and everything else follows quickly. Some people even decide on a printer and a mouse before they even consider what motherboard they need. People just walk into shops and pick up the cheapest possible board, or more often, their local computer-guy chooses for them – and they end up with a really basic or entry-level board. Motherboards are, and have always been, one of those components completely ignored by the majority of computer users, and people either have no clue of what they want, or don't care what they buy, as long as they buy the fastest and costliest processor in the market.

Stability in applications is most important; and when you consider that every bit of data passes through the motherboard before it reaches other components, it's stupid to not choose your motherboard wisely. Say you are transferring large files over the network to your flash drive, while busy playing an online multiplayer game; there are a lot of things happening that aren't just to do with your processor and graphics card or hard drive for that matter. A good open layout of the motherboard is also important. For example, attaching additional hardware and the space to install fancy custom coolers can't be guaranteed with every motherboard.

We're testing motherboards for all these reasons and also because this is November – our processor and motherboard test month.

This test is about more than just telling you what the best performing motherboard is but also about what to buy, why and what to look for in any motherboard for that matter.



For a change, this time we've decided to test motherboards that come with integrated graphics solution this month. We've chosen the few most commonly available, and the latest of chipsets to be carried in this test. With prices of computer components, including motherboards, falling steadily, there's very little that separates the older chipsets to the ones just released. The chipsets in this motherboard test will be the newly released ones from AMD, Intel and NVIDIA. A comparison test on the other lot, without graphic solutions, will be coming out really soon.

Now that we have our thoughts focused on motherboards with integrated graphics, we've obviously have to split the motherboards into two groups – motherboards for Intel processors using the LGA 775 format and the ones for AMD processors using the AM2 socket. Looking at just numbers, we received more boards for AMD processors than for Intel processors. Manufacturers of boards for Intel processors for that matter seem to make more boards for users who want to install a graphic card on their system.

Who is this motherboard test for? It could actually be for everyone! Most people would love to have a decent graphic card on their system but due to budget constraints or confusion, they compromise and go for something cheap and low-end. Months down the line, people don't want to sell off or dispose off their older card and buy something new. Onboard graphics solutions these days are actually quite powerful and you'll get an idea of what we mean when we start talking about the performance of some of the boards. To give you an idea, you should be able play games that came out before 2006 or so rather well. Even if you have plans to buy a good graphic card but can't afford it, you can settle for a motherboard from the ones we've tested. A few months down line, you can plug in a PCIe graphics card. With some of the motherboards we've received like the ones with the all new NVIDIA GeForce 9300 chipsets for Intel and the GeForce 8000 and the 7xx series for AMD, you can actually turn off the external graphic card and save power as well. You can also utilise the performance of your new graphic card along with whatever power your onboard graphics card does.

### How We Tested

Testing! That must mean lots and lots of statistics and numbers – everything to do with performance. It's the case with this motherboard test, but it's not only about the numbers either. It's a little known fact to many that performance in motherboards for all desktop applications and even gaming for that matter doesn't really differ a whole lot. Typically from past generations of tested motherboards, a difference of one to four per cent is expected in applications and games alike, as long as there is a common processor or a graphics card on the system. In our case, we have motherboards with onboard graphics rendering capabilities and there

is bound to be a difference of more than just one to four per cent. The test process although pretty similar to previous times, had a little more weighting assigned to the game and graphics intensive benchmarks.

We ran two fairly old games to get our scores. It wouldn't make sense to attempt running extremely GPU intensive games such as *Crysis* on the onboard graphics cards. We ran *Doom 3* and *Company of Heroes* at resolutions of 800 x 600, 1024 x 768 and 1280 x 1024. These games would give a substantial frame rate to measure, and users who do not plan on purchasing graphics cards would be running such games at lower resolutions on their 17-inch screens. Other than the game benchmarks, our usual set of regular benchmarks were used to measure performance of applications on the desktop – PC Mark 05 and the synthetic benchmark SiSoft Sandra, were also used. Weightings were given to the tests and we decided to set lower priority to SiSoft Sandra, the synthetic benchmark which has no direct relation to real world performance most of the time, but can be used to measure and compare statistics between motherboards of each platform.

Most of the other weighting was given for everything other than performance. Motherboards had to have plenty of features – be it loads of SATA and USB ports or support for multiple graphics cards. Because these are motherboards with onboard graphics solutions, it's OK to assume that most of these motherboards come with good HD video decoding capabilities.

Throughout the evaluation, we looked at the design and layout of the boards. We were looking for clean spacious layouts that allowed easy installation of the processor and the graphic card with no SATA ports located under the slot. Solid-state capacitors were also a factor, which would typically mean a better chance of a long living board. Graphics cards get hot and people know that. Now imagine something like that on your motherboard. Some of boards came with great coolers and heat dissipation units such as heatsinks and heatpipes to help keep the overactive chipset temperatures under control. Everybody loves freebies, so we also gave points to motherboards that came with additional fans or coolers that would enhance the performance or stability of the boards in any way. Freebies also included the fun stuff – games and applications to use on the system.

As for the test rig, we chose the fastest processors for either platform that we could find. We used an AMD Phenom X4 9950 for the AMD motherboards and an Intel QX9650 for the Intel ones. For the storage drives, we used two identical Seagate 7200.11 500 GB. These drives are very fast, affordable and would probably be the kind of drive someone buying a budget system with an integrated graphics solution would use. With the same idea of affordable hardware in mind, we stuck in 2 GB DDR2 of Corsair Dominator RAM on the boards. Two Corsair HX620's, which we admit are a little

too powerful, for the setups were also used.

It must also be clarified that the processors from AMD and Intel are not identical in performance, so it would be wrong to compare all the scores of the Intel boards with the AMD ones. Although the processor and motherboard were the only hardware differing, the two tests were handled separately.

#### Motherboards For Intel Processors

Intel is in a pretty comfortable position right now. Going by the number of people you come across, it appears like there are more Intel Core 2 Duo users these days than ever before. We received loads of products and we chose motherboards with the Intel onboard graphics chipsets – the G43's and the G45's. To keep up with chipset releases from all sides, Intel has been on a roll releasing updates for all of their chipsets before the whole Nehalem trend settles in, and the all new Socket LGA 1366 will have to be used. These might be the last few chipsets for the LGA 775 format it seems. The X48, P45, G45, G43 are the latest updates from Intel.

From the NVIDIA bandwagon, we received all the spanking new GeForce 9300 chipset-based motherboards. The ECS GF9300T-A, MSI P7NGM and the ZOTAC GeForce 9300 are the three boards using the new chipset.

#### Features

Features mean everything from components on the motherboards to things seen in the BIOS. The ASUS P5Q-EM is the best of all the boards when it comes down to just features. It comes with good BIOS with a lot that overclockers will like. Sensible increments and options to alter speeds and voltage for all the components is a God sent with this board. For a board that costs Rs 8,375, these are some of the features that are found in the high-end boards from ASUS and some other brands. Another board with similar overclocking features is the Gigabyte EG43M-S2H. The board also doesn't come with a PS2 port for the mouse, so you need to use a USB mouse or get a PS2 to USB convertor.

The Zotac GeForce 9300 board – although very good in performance, as you'll soon find out – is good, but the BIOS is rather boring. The BIOS is extremely basic with the absolute least amount of overclockability options and features. As for the features that are available, they just aren't practical. The huge voltage increments are an example of this. If you were planning on overclocking a lot, then this board is definitely a very bad idea. What it lacks in BIOS features, it makes up in the features on the board itself. The chip comes with a tiny fan on it, and this works well for the 9300. Typically, we've seen that the 9300 gets pretty hot when you're playing games.



Gigabyte EG43M-S2H is a complete board when it comes to features

Like some of the boards, VGA, DVI and even HDMI are available. The microATX form factor along with the various display connectivity options makes it a good HTPC board. The MSI P7NGM and the ECS GF9300T-A are also very similar with the number of features.

The MSI P7NGM like the ZOTAC too hardly has any overclocking features built into the BIOS. It looks very similar to the ZOTAC board, but this one doesn't come with a fan on top of the heat-sink; it uses solid state capacitors though. It has a clean design with the SATA ports positioned away from the PCI Express graphics card slot. The ECS GF9300T-A is no different from the other two 9300 boards either. The one thing that makes it stand out is the ALC889-based audio solution. The only other board with a different audio solution was the ASUS P5Q-EM with the Realtek ALC1200 chip. All the motherboards came with a single wired Gigabit LAN port. NVIDIA's HybridSLI and HybridPower allows external graphic cards to work better with the motherboard, both to save power as well as improve performance, but this works only for NVIDIA graphics cards.

In order to be future-proof, memory expandability is important, and only the ZOTAC GeForce 9300 and the Intel P5Q-EM can handle 16 GB of DDR2 so far. The MSI G43M2 board only comes with two RAM slots. None of the boards we received for the Intel platform supported DDR3 RAM or CrossFire, or even SLI.

#### Layout And Design

The ASUS P5Q-EM motherboard chipset cooler is bright blue, comes in an odd stealthy shape and does a good job of cooling the chip along with making the board look great. There is only one PS2 port that can be used for either a mouse or a keyboard. The board in general has been laidout very evenly and kept as spacious as possible even though this is a Micro ATX form factor board.

The ECS GF9300T-A is a proper ATX board and is the largest of all the motherboards for Intel processors. The SATA ports are placed above the PCI Express slot so that there is absolutely no way the card or the cooler can block the ports. In looks as well, the board is very gaudy and bright. It is a predominantly black board with a bright red PCI-E slot and black PCI slots. Other than the red and yellow RAM slots, there's also a fancy looking heatsink with a Black series badge on top. Dedicated power buttons on the board for Reset and Power On/Off are also a good touch for a board with a modest price. This is easily the least cramped board of all the ones for the Intel platform.

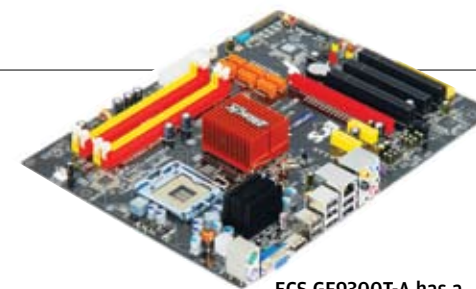
The Gigabyte EG43M-S2H on the other hand is a lot more cramped than the ECS. There are a few capacitors near the PCI Express slot that can be of concern when you plug in a large card such as a GeForce GTX 280 or a Radeon 4870 X2, for example. The heatsink on the north and south-bridge do a fair job of cooling. The MSI G43M2

has loads of capacitors placed all over the board between slots and even has the CMOS cell placed in between the PCI Express and the first PCI slot.

In the ZOTAC GeForce 9300, the 24-pin power connector for the board is located in an unusual position above the processor on the extreme edge. If you have happened to use a cabinet that has the power supply mounted at the bottom, then be sure the power supply has a long enough cable. There's also a LED poster with error codes if necessary. USB ports on the back of the board are also an unusual orange.

#### Performance

Performance is always an important factor no matter how many features a motherboard comes with. Going by overall performance, the Intel chipset motherboards were lagging behind the all new NVIDIA GeForce 9300 chipsets. Gaming performance is important in a test for motherboard with onboard graphics which is where the 9300s excelled.



ECS GF9300T-A has a clean spaced out layout

We also have to be clear that the Intel G43 and G45 chipsets have the better SATA controller than the NVIDIA ones. In all the data transfer tests where 4 GB files were copied to the drive, we noticed that the G43 and the G45 motherboards were three to four seconds faster. The MSI P7NGM board especially recorded rather poor scores in this test.

It was the same in the PC Mark tests. Although the 9300 boards performed a lot better in comparison to the Intel chipsets in the graphics tests of the benchmark suite, the real-world desktop application tests showed Intel chipsets doing better.

Of all the motherboards, the ZOTAC GeForce 9300 is a good performer, only slightly ahead of the ECS GF9300T-A motherboard. The only place where the ZOTAC GeForce 9300 lost out to the rest of the motherboards was in the file transfer tests. The 4 GB file transfer test took considerably longer than the other motherboards. Even the MSI P7NGM was lagging far behind the rest.

There was little or no difference in the CPU intensive video encoding tests. All of the boards scored between 67 and 70 seconds.

