

Freeserve crashes for a weekend

People who forecast poor service from fee-free access pioneer Freeserve had a field day last month when email for its 1.5m subscribers went down for most of a weekend.

Some were without access to their email for two-and-a-half days. The servers went down on the evening of Friday, 21 May, and flickered into life on the Sunday evening before crashing again. It was up by the next day.

Rival AOL, itself no stranger to downtime, said: 'We don't think this is something we would like to comment on.'

PCs LOOK FOR ET

PCs all across the world are processing sky-scan data for signs of alien life. And you can help. **page 42**

DIALLING TROUBLE

So you think tweaking your dialler will sort out all the new numbers? Think again. **page 37**

RAM BREAKTHROUGH

A new form of memory chip could lead to the solid state hard disk. **page 58**

Pressure grows for a toll-free, faster Web

The cost and speed of web connections are **fast becoming a political issue** as Britain races to embrace the web.

The downward pressure on prices continued as BT, no less, introduced freephone access at weekends — but only to BT Internet customers paying £11.75 a month.

Perhaps as significant, given the slow rollout of fast ADSL and cable links, was an offer of fast satellite access for just £20 a month, available via old Sky analogue dishes.

Full details are in our three-page special report [p38].

Cable & Wireless quietly began a rollout of a service using cable modems in set-top boxes (STBs).

But in a move likely to infuriate PC users in its franchise areas, C&W told PCW that it will not support standalone cable modems until well into next year. It seems PCs will be able to link to its STBs, but C&W

would give no further details.

On the plus side, C&W said cable charges were likely to be £30 a month flat rate: that's £10 less than the cable service launched by NTL in May.

Meanwhile, retailer Tempo's fee-free screaming.net, which offers freephone evening and weekend access, has been swamped with applications.

Data from sky **pages 38-40**
Point of view **page 28**

Users also get cut-price calls from LocalTel, with whom they have to register. LocalTel has complained to watchdog Ofcom that BT has delayed processing applications from customers wishing to switch accounts.

A Europe-wide web boycott was called on 6 June in favour of flat-rate access — charged per call as in the US, rather than time based.

It got little response in the UK. But Erol Zya, of the Campaign for Unmetered Telecoms, which organised

the boycott, said it had raised the profile of the issue and prompted many pledges of support.

Steve Webb, LibDem MP for Northavon, suggested in a Commons question on 9 June that call charges and BT's local-loop monopoly were holding Britain back from developing e-commerce.

DTI junior Minister Michael Wills replied that competition would sort the problem out. Mr Webb later described this attitude as complacent.

'I think the government ought to be more proactive,' he said. 'It's not just about prices. Look at cable modems: other countries have had them for years.'

He believed there was a danger of commercial priorities overriding national needs.

'It would be a remarkable coincidence indeed if what is good for, say, BT is always in the interest of the country,' he said. **CLIVE AKASS**

Yours for just £28,000 ... the 3D printer



That rather boring-looking machine in the background is an amazing 3D printer.

The Thermojet, built by California-based 3D Systems, is said to produce a strong, accurate model of a 3D design straight from a CAD drawing.

It works just like an inkjet printer, spraying a plastic-like material instead of ink from an array of 96 jets.

The model is built up layer by layer. Material colours currently are limited to black, white and grey. The machine, about the size

of an office copier, is targeted initially at design engineers, allowing them to produce prototypes in-house much quicker and more cheaply than existing stereolithographic methods. A cup and saucer, for instance, can be 'printed' in a couple of hours.

Vendor Bix says similar printers could become common in small offices and even homes. But not at current prices ... about £28,000.