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Intel Motherboards						
Brand Model No.	ASUS P5Q-EM	ECS GF9300T-A	Gigabyte EG43M-S2H	MSI G43M2	MSI P7NGM DIGITAL	ZOTAC GeForce 9300
						
Chipset	Intel G45	NVIDIA GeForce 9300	Intel G43	Intel G43	NVIDIA GeForce 9300	NVIDIA GeForce 9300
Socket	LGA 775	LGA 775	LGA 775	LGA 775	LGA 775	LGA 775
Northbridge	Intel G45	MCP7I	Intel G43	Intel G43	MCP7A	MCP7A
Southbridge	Intel ICH10R		Intel ICH10	Intel ICH10		
Price (Rs)	8,375	7,060	7,500	5,500	6,700	5,999
+	Quality board	Good overall performance	Good BIOS for overclockers	Inexpensive	Good overall performance	Good value for money
-	Expensive	Slightly expensive	Slightly expensive	Cramped layout	Not for overclockers	BIOS lacks overclocking features
Grand Totals (Out Of 100)	60.00	58.60	62.88	48.67	64.29	59.87
Features (Out Of 70)	41.20	34.09	42.95	28.88	40.99	35.14
Performance (Out Of 30)	18.80	24.51	19.94	19.79	23.31	24.73
Features						
Front Side Bus Speed	1600 MHz	1333 MHz	1333 MHz (1600 MHz OC)	1333 MHz	1333 MHz	1333 MHz
Memory Type / Max Freq. Supported	DDR2 / 800 MHz (1066 MHz OC)	DDR2 / 800 MHz	DDR2 / 1066 MHz (1200 MHz OC)	DDR2 / 800 MHz	DDR2 / 800 MHz	DDR2 / 800 MHz
Memory Supported / No. Of slots	16 GB / 4	8 GB / 4	8 GB / 4	4 GB / 2	8 GB / 4	16 GB / 4
Power Saving features (with GPU)	✗, EPU	✓	✗, DES	✗	✓	✓
No. Of SATA / PATA Ports	6 / 1	6 / 1	5 / 1	4 / 1	6 / 1	6 / 1
No. Of Rear E-SATA Ports	0	0	1	0	0	0
HDMI / DVI / VGA	✓ / ✓ / ✓	✓ / ✓ / ✓	✓ / ✓ / ✓	✗ / ✗ / ✓	✓ / ✓ / ✓	✓ / ✓ / ✓
Multi GPU Support (SLI / CrossFire / N)	✗	✗	✗	✗	✗	✗
Audio Controller / Channels / HD Compliant (Y / N)	ALC1200 / 8 / ✓	ALC889 / 8 / ✓	ALC888 / 8 / ✓	ALC888 / 8 / ✓	ALC888 / 8 / ✓	ALC888 / 8 / ✓
S / PDIF / Optical Port	✓ / ✗	✗ / ✗	✓ / ✓	✗ / ✗	✓ / ✗	✓ / ✗
No Of LAN Ports / 10 / 100 / Gigabit	1 / Gigabit	1 / Gigabit	1 / Gigabit	1 / Gigabit	1 / Gigabit	1 / Gigabit
Integrated WiFi (Y / N)	✗	✗	✗	✗	✗	✗
No. Of Rear USB / FireWire Ports	6 / 1	6 / 0	6 / 1	4 / 1	4 / 1	4 / 0
All Solid State Capacitors (Y / N)	✓	✗	✓	✗	✓	✗
Overclocking Options						
CPU / FSB / Memory	✓ / ✓ / ✓	✗ / ✓ / ✓	✓ / ✓ / ✓	✓ / ✗ / ✓	✓ / ✓ / ✓	✗ / ✓ / ✓
Overvolting (CPU / Memory / FSB / PCIe / Northbridge)	✓ / ✓ / ✓ / ✓ / ✓	✗ / ✓ / ✗ / ✗ / ✓	✓ / ✓ / ✓ / ✓ / ✓	✗ / ✓ / ✓ / ✗ / ✗	✓ / ✓ / ✓ / ✗ / ✗	✗ / ✓ / ✗ / ✗ / ✓
Package Bundle						
No of SATA / PATA Cables Provided	3 / 1	4 / 1	2 / 1	1 / 1	1 / 1	1 / 1
Performance						
PC Mark 2005						
CPU	9006	9618	9625	9650	8991	10112
Memory / Graphics	5950 / 1886	5656 / 2361	5933 / 1819	6083 / 1767	5708 / 2377	5795 / 2300
HDD	6755	6680	6609	6692	6110	6795
Overall	5663	6343	6181	6157	5802	6418
SiSoft Sandra 2008						
CPU Arithmetic (Dhrystone / Whetstone)	37053 / 29486	55563 / 43912	55325 / 44064	55707 / 44270	37175 / 29589	57890 / 46319
CPU Multimedia (Integer / Floating)	221990 / 120954	327057 / 179056	330038 / 180734	330759 / 181133	222010 / 120491	345168 / 189008
Drive Index (MBps) / Random Access Time (ms)	76 / 13	77 / 13	77 / 13	77 / 13	76 / 12	77 / 14
Memory Bandwidth Score (Integer / Floating)	5364 / 5353	4880 / 4850	5316 / 5301	5496 / 5497	4967 / 4956	5049 / 5042
3D Mark 2005:						
3D Marks / CPU Score	1583 / 4627	2810 / 10147	1478 / 5091	1494 / 4709	2684 / 9732	2824 / 10319
Video Encoding (DivX 6.2) Time	68	70	69	68	68	67
File Transfer - 4 GB File	188	188	188	192	206	193
Doom 3 (640x480 / 1024x768 - ultra no AA/AF)	21.0 / 15.8	57.4 / 32.0	27.2 / 15.9	27.8 / 15.7	56.2 / 32.4	56.8 / 31.5
Company of Heroes (800x600/1280x1024)	12.2 / 5.7	21.2 / 12.8	11.5 / 7	11.6 / 5.9	19.5 / 13.1	20.5 / 13.2

In the games – *Doom 3* and *Company of Heroes* – all the GeForce 9300 boards from ECS, MSI and ZOTAC scored similarly. *Company Heroes* is an RTS and 20 fps in a game like that can’t be called great, but it’s still close to twice as much as the Intel G45 and G43 boards from MSI and ASUS could achieve. *Doom 3* painted a different picture. At 640 x 480 with ultra quality but no anti-aliasing, the game runs pretty comfortably at about 50 fps. With the resolution set to

1024 x 768, frame rates dropped to around 30 fps. When *Doom 3* was first released, the best of cards were only able to run the game at around 40 to 50 fps at 1024 x 768. In that aspect, motherboard chipsets have come a long way since then. The MSI G43M2 and the G45 powered ASUS P5Q-EM could run *Doom 3* but scored close to half of what the 9300s were capable of. 3D Mark 2005, another benchmark that stresses a lot on the on the graphics subsystem,


ran very well on the ECS GF9300T-A and the Zotac GeForce 9300. They scored 2810 and 2824 respectively. What was interesting to see in 3D Mark tests was that the NVIDIA boards helped get the CPU score up a lot as compared to the Intel based ones. Intel’s onboard graphics solutions seem to depend a lot on the CPU. **Value** If we were look at just price, the MSI G43M2 is the cheapest of the bunch at Rs 5,500. If you did want something really cheap and basic, then this would be a decent buy. Using this as a base to build a powerful system is honestly not a bad idea. The board itself is limited in features and the design



isn’t exciting either. The price of Rs 5,500 is still fairly high for this board. For the same price, it’s easy to find motherboards of previous generations from Intel or even NVIDIA. The best bang for your buck board is the ZOTAC GeForce 9300. For just Rs 500 more than the MSI G43M2, you get a really decent board with good expandibility options. Even though this is a great board for everyone to buy, it’s not for hardcore enthusiasts who want to push the board to its limits, and squeeze every bit of performance out of the processor. It makes good sense for an HTPC, where a compact design and good HD playback performance is required. The GeForce 9300’s IGP is easily able to handle HD playback as well as

high definition. The fan on the heatsink will make sure things remain stable and when you feel like playing a few simple games, you can do that too, as this is the best performing board for Intel-based, onboard graphic systems. If performance doesn’t bother you, and you have a real graphic card to do that for you, then the Gigabyte EG43M-S2H can be the next best option for you. It has all the features of the ASUS P5Q-EM, including all the overclockability functions. Unlike the MSI board, the EG43M-S2H is slightly more open and well laid out. The ASUS P5Q-EM is a good board but the only problem with it is its price. At Rs 8,375, it’s the most expensive one. The onboard performance is nowhere close to the 9300 chipsets, and it only makes sense as a board for overclockers who might, for some odd reason, not want a dedicated graphics card. The ECS GF9300T-A board is a little bit more of an enthusiast

level board. With its three PCI slots, there is loads of space for adding additional cards. This is easily one of those boards you buy for now, and add a dedicated graphics down the line – just don’t expect to put in additional cards to SLI them. **Motherboards For AMD Processors** Unlike the Intel motherboard chipsets, there are many more AMD chipsets with onboard graphics in the market and we received loads of them. The ones we tested were mainly the ones with the AMD 780 and 790 chipsets as well as the NVIDIA GeForce 8000 series and the NVIDIA 780a chipset. Unlike the chipsets for Intel’s platform, there are boards that support NVIDIA’s SLI and AMD’s CrossFire. The price range of the products in this category range from as low as Rs 4,000 to as much as Rs 15,500. There were also a few more brands in this category than the previous one.



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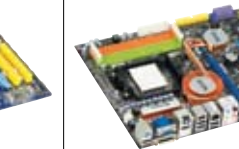
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AMD Motherboards										
Brand Model No.	ASUS Crosshair II Formula	ASUS M3N-HT Deluxe	ASUS M3N78 PRO	Biostar GF8200 M2+		Biostar TA790 GX XE	Gigabyte MA78GPM-DS2H	Jetway HA06	Jetway HA07-LF	MSI DKA790GX Platinum
										
Chipset	NVIDIA nForce 780a SLI	NVIDIA nForce 780a SLI	NVIDIA GeForce 8300	NVIDIA GeForce 8200		AMD 790GX	AMD 780G	AMD 780G	AMD 790GX	AMD 790GX
Socket	AM2+	AM2+	AM2+	AM2+		AM2+	AM2+	AM2+	AM2+	AM2+
Northbridge	NVIDIA nForce 780a SLI	NVIDIA nForce 780a SLI	NVIDIA GeForce 8300	NVIDIA GeForce 8300		AMD 790GX	AMD 780G	AMD 780G	790GX	AMD 790GX
Southbridge						AMD SB750	AMD SB700	AMD SB700	AMD SB750	AMD SB750
Price (Rs)	15,450	15,450	6,150	3,900		6,600	8,900	5,500	6,750	9,600
+	Good bundle	Feature rich	Clean organized layout	Great value for money		Support for 16 GB of RAM	Good overall performance	Inexpensive CrossFire board	Great performer	Good performer
-	Expensive	Expensive	Slightly insufficient cooling	Poor cooling solution		Nothing in particular	Expensive	Heatsink lacks quality	Heatsink lacks quality	Slightly expensive
Grand Totals (Out Of 100)	69.45	63.20	61.61	52.55		60.12	61.55	61.34	64.18	63.97
Features (Out Of 80)	45.82	41.44	40.08	33.25		36.19	38.54	37.87	39.97	40.85
Performance (Out Of 20)	20.21	20.03	21.53	19.30		23.93	23.01	23.47	24.21	23.13
Features										
Memory Type / Max Freq. Supported	DDR2 / 1066 MHz	DDR2 / 1066 MHz	DDR2 / 1066 MHz	DDR2 / 1066 MHz		DDR2 / 1066 MHz	DDR2 / 1066 MHz	DDR2 / 800 MHz	DDR2 / 1066 MHz	DDR2 / 1066 MHz
Memory Supported / No. Of slots	8 GB / 4	8 GB / 4	8 GB / 4	16 GB / 4		16 GB / 4	16 GB / 4	8 GB / 4	8 GB / 4	8 GB / 4
Power Saving features (with GPU)	✓	✓	✓	✓		✗	✗	✗	✗	✗
No. Of SATA / PATA Ports	6 / 1	6 / 1	6 / 1	6 / 1		6 / 1	5 / 1	6 / 1	6 / 1	5 / 1
No. Of Rear E-SATA Ports	0	1	0	0		0	1	1	1	1
HDMI / DVI / VGA	✓ / ✗ / ✓	✓ / ✗ / ✓	✓ / ✗ / ✓	✗ / ✓ / ✓		✓ / ✓ / ✓	✓ / ✓ / ✓	✗ / ✓ / ✓	✓ / ✓ / ✓	✓ / ✓ / ✓
Multi GPU Support (SLI / CrossFire / N)	✓ / SLI (3 way)	✓ / SLI (3 way)	✗	✗		✗	✗	✓ / CrossFire	✓ / CrossFire	✓ / CrossFire
Audio Controller / Channels / HD Compliant (Y / N)	ADI 1988B (SupremeFX) / 8 / Y	ADI 1988B / 8 / ✓	ALC1200 / 8 / Y	ALC662 / 6 / ✓		ALC888 / 8 / Y	ALC 889A / 8 / Y	ALC888 / 8 / Y	ALC888 / 8 / Y	ALC888 / 8 / ✓
S / PDIF / Optical Port	✓ / ✓	✓ / ✓	✓ / ✗	✓ / ✗		✗ / ✗	✗ / ✓	✗ / ✗	✗ / ✗	✗ / ✓
No Of LAN Ports / 10 / 100 / Gigabit	2 / Gigabit	1 / Gigabit	1 / Gigabit	1 / Gigabit		1 / Gigabit	1 / Gigabit	1 / Gigabit	1 / Gigabit	1 / Gigabit
Integrated WiFi (Y / N)	✗	✗	✗	✗		✗	✗	✗	✗	✗
No. Of Rear USB / FireWire Ports	6 / 1	4 / 0	6 / 1	4 / 0		4 / 0	4 / 1	4 / 0	4 / 0	6 / 1
All Solid State Capacitors (Y / N)	✓	✓	✓	✗		✓	✓	✓	✓	✓
Overclocking Options										
CPU / FSB / Memory	✓ / ✓ / ✓	✓ / ✓ / ✓	✓ / ✓ / ✓	✓ / ✓ / ✓		✓ / ✓ / ✓	✓ / ✓ / ✓	✓ / ✓ / ✓	✓ / ✓ / ✓	✓ / ✓ / ✓
Overvolting (CPU / Memory / FSB / PCIe / Northbridge)	✓ / ✓ / ✓ / ✓ / ✓	✓ / ✓ / ✓ / ✓ / ✓	✓ / ✓ / ✓ / ✗ / ✓	✓ / ✓ / ✓ / ✗ / ✓		✓ / ✓ / ✓ / ✗ / ✓	✓ / ✓ / ✓ / ✗ / ✓	✓ / ✓ / ✓ / ✓ / ✓	✓ / ✓ / ✓ / ✓ / ✓	✓ / ✓ / ✓ / ✗ / ✓
Package Bundle										
No of SATA / PATA Cables Provided	3 / 1	2 / 1	3 / 1	1 / 1		2 / 1	2 / 1	4 / 1	4 / 1	2 / 1
Key bundled items	Company of Heroes - Opposing Fronts, SupremeFX, LED poster	Extra heatpipes kit								
Performance										
PC Mark 2005										
CPU	7653	7643	7612	7625		7563	7608	7598	7611	7621
Memory / Graphics	4518 / 1933	4954 / 1925	4906 / 2183	4411 / 1839		4466 / 2579	4686 / 2384	4938 / 2550	5069 / 2623	4422 / 2405
HDD	6125	6136	6121	6148		6016	6074	6067	6089	6068
Overall	5476	5336	5572	5286		5731	5646	5702	5756	5635
SiSoft Sandra 2008										
CPU Arithmetic (Dhrystone / Whetstone)	38963 / 33222	39010 / 33150	39007 / 33125	38990 / 33068		39343 / 33524	36618 / 33624	39338 / 33331	39348 / 33428	39369 / 33514
CPU Multimedia (Integer / Floating)	97833 / 129078	97222 / 129100	97844 / 128099	97864 / 129080		98749 / 130176	98670 / 130485	98632 / 130160	98657 / 130153	98662 / 130189
Drive Index (MBps) / Random Access Time (ms)	80 / 13	80 / 13	80 / 12	80 / 13		80 / 13	79 / 13	80 / 13	80 / 13	80 / 12
Memory Bandwidth Score (Integer / Floating)	5218 / 5220	5238 / 5192	5158 / 5165	5165 / 5167		5216 / 5213	5103 / 5101	5062 / 5064	5177 / 5173	5174 / 5176
3D Mark 2005:										
3D Marks / CPU Score	2232 / 7989	2248 / 8135	2554 / 8315	1819 / 7929		3649 / 5637	3501 / 8243	3545 / 8177	3676 / 8101	3299 / 7653
Video Encoding (DivX 6.2) Time	91	93	94	94		94	94	95	94	93
File Transfer - 4 GB File	200	200	201	197		201	198	200	200	198
Doom 3 (640x480 / 1024x768 - ultra no AA/AF)	50.4 / 26.7	50.5 / 26.6	60.5 / 32.9	46.6 / 25.0		60.2 / 35.6	57.2 / 33	57.7 / 33.8	60 / 35.4	52.6 / 30.7
Company of Heroes (800x600/1280x1024)	14.6 / 8.7	14.3 / 8.9	17.3 / 10.7	12.9 / 8.1		32.4 / 17.5	27.2 / 13.6	29.6 / 15.5	32.1 / 17.6	30 / 16.6

Features

If you want features, then the ASUS Crosshair II Formula comes with pretty much everything. It is a NVIDIA 780a board that supports 3-way SLI. It has two Gigabit LAN ports. There is no DVI port on the rear, but you will get HDMI and the usual VGA connector. The same is missing with the M3N-HT Deluxe. The Crosshair II Formula being another high-end ASUS board has loads and loads of features for overclockers.

Another equally priced board as the Crosshair II Formula is the ASUS M3N-HT Deluxe. This too runs off the NVIDIA 780a chipset but has a few missing features – mainly the second Gigabit LAN port, and also the SupremeFX audio card.

There is a thorough breakdown of voltages for each of the components and the user gets very fine control of each one of them. This is what you typically get from a true high-end ASUS board.

The only GeForce 8300 based motherboard from ASUS is the M3N78 PRO. Priced at less than half the price of the the other two ASUS boards, it has the same number of features except for some limited tweaking options in the BIOS for the PCI-E component. Like the GeForce 9300, the ZOTAC GeForce 8300 too has a few features to overclock the system.

The two Jetway boards the HA06 and the HA07 both have LED displays that also show the

temperatures which is a great feature. They also have on-board buttons for powering the board up. These motherboards are definitely worth looking at as they are both very cheap but come with a very good and detailed BIOS.

If you need a CrossFire supported board with unlimited features, then the MSI KA790GX Platinum is one to look out for. It comes with all the display connectivity options as well as Firewire, E-Sata and six USB ports.





Layout

The ASUS Crosshair II Formula is one of the more attractive motherboards out there. The mix of red copper and a blue coated southbridge heatsink. There’s also a lit-up Republic of Gamers badge right next to the northbridge. Loads of copper pipings run all over the board. There are neat little lit buttons for powering up and also resetting the computer. A lit-up button on the rear of the motherboard allows users to reset the CMOS without

having to open up the cabinet and clear CMOS using a jumper or in some extreme caseses, even removing the battery by hand.

In comparison to the Crosshair II Formula and the M3N78 PRO, the M3N-HT Deluxe is a tiny bit more crowded. Once again, there are the similar lines of pipe running from up in the motherboard to the southbridge. We talked about how the M3N78 PRO from ASUS was cheaper and a little handicapped as compared to the other high-end end boards from ASUS. A few other



AMD Motherboards				
Brand Model No.	Palit AA-780G	XFX MI-A78S-8209	XFX MI-A78U-8309	ZOTAC GeForce 8300
				
Chipset	AMD 780G	NVIDIA GeForce 8200	NVIDIA GeForce 8300	NVIDIA GeForce 8300
Socket	AM2+	AM2+	AM2+	AM2+
Northbridge	AMD 780G	NVIDIA GeForce 8200	NVIDIA GeForce 8300	NVIDIA GeForce 8300
Southbridge	AMD SB700			
Price (Rs)	3,700	5,500	6,000	5,999
+	Good value for money	Decent performance	Decent performance	Above average performer
-	Lacks HDMI	Nothing in particular	Nothing in particular	Insufficient cooling
Grand Totals (Out Of 100)	50.79	57.28	58.77	57.22
Features (Out Of 80)	29.40	36.61	37.31	35.46
Performance (Out Of 20)	21.39	20.67	21.46	21.76
Features				
Memory Type / Max Freq. Supported	DDR2 / 1066 MHz	DDR2 / 1066 MHz	DDR2 / 1066 MHz	DDR2 / 1066 MHz
Memory Supported / No. Of slots	8 GB / 4	8 GB / 4	8 GB / 4	8 GB / 4
Power Saving features (with GPU)	✗	✓	✓	✓
No. Of SATA / PATA Ports	6 / 1	4 / 1	6 / 1	6 / 1
No. Of Rear E-SATA Ports	0	1	1	0
HDMI / DVI / VGA	✗ / ✓ / ✓	✓ / ✓ / ✓	✓ / ✓ / ✓	✗ / ✓ / ✓
Multi GPU Support (SLI / CrossFire / N)	✗	✗	✗	✗
Audio Controller / Channels / HD Compliant (Y / N)	ALC883 / 8 / ✓	ALC889 / 8 / ✓	ALC889 / 8 / ✓	ALC888 / 8 / ✓
S / PDIF / Optical Port	✗ / ✗	✗ / ✗	✗ / ✗	✓ / ✗
No Of LAN Ports / 10 / 100 / Gigabit	1 / Gigabit	1 / Gigabit	1 / Gigabit	1 / Gigabit
Integrated WiFi (Y / N)	✗	✗	✗	✗
No. Of Rear USB / FireWire Ports	4 / 0	4 / 0	4 / 0	4 / 1
All Solid State Capacitors (Y / N)	✗	✗	✗	✗
Overclocking Options				
CPU / FSB / Memory	✗ / ✓ / ✓	✓ / ✓ / ✓	✓ / ✓ / ✓	✓ / ✗ / ✗
Overvolting (CPU / Memory / FSB / PCIe / Northbridge)	✗ / ✓ / ✗ / ✓ / ✗	✓ / ✓ / ✓ / ✗ / ✓	✓ / ✓ / ✓ / ✗ / ✓	✗ / ✓ / ✓ / ✗ / ✗
Package Bundle				
No of SATA / PATA Cables Provided	1 / 1	1 / 1	1 / 1	2 / 1
Key bundled items				
Performance				
PC Mark 2005				
CPU	7588	7610	7620	7626
Memory / Graphics	4288 / 2078	4499 / 2104	4509 / 2189	4780 / 2186
HDD	6040	6140	6143	6148
Overall	5401	5517	5548	5643
SiSoft Sandra 2008				
CPU Arithmetic (Dhrystone / Whetstone)	39339 / 33394	38898 / 32955	38999 / 33029	36588 / 33116
CPU Multimedia (Integer / Floating)	98660 / 130102	97192 / 128341	97828 / 129058	97815 / 128991
Drive Index (MBps) / Random Access Time (ms)	80 / 12	80 / 13	80 / 13	80 / 13
Memory Bandwidth Score (Integer / Floating)	5021 / 5023	4971 / 4978	5204 / 5197	5159 / 5167
3D Mark 2005:				
3D Marks / CPU Score	3052 / 5517	2347 / 8285	2529 / 8050	2556 / 8642
Video Encoding (DivX 6.2) Time	96	94	93	93
File Transfer - 4 GB File	199	213	200	195
Doom 3 (640x480 / 1024x768 - ultra no AA/AF)	48.8 / 28.4	57.7 / 30.8	59.7 / 32.6	60.3 / 32.9
Company of Heroes (800x600/1280x1024)	25.2 / 12.7	15.2 / 9.4	17.7 / 10.6	17.7 / 10.9

things are also missing. The biggest difference can be seen by simply looking at the board. There are no heatpipes and there is a very basic solution in the form of a heatsink. Everything else about the board is still great. The board has loads of space, three PCI slots but just no SLI. Even the capacitors are cleanly put in small bunches whenever necessary. SATA ports are mounted sideways, so the cables don't interfere with the card.

The two boards from Jetway had very similar designs and layout. The two based on the AMD

780G and the 790GX chipsets. The towering heatsinks on the boards aren't of the best quality and they don't seem mounted very well. The SATA ports lie in between the two PCI-E slots so they steer clear of any large cards that you might use on the board.

The MSI DKA790GX Platinum is a huge board and is absolutely unlike the G43M2 board for Intel processors. The heatsink on the chipset isn't very good though. The fins are delicate and easily break off if you aren't careful while fitting the processor heatsink.

The NVIDIA 8200 and 8300-based motherboards from Biostar, XFX, ZOTAC were all compact Micro ATX boards. The ZOTAC GeForce 8300 especially got very hot when we ran benchmarks. Overclocking with a chipset this hot is pretty unthinkable. The Biostar GF8200 M2+ had an even smaller heatsink than the Zotac motherboard and abnormally tall capacitors. The XFX GeForce 8200 and 8300 boards too were hot but they had slightly better cooling solutions with the heatpipes.

Performance

The performance of onboard graphics solutions for the AMD platform has typically been better than the ones for Intel platforms. For example in all the game benchmarks, the performance of the boards wasn't a lot different. In *Doom 3*, at a resolution of 640 x 480 and ultra quality, the frame rates recorded were between 46.6 and 60.5.

Of all the motherboards, the Jetway HA07-LF was the best overall performer. The AMD 790GX chipset is an even more powerful version of the famous 780G chipset. *Doom 3* will also run fairly smoothly at 1024 x 768 with quality set to maximum. The HA07 board recorded 35.4 fps at this setting. The next best performer is the other AMD 790GX powered board — the Biostar TA790 GX XE.

PCMark 05 didn't really show any big jump in numbers, so desktop performance was more or less the same — whether boards were priced at Rs 4,000 or at Rs 15,500. The graphics and the memory handling were the only two areas that affected the overall PCMark 05 score. The only real benchmark other than the games that are affected is the file transfer test. The XFX MI-A78S-8209 took 213 seconds for copying a 4 GB data file. Unlike the Intel based chipsets where the CPU score would drastically be affected in 3D Mark, the CPU scores for motherboards for the AMD platform were a lot more stable with both the NVIDIA boards as well as the AMD ones.

**Bundled Goodies**

All the motherboards for Intel and AMD processors come with the bare necessary items, there are some who go overboard. ASUS especially supplies addons and games with almost every motherboard. The ASUS M3N-HT Deluxe comes with a heatpipe for the memory that can be attached to it. It is only meant for two RAM sticks though. The Crosshair II Formula board is part of the Republic of Gamers range of boards from ASUS. A copy of *Company of Heroes - Opposing Fronts* is bundled along with it. An LED poster also comes with the package.

**Value For Money**

The ASUS Cross II Formula receives the award as the Best Performer of all the AMD boards. This is totally a hardcore overclocker board. It comes in a great package and everything about it exudes quality — everything from the BIOS to the quality of the board and the bundle supplied. All this comes at a price of Rs 15,450.

The most impressive value for money board has to be the Jetway HA07-LF with its unbeatable price



Jetway's HA 07 is cheap but is the best performer of all the boards for the AMD platform

of just Rs 6,750. A good open layout, great onboard performance, even better overclocking features and it also supports CrossFire. The HA06 is another similar feature-filled board based on the AMD 780G chipset with CrossFire but only a little slower than the HA07. The HA06 is priced at just Rs 5,500.

Another really good motherboard that comes at a fairly low price is the Biostar GeForce 8200 M2+ that sells for just Rs 3,900. The board doesn't come with CrossFire but it makes an excellent buy for someone who wants a really cheap motherboard for an entry level AMD processor. The Palit AA-780G is another cheap board available for Rs 200 less than the Biostar GeForce 8200 M2+. It's an equally compact board that is left behind a bit in the gaming performance.

The MSI DKA790GX Platinum is the next overall best board. This is yet another board powered by AMD's 790GX. At Rs 9,600, it's more affordable than the ASUS Crosshair Formula II and the ASUS M3N-HT Deluxe, performs almost as good as them, has a pretty good BIOS and a clean layout.

A similar conclusion like the boards for the Intel platform can be reached by just looking at the performance figures for the AMD platform boards. The performance that really matters to a lot of the people using computers today- everything to do with desktop applications like browsers, mail clients and office suites, there isn't a whole new world of performance waiting you while upgrading to a better motherboard. A motherboard is something that you look for as a base to build an entire system on. Features, reliability and the ability to upgrade and expand are the key - not performance. This is clearly seen in this test where we see boards priced at two times higher perform more or less the same way as their cheaper counterparts. A brief guide to what processor and motherboard you should go for lies ahead...

rossi.fernandes@thinkdigit.com

### Security is a matter of trust.



**Software Protection *Sentry***

- Anti Piracy
- Web Authentication
- Time Leasing



**Biometrics *BioSentry***

- Time Attendance System
- Physical Access Control
- Logical Access Control (PC Logon)
- Data Security



**Smart Card *SmartSentry***

- Time Attendance System
- Physical Access Control



**Software & Other Applications**

- Time Attendance Software
- Payroll Software
- Canteen Management
- Visitors Management
- Library Management, etc

**Wyse Biometrics Systems Pvt. Ltd.**  
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Aranyeshwar Road, Parvati, Pune.  
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Web: www.wyse.co.in

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102

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103



You need	Motherboard	Processor	Why	Price (Rs)
High End board for AMD Platform with integrated graphics and the option of upgrading to a multi-GPU setup for gaming/overclocking	ASUS Crosshair 2 Formula 	AMD Phenom X4 9950	The Crosshair 2 Formula supports Hybrid SLI and Hybrid Power. This means you can power down two GTX 280 cards and use the integrated graphics while browsing to save power and power up your cards in SLI to destroy benchmarks. The X4 9950 is a sweet CPU for a very sweet price. Its hardly 20 percent slower than the Intel CPUs in most cases, but costs a fraction of their astronomical prices	25250
Strict Budget (CPU + Mobo under Rs 8,500)	Biostar GF 8200 M2+ 	AMD X2 5200+	The X2 5200+ is a good CPU for a home PC. The GeForce 8200 chipset will handle games, movies and multimedia with ease. The price is the icing on the cake	7400
An HTPC with HDMI support and Blu-Ray playback	ZOTAC GeForce 9300 	Intel Core 2 Duo E7200	For Blu-Ray playback and a decent gaming setup, or anyone who wants a powerful system for anything other than hard-core gaming the GeForce 9300 represents the best you can get. The E7200 is a good CPU for an HTPC and coupled with the GF 9300 makes a good solution for a strong multimedia PC	11759
A decent gaming setup with integrated graphics	MSI P7NGM DIGITAL 	Intel Core 2 Q8200	MSI's GeForce 9300 offering the P7NGM Digital was the fastest motherboard in this test; along with Intel's quad core Q8200 running at 2.33 GHz this makes for a killer PC that can handle casual gaming with ease	17485

## Contact Sheet

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**105** Green Revolution

**107** A Store Lore

**108** Remote IT Infrastructure Consolidation

## GREEN REVOLUTION

Dr Kaladhar Voruganti

A datacentre that hosts application servers, network switches and storage devices is considered to be 'green' if it consumes less power for running and cooling the computer systems hosted by it. Datacentre operators are very conscious about power consumption because there is a limit on the amount of power that can be provided by the power sub-station supporting the datacentre. Once that limit is reached the datacentre operator has to open a new datacentre, and the new unit will initially not be fully utilised. Thus, in today's cost-conscious era, most datacentre operators are vigilant about ensuring that the computing resources are not under-utilised (because underutilised resources still consume a lot of power even when they are not doing useful work); procuring devices that consume less power and ensuring that they are using efficient datacentre cooling mechanisms. Thus, in this article we will discuss how datacentre administrators deal with the following issues:

**There was a green revolution in the 1960s which increased the yield of agriculture production in many developing countries. similarly, there is another type of green revolution that is occurring in today's environmentally conscious world for it systems**

- How to increase resource utilisation?
- How to evaluate the resources they are purchasing with respect to power?
- How to ensure the devices are consuming less power?
- How to design/leverage efficient datacentre cooling mechanisms?

### Increasing resource utilisation

Memory, CPU, fan, network cards and disks are some important computer resources that consume power. The input workload determines how much work these resources have to perform, and this, in turn, dictates the amount of power consumed by the computer system. It is interesting to note that the amount of power consumed by a system that is 50 per cent utilised is not that much more than a computer system that is 10 per cent utilised (due to the presence of fixed power consumption costs). Hence, less power is consumed by a single box that is 50 per cent utilised than five boxes that are each only 10 per cent utilised.

In the past, the software running on a box was very tightly coupled to the hardware box, and thus, it was very difficult to dynamically move an application from one computer to another. However, with the emergence of hypervisor (server virtualisation) technologies like Xen, HyperV, and VMWare, now it is possible to dynamically move applications between computer systems, and thus, increase the overall system utilisation. The hypervisor technology allows multiple applications to run on a single box, and the failure of a single application does not affect the execution of the other applications running on the computer. The hypervisor technology has been around since 1960s (IBM VM operating system), but only now this technology has been made available to run on commodity hardware systems, and thus, it has become more prevalent. Most datacentre operators are re-designing their datacentres to leverage this technology.

Evaluating Resources

Standards organisations like SNIA (Storage Networking Industry Association) are grappling with the task of how to rate a storage device with respect to its power consumption properties. For example, a storage device might use flash technology instead of disk drives, and thus, it can consume less power while being more expensive. So, it is not prudent to just look at the amount of power that is consumed by a computer device in isolation. Instead, one should look at power consumption in conjunction with performance, availability, reliability, physical shelf space requirements, and cost considerations. Therefore, system administrators have to make trade-offs between these different parameters, and there is a need for new power-related metrics like IOs/Watt or IOs/Watt/dollar, or Watts/Cubic Feet etc.

Furthermore, the admins need to look at their respective application workloads to select the proper type of computer resources. For example, there is a difference in the I/O characteristics of archival workloads and online transaction processing (OLTP) type workloads. In archival workloads one does not care about high throughput, whereas, in OLTP workloads throughput requirements are very important. Thus, one can purchase a storage system with slower RPM disks for archival workloads than for OLTP workloads because slower RPM disks consume less power and are usually cheaper.

Ensuring Less Power Consumption

There are both proactive and reactive techniques with respect to reducing power consumption in computer devices.

**Proactive techniques:** These techniques a priori ensure that devices consume less power. For example, one can cut down on the number of disks being used by using higher capacity disks. A one-terabyte disk will consume less power than ten 100 gigabyte disks. Similarly, one can

reduce the number of copies of data, use data compression, thin provisioning and data de-duplication techniques to reduce the amount of data being stored on disks. This, in turn, reduces the number of disk drives being used which, in turn, leads to less power consumption. Similarly, one can also use Flash drives or higher efficiency power supplies to also proactively cut down on the amount of power being consumed.

**Reactive techniques:** In reactive techniques one dynamically changes the state of a physical resource from high power consuming state to low power consuming state. The state of CPU, memory and disk drives can be dynamically transitioned between different power states. It is important to note that there is a trade-off between power consumption and performance when one transitions a device to a lower power state. For example, if we spin down or shut down a disk drive, the next time we want to read data from that drive we will incur higher latency. This is not acceptable behavior for all the different types of workloads. For example, interactive applications cannot wait for disks to spin up.

Designing Efficient Cooling

In the past people assumed that for every one watt of power consumed, you requires one watt of power for cooling. However, now people are building sophisticated datacentres to reduce the power required for cooling. Datacentre builders are using the notion of hot aisles and cold aisles, and are also encasing (insulating) the racks to ensure that hot air does not mix with the freshly brought cold air. Datacentre designers are also using blanking panels to fill up empty space in racks in order to manage airflow efficiency. People are also locating datacentres in regions where the outside air temperature and humidity is optimum (temperature range of 20 degree to 25 degree C, and humidity range of 40 to 45 percent with a maximum dew point of 17 degree C). Some system designers have started to leverage water-cooling in lieu of air-cooling in order to more efficiently remove the heat from the hot systems.

However, the plumbing infrastructure requirement for water-cooling leads to higher startup costs. Datacentre designers are also employing raised floor designs to facilitate better airflow circulation. In conclusion, the use of these cooling techniques is now leading to a ratio of less than one watt of cooling for every one watt of power consumed.

In conclusion, it is important to note that in addition to performance, power management is another quantitative way of measuring system performance. Going forward, as standards bodies produce new power measurement units this will become another key differentiator between the products from different vendors. ■

*The author is Technical Director, Advanced Technology Group, NetApp*

A STORE LORE

Jim Simon

Many innovations in the IT industry start as complex and expensive technologies aimed at large enterprises, and then later filter down to the small and medium enterprises (SMEs) as simplified, cost-reduced packages. Storage or backup technology is no exception to this rule. Big-ticket concepts such as networked storage, tiered storage and fully-automated and fully-integrated backup, restore and archive functions are now available to SMEs and are being rapidly adopted.

What are the storage requirements of the SME and how do they differ from those of the large enterprise? The three main considerations lie in the area of primary storage performance and expandability, backup and archive function, and staffing costs for installation and maintenance of the data protection system.

Primary Storage

The primary function of the storage system is to reliably store the files and database of the company and allow rapid retrieval by multiple users. For most enterprises, storage choices can be evaluated in terms of availability—that is latency and transfer rate, and cost per megabyte. However, the SME faces a much greater challenge in managing the growth of its storage capacity, which may be rapid but will always be unpredictable. For this reason the SME will look for a storage solution which can start small but can scale easily, with the ability to add storage quickly and easily in small or large modules with minimal disruption to the system while maintaining the same level of accessibility and cost per megabyte. While the large enterprise will plan for a growth in capacity of 20-50 percent per annum, the SME must plan for a growth from zero percent to 200 percent or more per annum.

Backup And Archive

Backup is an essential, integral part of any storage architecture and must be planned and rolled out at the same time as the primary storage. It must also meet the same criteria for cost, performance, reliability and expandability as the primary storage.

Backup covers two major functions, the ability to restore the files and database of the company in the case of catastrophic failure of the primary storage and the ability to make

**SMEs face a much greater challenge in managing the growth of its storage capacity, which may be rapid but will always be unpredictable**

copies of essential data for infrequent access for business, regulatory or legal reasons. The usual reasons considered for failure are “earthquake, fire and flood” but in fact the more likely reasons are equipment failure, software failure, viruses and worms, human error and deliberate sabotage. SMEs are more vulnerable to human error and sabotage since equipment is often in an open office environment and is maintained by inexperienced staff.

The archive function sometimes uses the same tape drive as the backup function but recently the trend in companies large and small has been to make frequent backup copies to a separate backup disk device allowing rapid disk-speed backup and restore, and to use tapes only for archival purposes.

It will also be prudent to move backup and archived information on tapes to an off-site remote location to safeguard against local disasters.

Manpower

The third area of consideration is the area of staffing costs which is a particularly difficult area for SMEs. For an organisation of 100 people or so it is difficult to justify more than one full-time IT employee. A larger organisation can have the luxury of having IT staff to manage, and even on-call staff available. For the SME operating 24/7 the worst nightmare is a catastrophic failure requiring restore from backup in the middle of the night or at a weekend when the only IT person is away. Therefore a backup and restore which is fully automated without requiring the presence of skilled staff can improve performance and security and bring down costs in this area.

For the SME the functions of the storage system may best be summarised by the mantra: store-retrieve-backup- restore-archive. Attention should be given to the ability of the storage system to scale easily from very small capacity to very large, with storage increments added easily. It is always better and cheaper to buy and install storage as it is required rather than in advance since prices are always on the downward trend, and performance always improves. The backup and restore architecture must be laid down at the same time as the primary storage and it must also be reliable and scaleable. ■

*The author is Director of Marketing, APAC, Quantum*



# REMOTE IT INFRASTRUCTURE CONSOLIDATION

Fortune 1000 CIOs are making the strategic choice to consolidate remote site IT infrastructure into central datacentre. They are compelled to move some or all remote file servers, email servers, backup, and other servers because through such site consolidation they can jointly address the need to reduce remote site operating costs and mandates for more rigorous security and compliance.

The stumbling block to consolidation, however, is the severe impact on application performance as seen by remote users. Relocating local servers to a datacentre and connecting them across a wide area network (WAN) link often results in order-of-magnitude slowdowns to response times and data transfer rates. At these levels of delay business processes are impacted forcing site consolidation efforts to be stalled.

CIOs often discover that upgrading bandwidth to remote sites has little or no effect on application performance. The problem lies instead with the way the applications interact with the server across the WAN. Microsoft Windows file systems, Microsoft Exchange, NAS, backup applications, CAD applications, and many others were developed with the idea that the client and server were local. Across the WAN, however, where congestion, resource contention, diverse routing conditions, and high latencies exist, these applications grind to a crawl.

## Why Consolidate?

Remote site server consolidation is a clear win in terms of reducing operating costs and improving data security. However, there were compelling reasons for distributing server infrastructure in the first place.

The reason many companies chose to place servers at remote sites has been to deliver consistent application performance to remote users working with local data sets. Microsoft Exchange servers, for example, have commonly been deployed at remote sites with only 20-30 users because above those numbers, most Exchange messages end up being between local users. Provisioning of servers at remote sites, however, often leads to low resource utilisation and high costs. Since Exchange servers are typically resourced for a capacity of several thousand users, deploying a dedicated server for a few dozen means inefficient use of server resources. This same issue exists for file servers, and web servers. Worse, all those servers have to be managed, backed up, repaired, and patched.

Site consolidation has a tremendous ROI, as long as user application performance is preserved

Centralising servers at a data center means greater resource utilisation, and fewer servers to backup and patch. Since complexity is reduced, such consolidation also means lower IT staff requirements, less chance for errors, and better system security.

Because of the clear benefits, companies are trying to consolidate infrastructure as much as possible, yet many are surprised at how difficult it is to actually complete a successful site consolidation project. They find they can't deliver consistent end-to-end application performance even with significant upgrades to WAN bandwidth.

## Three Barriers To Site Consolidation

When WANs are involved, client-server applications that worked fantastically on LANs break down and work poorly, or not at all. The reason is threefold: Constrained WAN bandwidth; TCP throughput drop-off with latency; Application chattiness multiplies the effect of latency.

**Constrained WAN Bandwidth:** WAN bandwidth is often orders of magnitude less than local area network (LAN) bandwidth. A typical remote office has between 64 kbps and T1 bandwidth (1.544 Mbps) or E1 (2 Mbps). Compared to modern LANs that have 100 Mbps to 1,000 Mbps, a remote site typically relies on less than 1 percent of the bandwidth to access data as a result of server consolidation.

From a pure bits-per-second perspective it's easy to see why moving a large file across a WAN link should take more time than over the LAN. However, it's often the other two constraints, not bandwidth, that result in low application performance.

**TCP throughput drops-off with latency:** All applications rely on underlying communications protocols which, for reliable transport across the network is almost always TCP. TCP sends data in "windows". A window defines the maximum amount of data a sender can transmit before receiving acknowledgement from the receiver. Since it takes a round-trip time to receive the acknowledgement from the receiver the maximum throughput is the amount of data in a window divided by the round trip time. TCP slow start and congestion control features designed to increase reliability also make the throughput problem worse.

**Application chattiness multiplies the effect of latency:** On top of TCP, applications have their own communications protocols. For example, Microsoft Windows uses CIFS, the Common Internet File System. Microsoft Exchange uses

MAPI, the Messaging Application Programming Interface protocol. Web based applications rely on HTTP, and so forth.

Some protocols (application or transport) are extremely "chatty", which means they generate hundreds or thousands of round trips from client to server, even to accomplish seemingly simple tasks. For example, dragging and dropping a 1 MB file in Windows can trigger over 4,000 WAN round trips. On a LAN, when the latency between client and server is often less than a tenth of a millisecond, those thousands of round trips are completed virtually instantaneously. When the same operation is done on a WAN, the latency is usually in the range of 50 ms to 250 ms, or even more when satellites are involved.

Application protocols also have a limited amount of data they can transmit on each round trip. So the problem of many round trips is worse for large files. If the application protocol has a "transfer size" of 16 KB, then 16 MB file will require 1,000 trips, just to deliver the data, plus lots of additional round trips generated by the application to manage the data transfer, file system operations, or whatever other operations are required.

A similar chattiness issue applies to the TCP layer, which affects web-based business apps, as well as applications like Notes, FTP and other mission critical applications.

## Exposing The Myths

Over the past few years, vendors have created a number of products to accelerate application performance. These solutions, often categorized as WAN Optimisation or WAFS, have fallen into three categories:

1. TCP optimisation, 2. Compression 3. Caching

IT professionals have learned that these solutions are either insufficient to address performance across a wide range of applications, introduce additional complexity, or both. While each of these solutions can solve specific issues with application performance across the WAN, the myth still exists that they are general solutions to application performance.

### Myth #1: You can solve application performance with TCP optimisation alone

Many IT professionals are aware that TCP as originally defined has a maximum window size of 64 KB (the typical amount of data that can be carried in each TCP round-trip), and that the limit can be modified with some work. In many cases, the configured maximum TCP window size is even smaller - 16 KB or 32 KB, which makes the problem even worse. Even companies who elect to go the route of modifying TCP find that fixing or improving TCP does not help application performance if the application protocol is less efficient than TCP.

Benefits Of Consolidation Of Remote Site Infrastructure

- Reduces cost and complexity
- Improves compliance
- Improves data and network security
- Improves resource utilisation
- Eliminates need for costly WAN bandwidth upgrades
- Eliminates write consistency issues associated with caching
- Frees up WAN capacity for VoIP and video applications

Hardware solutions exist to modify TCP's behavior in other ways across the WAN to increase its throughput, but modifying the TCP layer in the networking stack does nothing to improve performance issues caused by higher layer protocols. For many applications like Windows file sharing or Exchange, the application protocol (CIFS and MAPI, respectively) are much chattier and less efficient than TCP itself. Thus, making TCP more efficient can be helpful, but in many cases this approach alone is insufficient.

### Myth #2: You can solve application performance with compression

Companies that attribute application performance issues to lack of bandwidth often reach the conclusion that they can solve the problem by adding compression appliances. This is equivalent to adding more bandwidth. More bandwidth is helpful, but again it's insufficient to solve the problem. Adding bandwidth does not help alleviate the chattiness of the application, which means that all those round trips still have to take place. No matter how much bandwidth you buy, once the initial congestion has been alleviated, the application performance will not be materially affected.

### Myth #3: You can solve application performance with caching

Some companies have investigated caching appliances as a way to enable site consolidation. That approach can work for single data types, but will not provide a general solution and often is used just to hide the underlying performance problem. For Exchange, there are special purpose mail caching appliances available, but they are not a general purpose solution to the problem. Caching is an application-specific technology: File caching works for file systems, Web caching works for web pages, mail caching works for email, and so on. So while adding an Exchange mail cache will help by storing attachments locally, it adds complexity and only affects the perceived performance of Exchange.

Another issue for file caching is write consistency. Often caching products will implement elaborate file locking mechanisms to prevent two users from writing the same file. But in the event of network outages and/or box failure, these mechanisms can fail leading to catastrophic results.

With Exchange 2003 and Outlook 2003 Microsoft introduced integrated client-side caching to address performance across the WAN. This hides the delay in getting email from servers to clients by not displaying any new email headers until the entire email and any attachments are fully delivered. Client-side caching can improve the perceived user experience but may cause much heavier traffic across the WAN, since emails are delivered to the client that might have been deleted without being read if only the headers were seen. ■





112 FIFA 09



00 Tech Quiz



128 The Last Word

# Digital Leisure

Technology Beyond Work



Michael Browne

## Going Psycho...

One of the best looking games just got better. A whole lot better! Did that sound like a slogan for a publicity campaign? Well, EA can quote me on this one; because I'm dog-tired looking for non-existent flaws and you know your looking at something close-to-perfect when you need to scrutinise just to find something worth nitpicking.

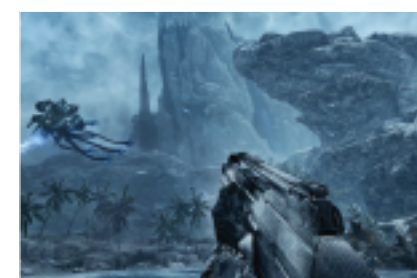
For many of us the original game was something special — never-seen-before graphics and life-like environments, superb weapon effects, and a well told albeit far-fetched storyline. In *Crysis* you played Nomad, part of Raptor squad; an elite group of commandos tasked

with rescuing scientists captured by hostile Korean soldiers on a desolate island. What starts as a non-routine rescue-cum-destroy mission quickly goes out of hand as a mysterious distress beacon triggers the awakening of a gigantic alien life form buried beneath the islands surface. This alien transforms the lush paradise into a frozen wasteland. There is a large icy globe that emanates from this large being and is steadily moving outwards icing anything in its way. The large alien being also unleashes a horde of alien creatures in a variety of exoskeletons whose only goal is to ensure you're fish food. Between the straggling Koreans and the hostile exoskeletons you were largely occupied with staying alive while also getting off the island and destroying what is now identified as the alien mothership before the icy zone expands to proportions of endangering entire countries.

Score: 9/10  
Developer:  
EA Games  
Publisher:  
Crytek Studios

That being said, *Warhead* plays like a new game and there are no repeats. Psycho starts on a different part of the island and has very different levels and a gung-ho type of personality which grows on you. He's also British, so prepare yourself for some tongue-in-cheek dialogue delivery.

In terms of visual quality, the best in the business just got better. Even on DX 9, *Warhead* is noticeably better looking than the original. Of particular interest are the HDR effects and sunlight reflections on water and weapon detailing and glowing embers on debris; all these are real visual treats that you should not miss. The game does run a little slower for that. Gameplay is brilliant and some weapons have been tweaked. You'll notice *Warhead* plays a little faster though this may be due to Psycho's rather dynamic care-a-damn personality. The game is also noticeably easier, for all you God-mode lovers.



Now here's where EA's evil genius is to be appreciated; how do you repeat such a success story? Since the team is scattered each person individually goes about completing his objectives while working together via commlink. Given this, how about giving you the chance to play as each surviving member of Raptor Squad? So you get to play different campaigns with the same base storyline. There are three surviving members of Raptor Squad — Nomad, Psycho and Prophet. Nomads' story has been told. *Warhead* covers the adventures of Psycho. So you may see Prophet in the near future...

If only EA had made something a little kinder on PCs I'd have been a little kinder with my rating; *Warhead* murders my 8800 GTX and if you don't watch it, you may just be tempted to shell out for an upgrade. Any gamer worth his salt must try *Warhead*; it's one of those select few games around that deserves all the hype it gets. Please upgrade your graphics card and RAM before playing because while the game is good enough to play without all the eye candy, the devil is really in the details.

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**F**IFA introduced cutting edge graphics, the heart thumping in-game chants, the menu tracks and the high of scoring a goal from a trademark David Beckham cross to the genre. These features contributed to the phenomenal triumph of the franchise. This year, *FIFA 09* in no way falls short of our expectations. David Rutter, the chief producer of *FIFA 09* has stated that there are more than 250 improvements in this edition of the game.

The first thing you'll notice on starting up this game is the new main menu and the extreme profusion of gameplay options to choose from. The abundance of these options tend to confuse the gamer at first, but a widget system makes sure that the game retains the player's attention. Widgets help the gamer keep track of all the current progress and records set in the game. Apart from the usual gameplay there is also a surprise addition – the 'be a pro season' where you can select and control one player through a maximum of 4 seasons. Gamers can choose between existing players or create a new custom player model and jump right into the game. Carry out the given objectives and you'll earn experience points, which you can spend to improve your player's attributes. For the first time in the history of the *FIFA* series, the player stats like height, body mass, and weight have started to matter. This interesting feature has redefined the tackling, jostling and collision system. The player's physical characteristics are important in deciding the outcome of the match. Another innovative addition to the game is the Adidas Live Season feature that will update the game database for all the player's statistics based on their respective performances in the real world matches.

Getting down and dirty with the action now – the graphics of *FIFA09*. This game is equipped with an all-new graphics engine that boasts of 'life-like' player models and details. *FIFA 09* amps up the envelope of HD gaming with the introduction of dapper features like post processing effects, output video quality enhancement and support for shader model 3.0. There have been specific improvements to player-models wherein each and every international and first division professional league football player has been painstakingly designed by EA to closely resemble their real life counterparts in the game. It is now possible to identify all your favourite footballers on the pitch as it would be on a television screen! It is actually possible to see the sweat on their foreheads, the nerves jutting out of their arms and to make out every expression on their faces – from joy to disappointment. The real treat comes to in watching Rooney celebrate at Old Trafford on scoring a winner; the whole stadium comes alive with fanatical fans and their raging chants. *FIFA09* introduces 24 authentic stadiums from around the world including Wembley, Emirates, and the Millennium Stadium just to mention a few amongst others which have been meticulously designed.

As far as the sound goes, the track list brims with adrenaline. Frankly there is nothing special about the on-pitch sound support in *FIFA 09*, but the commentary is the real treat, which makes you feel as if you were in the company of Ally Mcoist and John Motson. The build-up of a match reminds you of the live coverage on a Saturday by ESPN.

*FIFA 09* brings with it a breath of fresh air in the gameplay department. The controls are customizable to fit varied user needs,

with both attacking and defensive controls being customisable independently. EA introduces for the first time a mouse and keyboard combo control system, which provides a cool new way to carry out all those hard to perform off the ball tricks. When it comes to gamepad controller support, a major flaw awaits all those with 'non-branded' pieces of hardware. *09* provides a very dismal support for controllers other than those manufactured by industry leaders such as Microsoft, Logitech and Saitek.

Fighting back against the ongoing piracy-wars, EA's *FIFA 09* is shipped in with DRM (Digital Rights Management) protection. EA has incorporated an ingenious piece of technology in *FIFA 09*, which requires you to register the game online at least once before it is fully activated. This means that even though you might download the full version of the game on to your PC, and install a crack, the game will still not give out its full experience.

The multiplayer support in *FIFA 09* is like none other and you are going to be spoiled for choice. *09* introduces a 10 on 10 Be a Pro online gaming mode that makes it possible for you to join up with a gang of friends and kick some butt in a team match where each gamer controls an individual player.

*FIFA 09* is one of those games that will not disappoint its players in any manner. Be it the avid gamer type who swears by every *FIFA* title that's hit the shelves till date, or the casual gamer who is just looking forward to playing a fun game to kill some time. Investing in this gaming title would definitely make sense in all respects. It's a must buy for all *FIFA* fans and if you're not one, just take our word for it and we promise that the next time a new *FIFA* title is released you're not going to wait for a review before buying it.

Courtesy SKOAR!



# Feature Presentation

Rating: 8/10  
Publisher: EA Games

Developer: EA Canada  
Publisher: EA Sports  
Web site: [www.fifa09.ea.com](http://www.fifa09.ea.com)



# Spot the Nots

**1** Which of these fictional computers is not sentient?

- a) The Interociter
- b. Skynet
- c. Hal 9000
- d. Deep Thought



**2** Which of these was one of the codenames for windows 7?

- a. Viridian
- b. Blackcomb
- c. Kahuna
- d. Velocity

**3** What is THX an acronym of?

- a. This handles x-treme (sound)
- b. Thorium X
- c. Tomlinson Holman eXperiment
- d. This has xtra

**4** Spot the notes

- a. Piet
- b.FALSE

- c. Raiden
- d. Whitespace

**5** What is the scenario of von-neumann machines taking over the world referred to as?

- a. Black out
- b. Red sweep
- c. Blue death
- d. Grey goo

**6** Who discovered the binary number system?

- a. Pingala
- b. Aryabhata
- c. Brahmagupta
- d. Sushrata

**7** Which of these never was an arcade game?

- a. Galaga
- b. Tetris
- c. Donkey Kong
- d. Dig Dug

**8** How many colors could the VGA display?

- a. 16
- b. 64
- c. 256
- d. 248

**9** Which of these is not a video card output?

- a) HDMI
- b. VIVO
- c. DVI
- d. HD-15

**10** Which of these is not a 3d graphics API?

- a) Direct3D
- b. Open GL
- c. Quickdraw
- d. DrawX

**11** What is the lowest abstraction level, which interfaces with resources such as memory, processor and I/O devices, in an Operating System called?

- a. Kernel
- b. Driver
- c. Setting
- d. Linux

**Did You Know?**

That the internet is short for internetworking.

## Answers

- |      |       |
|------|-------|
| 1. a | 11. a |
| 2. d | 10. d |
| 3. c | 9. a  |
| 4. b | 8. d  |
| 5. d | 7. b  |
| 6. a | 6. a  |

Got an interesting question? Send it in with the answer to **TQ@thinkdigit.com** Mark "TQ" in the subject area

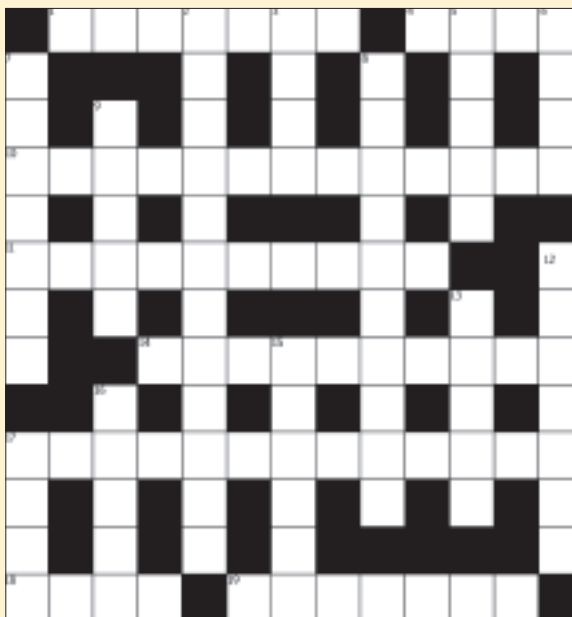
## Crossword

### ACROSS

- 1. Transmitters of internet messages(7)
- 4. Taiwanese computer hardware company(4)
- 10. Movement of a virtual machine from one physical host to another while continuously powered-up(4,9)
- 11. Fast-paced action activity for PC or consoles(6,4)
- 14. To control (an industrial process) by computer(10)
- 17. A program that allows the user to write and read messages on the net(4,4,5)
- 18. More intelligent than a geek(4)
- 19. Social Networking Site founded by eUniverse(2,5)

### DOWN

- 2. An algorithm to find the day of the week for any date(8,4)
- 3. Telephone sound(4)
- 5. Flexible series of connected links(5)
- 6. Redundant Array of Independent Nodes(abbr)(4)
- 7. Distribution of the final version of an application(7)
- 8. Consisting of small disconnected parts(10)
- 9. Television and Video Compact disc(abbr)(2,3)
- 12. Area of the screen in GUI(7)
- 13. An alloy of iron used as a covering plate(5)
- 15. Capacity of a physical system to do work(6)



- 16. Electronic equipment that mixes two or more input signals to give a single output signal(5)
- 17. ---frame- cabinet containing the CPU(4)

Last month's Winner  
**A. Archana**

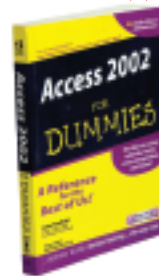
Send in your entries to **TQ@thinkdigit.com** on or by the 20th of this month. One lucky participant will win

**Access 2002 for Dummies**

By John Kaufeld  
Published by

**WILEY-INDIA**

**Win!**



## October's Solution



Crossword by Nitaa Jaggi



### Jet Car To Shatter Land Speed Record

A Jet powered car named "Bloodhound SSC" is eyeing the 1000 mph land speed record. Unveiled this month at London's science museum, the 'SSC' stands for Super Sonic Car. The current land speed record is 763 mph



### Google starts reading minds

Google, partnering with MediaVest have started to monitor brain waves and psychological responses to video ads on YouTube. The experiment was conducted with the help of NeuroFocus on a group of participants. The conclusions will be used to improve ad quality determinations



# Escape

PURSUIT OF HAPPYNESS

## Men Click, Women Cuddle



According to a recent survey that keeps with popular belief, there is one significant behavioural difference between men and women in general — women prefer to spend more time with family in order to stay happy.

In an Australian study and called the *Happiness Index* survey of what makes people happy, all it takes to make a man happy is staying glued to a computer.

8,500 people across age groups 18 to 64 were surveyed to arrive at this conclusion. The only area where results matched was in the area of relaxation. Both men and women considered relaxation techniques vital to stay happy. For over half the men, happiness meant surfing the Internet, playing games online or accessing social network sites such as Facebook. Only 39 per cent of women mentioned these as reasons to stay happy.

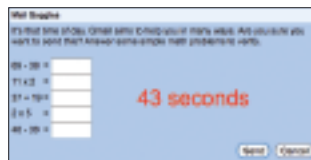
So what can we conclude? Perhaps, guys

should consider spending quality time with family to convince their female counterparts to let them buy that new computer, game or gadget. They don't teach you this in their surveys!

DON'T DRINK AND MAIL

### Goggles For Your Prestige

There are stressful times that call for a couple of drinks and end up creating a mess and even embarrassment later. The hours pass by, and you get back to your senses, realising you just wrote someone a mail, you were just not supposed to. Your ex-girlfriend or boyfriend; worse still — your boss! The damage is already done... now what? You can prevent



this in the future with a Gmail application.

Christened Goggles, the aforementioned activities are exactly what Google aims to avoid with Goggles. A very simple concept, Goggles works by testing how alert you are without asking you to walk on a straight line!

Suppose you generally hang around in a pub for a couple of drinks in the evenings after work, around 7 to 9 in the night, enter this window while configuring Goggles.

During these hours, if you log in to Gmail and compose an email, it will prompt you to answer five simple arithmetic problems.

Your email would be sent only if you answer the questions correctly. Not only does this application help you in such sensitive situations, but also would serve as a filter in your email account being used by bots.

PORN WITHOUT PORN

### Clean Titillation

Some inventions are amazing, and others just leave you scratching your head. Some are both good or bad, depending on how they're used. One such invention is the Internet.

## Whatever Happened To...

### UEFI

Floating around for over five years, was the long overdue replacement for BIOS. The operating systems in computers use BIOS to interface with the hardware, and have been doing so for over two decades. UEFI, which stands for Unified Extensible Firmware Interface was poised to be the change around three years ago. Underperformance of motherboards, and a lot of computer problems are because of the substandard performance of BIOS. UEFI is based on the EFI specifications from Intel, and although the EFI is copyrighted, the specifications are open for UEFI for anyone to program. Currently, Intel, AMD, Dell, IBM, HP, Lenovo and Microsoft are all part of the UEFI non-profit collaborative trade organization.

BIOS is written using very old code. Most new programmers cannot program the BIOS, at least not in-depth because a lack of understanding of how it works. UEFI was about to change that with higher level programming languages like C++ being supported, along with Bios. Machines with UEFI were about to shipped by Intel in 2005, and by Microsoft in 2007, but very few machines were shipped, and UEFI did not end up replacing BIOS. The idea is still going strong, and UEFI cannot be written out as yet, but it will be some more time before it replaces BIOS. This is because of the proliferation of BIOS, UEFI will have to overcome the inertia of two decades of use.

It provides us with an insight to our world and teaches us virtually everything possible. But then as you would all agree, the weirdest things happen online!

The latest is a site that shows porn, without the act. Termed *PG Porn*, this Web site is aimed at porn fans who enjoy the titillation of porn but are offended by on-screen acts.

It all started when three brothers — James, Sean and Brian Gunn were having a discussion one day. Considering growing acceptance on part of surfers for online porn, they were of the opinion that it holds tremendous commercial scope.

The Gunns are no kids on the block. Sean started in the Emmy Award-winning, Golden Globe-nominated, American comedy-drama series *Gilmore Girls*. His brother James is the screenplay writer of *Scooby Doo* released in 2002.

As James Gunn, writer, director and producer puts it, "This is a place where the porn and the mainstream film industries meet and get to have some understanding of each other. We like to pretend that we're miles and miles away from pornography, but we're not."

According to Frederick Lane, the author of *Obscene Profits: The Entrepreneurs of Pornography in the Cyber Age*, "Pornography's size as an industry is often overstated, but Web-based porn generates at least \$2 billion a year. People are getting more blasé about porn; I don't think there's any question about that. I think the Internet has played a huge role in that, it sort of lowers everybody's threshold."

The name *PG Porn* is taken from the term PG that stands for Parental Guidance

suggested — a rating, at times, given to movies despite being free from objectionable content.

The brothers don't expect you to watch the web-episodes with your parents. Here, comedy replaces sex. They expect most of their viewers to be males, at least initially — they assume most men watch porn.

As a warning, however, Bob Peters, president of New York-based Morality in Media, said *PG Porn* is not as bad as regular porn sites. He worries viewers will eventually move on to the real thing. Without any doubt, it's an open world out there on the Internet, and we need to discern between the good and the bad.

#### FORBIDDEN FRUIT

## Exploring As A Eunuch

For those of you who haven't heard of the Forbidden City, it was the Chinese imperial palace from the mid-Ming Dynasty to the end of the Qing Dynasty. Located in the Dongcheng District, in the heart of Beijing, it now houses the Palace Museum. For nearly 500 years, it was home to the Emperor, his household, and was also the ceremonial and political centre of the Chinese government.

However, after being home to 24 emperors, which includes 14 from the Ming Dynasty, and ten from the Qing Dynasty, the Forbidden City's reign as the political centre of China ended in 1912. This happened with the abduction of Puyi, the last Emperor of China.

Puyi, a lavish man, was held hostage, and



eventually sold precious items to sustain his lifestyle. The rest were stolen by the eunuchs of the palace.

You haven't missed on any of the excitement—IBM has now financed a cultural project to let you visit the Forbidden City, and get a feel of it too. Moreover, it lets you dress up as a eunuch yourself. You can watch emperors from the Qing dynasty dine, train crickets to fight, and then feed them with blood-fattened mosquitoes. Besides, you can also practice archery with a courtesan.

At the virtual palace, launched recently, you can also dress up as part of the imperial entourage.

IBM Program Manager, John Tolva says you can choose among nine historical costumes after entering the virtual City. He adds that you can't run or fly so that other virtual visitors are not distracted.

Named *Beyond Space and Time*, this project also has the finer details such as the eunuchs that shaped the course of the palace, and went on to hold great power. Paula W. Baker, Vice President, IBM says one of the costume you can choose is that of a eunuch.

For those of you who want to get into the finer details, you can also have a closer look at the women who were chosen to serve the emperor.

Built over a period of three years and a whopping \$3 million, by IBM, [www.beyondspaceandtime.com](http://www.beyondspaceandtime.com) is worth trying. We wish

## People Who Changed Computing

### Dennis Ritchie



Dennis MacAlistair Ritchie wrote the future of computing when he created the C programming language while working for AT&T Bell labs in 1972. One of the first object oriented programming languages, C (and derivatives like C++) is the most commonly used programming language in the world. C is platform independent, is used across a wide variety of architectures and platforms, is one of the most powerful programming languages around, and a number of independent compilers exist.

Dennis Ritchie's contribution to technology does not end there. Along with Ken Thompson, Ritchie developed the Unix operating system. Unix is used as the OS for everything between mobile phones and supercomputers.

In 1983, Ritchie received the Turing award for developing the Unix operating system. In 1999, he received the US National Medal of Technology for Unix. Ritchie was born in New York and achieved a double degree in physics and applied mathematics from Harvard. He retired in 1997.



# Bluff

YOUR WAY THROUGH

## MMORPGs

**Attribute:** The characteristic of the in-game avatar – like strength, intelligence or magical prowess.

**Camping:** Waiting in a particular place, hiding to conserve health, or resource hogging at a spawn point

**Farming:** Gathering credits or currency by repeatedly performing the same operation

**Guilds:** Groups of players of the same type or with the same interests within a game

**Mule:** A character created by a gamer just to explore the game, and keep track of resources, and see what is happening in the game world at any point of time. They are stripped down, and are used to scope out the game before playing with the primary character.

**Party:** A group of friends who form a clan online and play together. Can also refer to a virtual gathering of real people.

**Race:** A species of sentient beings in the in-game universe. Common races include humans, dwarves, elves and orcs.

**Server:** MMORPGs host multiple servers for their games, users cannot interact with each other across servers.

**Twink:** The benevolent donation of resources, credits or items to give a kick start to a newbie.

**Usage:** I used a **Mule** with zero **attributes** to check out the resources available on this **server**. Then I **farmed** for a while and gathered experience points, escaped a **party** by **camping** and got **twinked** by an experienced player for joining his **guild**. I usually choose to belong to the elf **race** in a game.

## Wild Wild Web

### Where Did Your Socks Go?

Ever lose your socks? You are not human if you haven't – or you don't wear socks. If you are stuck with a single sock and don't know what to do with it, and want to find out what in heaven's name happened to the other sock – <http://funbureau.com> has the answers for you. Maybe this is a tactic by large media conglomerates to control your mind, maybe the aliens steal human socks for our DNA, as its an object that is hardly missed, maybe a voodoo shaman has stolen your socks to practice his

black arts on you – you never know what they can do with your sock. They have a sock vault for a secure repository of all your socks, a Sherlock Hound to go find the missing socks, a forum for you to connect with other sock losers and lovers and a directory of special and rare socks – among other things.

### Mensa Fer Da Stoopid

So you are not Albert Einstein, you don't have a three digit IQ; hell, you don't even have a two digit IQ... that's absolutely nothing to be ashamed of. Head over to <http://www.not-mensa.com>

to find other like minded people. They even have a test section for those with low IQs. You can also test your math and spelling skills, and you don't feel dumb even if you fail them. Hey, your pet will always perform worse than you right – maybe not. You can even test your pet.

### Crazy thoughts

Ever had goofy thoughts that you did not document? Why let it go to waste. There are a lot of things people think about, but stuff from the bottom of the brain is right here [www.crazythoughts.com](http://www.crazythoughts.com).

someday we are able to dress up as an Emperor and walk around the Taj!

### VIDEO NABS BIKER

## Hold Your Horses

**I**t all started as a session of bike riding as if no one was watching.

Twenty eight-year-old Sandor Ferenci from Oxford, Central England tried everything possible from wheelies, skids—racing on the wrong side of the road. His driving stunts were filmed by his friend and were later posted on YouTube.

A motorist who saw Ferenci noted his registration number and informed the police, who finally tracked him.

When they confronted Ferenci, he asked them whether “this was about the YouTube video”. The police then viewed the clip on YouTube that showed Ferenci performing all the stunts in various angles. It also showed him

performing wheelspins and causing the tyres to smoke.

Although the exact speed could not be specified, prosecutors estimated it to be 280 kilometers per hour.

Ferenci was arrested and was handed a 12-week jail sentence. Judge Terence Maher told Ferenci, a caretaker of an elderly lady that he was a risk to himself and others on the road.

Maher said he wanted to send out a clear message that if you are caught driving the way Ferenci was caught, serious action would be taken.

The next time you or your friends upload a video on YouTube, do consider the far-fetched implication it may have!

### SCI-FI SOFTWARE

## Learning Alien Lingo

**W**e've read a lot about aliens all through the years and have even enjoyed

movies on the topic. But are they for real? What if we happen to encounter them some day? Would we be able to understand them? Dr Elliot from Leeds Metropolitan University had some serious thought on this and has developed a program to understand aliend languages.

Elliot's program compares an alien language with a database of 60 global languages and identifies if it has a similar structure. According to Elliot, alien languages, despite being different from those on earth, will have some familiar patterns in them. He uses this principle to reveal how intelligent the life forms are.

Elliot believes all human languages have connecting terms such as the ifs and buts in English, and such terms can be separated in to nine words or characters in any languages.

We wish Elliot success, but considering that the very existence of aliens is debatable, we wonder whether we would see any

fruit to his efforts. Besides, understanding an unknown language is similar to figuring out the difference between a bark and a growl!

## NOMADIC WORLD

# Travelling Designers

Meet Olivia Meiring, Nathan Swartz and Tristan—a family of three from Pittsburgh that live off a recreational vehicle. In these days of wireless internet, laptops and web tools, it's indeed possible to work while on the go.

They have showcased their interesting journey on their website <http://tumblewagon.com>. Here, Swartz sheds light on the technology they use. He is quick to point to the fact that the two pieces of technology they have forbidden on their journey are the television and GPS. According to him, the television keeps you glued

# Outraging The Modesty Of Elephants Everywhere

Remember the picture of the elephant at the end of the Enter news? That particular image proved to be a thorn in Vijay's side. Since the story was about elephant poaching, he thought it was a good idea to Google "dead elephant" — and was unpleasantly surprised. After that, he found an image of a live elephant, and was midway through adjusting the image, to make it ready for print, when he

noticed something showing between the legs. So Vijay goes out of his way to protect the modesty of the pachyderm — and goes right ahead and puts a leaf over the area. Google "leaf" and you get either maple or marijuana. Now an early draft actually had an elephant with a marijuana leaf covering its privates. Pity that Raaabo noticed it, blew up and edited the whole thing out — you missed quite a sight.

## DIGIT DIARY

into other people's lives when you should be living your own, and GPS on the other hand keeps reminding you where you are. He says if he ever wanted to know where he was, then he would have never left Pittsburgh.

They use their iPhone to stay connected to services like Twitter and Facebook, and are pleased with AT&T's internet connection. Although they don't use the phone for heavier coding requirements, requirements such as making changes to code or sending email is where they use their mobile connection.

They use a Sprint wireless internet connection to stay connected all the time. They connect their laptop, again a Mac to the wireless connection. The operating system of choice is Mac OS X Leopard. They use its Internet Sharing option in OS X to use the computer as a wireless router and WiFi hotspot. This enables them to access faster internet on the iPhone via Sprint, in case the AT&T connection is slow.

Finally, they backup all their data using Apple Time Capsule, a wireless backup solution. Entertainment is also taken care of. Airport Express with Airtunes lets them

wirelessly connect their speakers to their laptops and stream music, so that there is no messy wiring around their vehicle.

As far as plain old snail-mail is concerned, they use Earth Class Mail, a service that sends your postal mail to you online. This way they don't miss on connectivity in any way.

This story seems promising in this internet age. But switch back to India, and with our ISPs, consider travelling outside the metros into the towns and villages, in the hope of sniffing out last mile bandwidth! We doubt Apple would be able to help us here! ☒



Featured here are snippets from some of the best bloggers who have registered at the Blog Watch section on thinkdigit.com.

If you wish to be featured too, head to [www.thinkdigit.com/blogger.php](http://www.thinkdigit.com/blogger.php) and sign-up.

## Sachin

<http://sstechnlife.blogspot.com/>

## Retrieving Password

Q.I always tend to forget my Windows password. Is there a way to have a password recovery disk so that I can retrieve my password easily?

A. Yes, there is an option to create a password reset disk in Windows XP. Go to "Start | Control panel | User accounts". Then click your account name and then on "Related tasks". Next, click on "Prevent a forgot password". A wizard will come up. Follow the simple instructions and you have your password reset disk ready.

## Thumbnail change

Q.How can I change the size and quality of a thumbnail in Windows XP?

A. You can change the size and quality of the shell's thumbnails by: Start Regedit, expand **HKEY\_CURRENT\_USER** (only for you) or **HKEY\_LOCAL\_MACHINE** (for all users of this computer) and in **Software\Microsoft\Windows\CurrentVersion\Explorer**, add or

modify the following entries:

**ThumbnailSize** - Double Word, decimal value between 32 and 256.

**ThumbnailQuality** - Double Word, decimal value between 50 and 100.

## Techfat

<http://techfat.blogspot.com/>

You have viewed your favorites websites such as [wap.tagtag.com](http://wap.tagtag.com), [m.yahoo.com](http://m.yahoo.com) on your mobile phone or PDA. You like them and want to access them on your computer. You don't want to pay for paid WAP browsers, or dislike so called WAP emulators (TagTag.com). Your browser doesn't access wml websites. Even FIREFOX doesn't support wml pages by default. Here is an add-on for FIREFOX named "WMLBROWSER" which is available at <https://addons.mozilla.org/en-US/firefox/addon/62>.

Install this add-on and restart firefox. Voila you've got WML access. You can go through the project "WMLBROWSER" at <http://wmlbrowser.mozdev.org>





## Feedback For October 2008

### Gimme!

Please can you guys download the full version of *Halo: Combat Evolved*, *Rayman 3: Hoodlum Havoc* and *Prince of Persia: The Sands of Time*, and then compress it and mail it to my e-mail address? Please\*(100000). I hope that you will fulfill my requests.

**Rocky Sixer**

Thanks for the laughs. Is there anything else you'd like?

Team Digit

### Fanboys

This is the first time I am writing to you. I have been subscribing to your magazine for years now. It's great, surely one of the best and definitely a job well done! Great stuff!

The Editorial of October 2008 issue made me write this letter to you. Last few months, I notice that *Digit*, has been derisive about Microsoft and their products, and biased towards open-source (read: Firefox). Adulation is all I see.

What's wrong with Vista anyway? I have been running it since it's launch in my Dell Laptop with just 1 GB of RAM with all the frills and whistles turned on. (Note: I do heavy multitasking). I don't remember it ever crashing. Not even once. I have not faced any technical problems with it.

I have not faced any security issues either. Mind you, I use IE7 for browsing and no anti-virus. Just Windows Firewall and Defender with all applications and OS fixed with the latest patches. Absolutely no hardware

compatibility issues. Few software compatibility problems I had was ironed out after SP1.

Brilliant user interface with great usability. Better, deeper and intelligent control of the operating system. (Have you ever been into the Performance Information and Tools inside the Control Panel? How about the Reliability & Performance tools present in Computer Management? Can Linux give me that granular control and insights / reports about my computer?)

A variety of other useful features and improvements over Windows XP.

Have you used it long enough to criticise it? Have you conducted tests on Vista in your labs enough to judge it? Guess, it's true, when Microsoft says "Get the facts right!"

I guess we all have a mind to think and decide, rather than be influenced and flow with the crowd. It's surely the problem between the keyboard and the chair. Being a technology magazine, I would expect *Digit* to be more neutral and be critical and appreciative about all walks and fields of technology than being biased.

Looks like being Anti-Vista and Anti-Microsoft is the latest cool factor and *Digit* wants to be "cool"! Disappointing!

**Sriram**

If we are criticizing a particular software or operating system, we have rock solid reasons to support our claims – we need to. Our criticism is not based on such shallow aspects as "being cool". If you're an old reader, you will know that we have taken stands long before they were "cool". To answer your

questions, yes, we have been using Vista – even before it was launched, and we know what we're talking about. Lack of space prevents us from answering your questions in detail. We've carried enough articles about it before though, and maybe another is due soon to answer your questions.

We have also used several other operating systems and for long enough to know what Vista is lacking. We've even praised Vista for its better security, and criticised it for irritants like UAC. We openly say that XP is great, and it's a Microsoft product, remember; so no we're not those "cool anti-Microsoft chaps". Vista just fell far short of expectations; it's happened before too, remember Windows 98 to Windows ME? All of us are hoping that Windows 7 will shut us up, because we're not fanboys, and we really do want a new Microsoft operating system that takes us where XP took us after 98.

Team Digit

### Secret Weapon

First of all I would like to thank you very much for the spark it ignited in me for the hunger of technology.

When I was a 14 year old kid, we got a computer at our home, but I was not allowed to touch that computer; they didn't even let me in the computer room, I felt very bad that time, and decided to be an expert in the technology area, I was very enthusiastic about computers.

Luckily *Digit* was the magazine which my elder brother gifted me on my birthday and this was the start of my IT career as I was totally determined to be a CIO one day. The knowledge gained by reading this magazine adds a lot of weight when you speak to someone in terms of technology.

Now everyone I know asks me for advice before buying a product, or opting for a technology. It feels great! Thanks *Digit*.

Now when We have subscribed *Digit* and few other magazines for our organization, I was very impressed by the delivery and quality of this magazine. It is delivered on time in excellent conditions, where as the others never reach on time, and their condition is also not good. It compelled me to write a letter to you for the great job done.

**Reetesh Choudhury**

## Write to the Editor

E-mail: [editor@thinkdigit.com](mailto:editor@thinkdigit.com)

Snail Mail: The Editor, *Digit*, KPT House, Plot 41/13, Sector 30, Vashi, Navi Mumbai 400 703

*Digit* will publish the best letters on these pages. Letters may be edited for clarity. Please include your complete address in all communication.

For subscription queries send an e-mail to [help@thinkdigit.com](mailto:help@thinkdigit.com)

Thanks for the vote of confidence. We're glad you're getting your magazine on time, and we're committed to getting the magazine out in time to all our subscribers across the country.

We hope to improve deliveries even more.

Team Digit

## Huh? What? How?

I'm proud that I was born in such a place that I could get to read such a great magazine. You have done an incredible job. You guys have taken a big leap to do a great job to make a huge contribution especially to all the tech freaks. You people just ROCK! Hats off to you!

However, I've got two core suggestions. Firstly, see if you can add more pages to "Q & A", and send people their solutions immediately. Secondly, your "Q & A" and "Tips and Tricks" section help readers a lot. But why not introduce a new section called "What & How". What do you say?

By far, *Digit* is India's No. 1 Tech Mag. Congratulations! And thanks to you for making it easier for me to become popular with my friends. All the Best.

Lilleshwor Sharma

We will look into making the Q&A section larger for you. You can log on to [thinkdigit.com](http://thinkdigit.com), click on the "Tech Q&A" section, and post your problems there. Our panel of experts are pretty quick to reply.

As for the What & How section you propose, we already have a How To section, and regular DIYs that we do. These are basically "what and how" with different names.

Team Digit

## Stop Wasting

Congratulations, on being India's best Tech mag. I make fun of others who dare to to buy other mags. I wonder what what sort of minds you guys have. Are you all equally awesome with your tech knowledge and ways of having fun? I wish I could see you at work.

I've been reading *Digit* for 4 years, and I loved the GPU test and Icons Of Trust. I've been hearing about binding problems for years, but this month was the first time I got a fatter than usual magazine. I got the Tips n Tricks pages twice over. That's 8 pages someone else didn't get, or just 8 wasted pages. Please be more

careful, I hate seeing our *Digit* pages being wasted in such a way.

Kanha Dey  
Jharkhand

Our gathering and binding crew are bound to make the odd error or two when working with lakhs of copies. We'll pass on your message, and are happy you got more, and not less, because that would be something we wouldn't want.

Team Digit

## I'll Put A Spell On You...

I knew that there should be something different in this edition but... This much was unexpected. It has really put me in a festive mood. I am reviewing the Pack here:

### Digit Magazine

I started reading the book in 2004 then discontinued when I was in class 10. Now, the 5th subject is Computers, so I restarted it. I can't subscribe to the book as the postal services over here are awful. The contents are also attractively wrapped for us. Everything makes you an Ace.

### Fast Track

The first Fast Track I laid my hands on was 'Gaming'. It changed my life. From then on, I read it regularly. Hats off for this labour of yours. This month's FT to Adobe Flash was really helpful, and explains the subject so well that even a first grade child who knows English can grasp the basics.

### CD

You all are ALMIGHTY GOD. I was just learning about HTML and CSS, and the CD is a treasure. I got two CDs in my pack though, but one was corrupted, so it evened things out.

### DVD

Three Dual Layer DVDs! I couldn't believe it on the stand when I first read that. But experience is best teacher and it told me to believe what you write. All the tools, apps, distros, games you got for us are superb. The packing was better last time though.

Harry Potter

We're glad you liked our special issue. Please write in with real names though, unless you are actually the fictional character; in which case, can you grant us all three wishes?

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## More Tech Careers

I studied in a boarding school, and in my dorm there was this guy who had a lot of knowledge of computers for his age. In class 7, he knew words such as telnet, FTP servers, P2P and I was greatly influenced. I wanted to be like him, and then one day I saw him take out a magazine called *Digit* from his bag. He said they give two CDs with it. From that day on, it was *Digit* all along...

Honestly, back then I would not even read one page of the magazine; it was the CDs that I wanted. But things have changed now, and I can't resist reading the entire magazine and *Fast Track*, because now I can understand the stuff you write. You guys have done a hell of a job, and we guys simply love it. Keep up the good work. I have a few things that I wish to bring to your notice. You review mobile phones... it has a 3.2 mp camera... plays MP3... touch screen... price this much, and so on... but it would be better if you can also tell us what formats of audio and video it can actually play?; does it play WMV files?; what application formats run?; so that when we spend time and money behind a particular download we don't get a 'file not supported' message.

There is however another thing that is more important. Please start a full-fledged career section. You can do it this way. Take up a career, say CEH, one cannot become a CEH directly. Track its course right from N+, S+ and give a briefing about what the courses actually teach you and its duration. What exams one has to sit for. Here are several career guide magazines in the market but not one covers the computer section adequately, its just MCA, Tally and the rest. Guess they just don't have the knowledge of this field, so that leaves only you. Please start one.

Thanks a lot for your magazine... and congrats for standing first in class.

Sourav Basu Roy

That was quite a poignant story about your boarding school. We are glad that we can help our readers out in so many aspects. We usually include the supported formats in our reviews, look for them in the specifications provided. We also carry an irregular section called Tech Careers, and we promise to try and make it a more regular feature.

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LETTER  
OF THE  
MONTH



## The Last Word

# Keep It Complex

TO JUDGE BY one disturbing trend that I have noticed in this country is that many people have started to talk in terms of declining standards in education. This has been the case in much of the west for over 30 years – although my personal experience is restricted to the UK.

Part of the reason that I got into a full-time job on a computer magazine was the dramatic and deliberate drop in syllabus standards; I was working as a teacher of maths and physics at the time, and was horrified by what was forced upon us. The trend had started a few years before, and has continued since, but it was such a shock that it drove me out of teaching. This was deliberately contrived by the government of the day, and this fact certainly keeps me in touch with my inner conspiracy theorist; but let's not dwell on the causes or the reasons.

The result has been a dramatic drop in educational standards, right across the board. The information age? What use is information without understanding? IT – information technology, again, useless without understanding.

Einstein said something to the effect that technology was an axe in the hands of a psychopath; certainly it is dangerous in the hands of the ignorant. Look at Wikipedia. Such a brilliant idea, and so dangerous a tool. Much information in there is correct, but much is misleading and downright wrong. With subjects that are sensitive to some extent – climate change, GM foods, etc. – zealots have taken over and rigorously enforce their views. One scientist whose views were clearly not liked by the zealots decided that he would at least be safe correcting the mistake in his entry for his year of birth. The next day his correction was undone and the mistake replaced. Now that's dedicated zealotry!

How are we to judge this and other sources of information? Only a well educated society can properly make such judgements. We live in a world that is increasingly dependent on science and technology. The issues we face, and decisions that we collectively have to take, are also increasingly complex and technical. A dumbed-down, under-educated society is exactly the opposite of what we need as we move forward.

We should also be able to rely on the piercing analysis of a free press. But in the UK at least, the main organs of the press have similarly slid down the intellectual ladder. Not all, of course; there are still a few havens of clear, critical thought, but the main channels, such as BBC news, and so forth, are hardly worth attention, with their own patronising political agendas. Alright then, yes, I am mainly referring to the BBC.



Edward Henning, Editor-in-Chief

**“A dumbed-down, under-educated society is exactly the opposite of what we need as we move forward”**

Of course one answer to all this is computers. I am always reading about the great benefits computers can bring to the classroom – in the computer science lab or physics class, OK, but computers often become screens behind which bad teaching hides, and a source of infinite distraction. Education is about learning sets of ideas and facts, and about learning tasks – how to do certain things. The more a machine is capable of doing things for you – and a modern PC is extraordinarily capable – the less you will learn for yourself.

This really is yet more dumbing down rubbish. I agree here with the head of Intel of a few years back, Andy Grove, a very thoughtful and intelligent man. A man who wanted to sell as many microprocessors as possible but who said that there were two things in life that should not be computerised, and the other one was education.

Come on India, education is one area where you really should not emulate the west. There are families in the UK who send their kids to school over here, because they know they will get a better education.

Let's keep it that way.

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