Bix <http://bix.co.uk>; 0115 840 4060

Psion may launch Palm rival

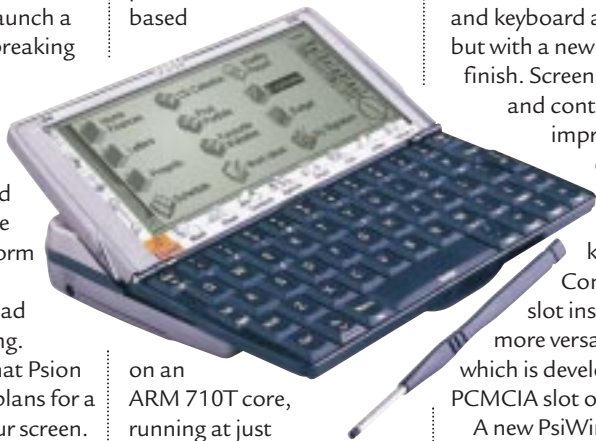
Psion launched a racy new version of its Series 5 handheld last month – and hinted that it may launch a rival to the groundbreaking PalmPilot.

'We recognise that there's a demand for a pen-driven handheld like the Palm... We're not ruling out any form factor,' said Daniel Doulton, Psion's head of product marketing.

But he stressed that Psion had no immediate plans for a Series 5 with a colour screen.

'That would put the Series 5 beyond the price level at which we want to sell it. Also, it would drain more power and we want to preserve the Series 5's long battery life,'

he said. The new Series 5mx [pictured] has a faster processor based



on an ARM 710T core, running at just under 37MHz. It packs 10Mb of ROM-based software and 16Mb of RAM – of which more than 3Mb would be used by the optional Java Virtual

Machine, unless you buy a memory card.

The world-beating case and keyboard are retained but with a new metallic silver finish. Screen backlighting and contrast have been improved. One disappointing feature is that the mx keeps the old Compact Flash 1 slot instead of the more versatile CFII, which is developing into the PCMCIA slot of mobiles.

A new PsiWin 2.3 boasts improved synchronisation with major desktop products – another strong point of the PalmPilot.

● Full review, page 92

● Symbian development, page 34

short stories

► **PIII FRONT-SIDE BOOST**
Intel will boost the PIII's front-side bus speed to 133MHz in September, according to unconfirmed reports.

The design will use Rambus rather than the newly available PC133 memory. Future speed increases are planned.

The Celeron's front-side bus will stay at 66MHz until at least next February, when it will be upped to 100MHz, Intel says. This could be a bid to extend the market life of the PII, which will then be slower than the 'low-end' Celeron.

IAN ROBSON



Dolphin handhelds have been RF enabled to let them talk wirelessly to base. The 386 DOS-based handhelds support a variety of accessories.

Hand Held Products 0031 402 901 603

Compaq puts CE on air

Compaq plans to broadcast flight information and stock prices to its CE devices. It announced the move at

From Andrew Craig in Denver, Colorado

the launch at the CE developers conference of its latest CE mini-laptop.

The 2.9lb Aero 8000 has a 10in SVGA screen, up to 13 hours battery life and a smart-card port.

Other devices on show included set-top-boxes, in-car units, petrol pumps and barcode scanners.

CE general manager Jonathan Roberts said Symbian's rival Epc32 OS was too focused on mobile phones. 'We're better equipped to deliver a complete solution,' he claimed.

Microsoft president Steve Ballmer has claimed Symbian partners will jump ship if CE is successful.

Saints stay cool as IT rage hits the desktop

An astonishing one in five users have never seen anyone vent frustration at a computer, according to a new report. One in two are unfazed by the time it takes to solve IT problems, and three in five have never been bothered by jargon.

But Compaq and MORI have coined the term *computer rage* to describe the state well known to those recognisable mortals whom IT has at some time reduced to hair tearing frustration.

MORI, on Compaq's behalf, questioned 1250 users, producing a predictable catalogue of irritation. More startling was an apparently widespread Christ-like tolerance.

Five in six under-25s had never felt like taking IT aggression out on anyone or anything. A spotless nine in ten reported

that they had never criticised their company, not even to friends, over IT standards.

True, one in four under-25s have seen colleagues kick their computers, and as many had seriously considered pulling out their machine's plug. But overall, six out of ten people of both sexes had never seen colleagues stressed out by IT.

Men apparently have more IT problems than women: 26 percent as opposed to 17 percent reported daily hassles.

Psychologist Professor Robert Edelmann said the report highlights a serious problem. 'Computer rage is much more prolific than ... road rage.'

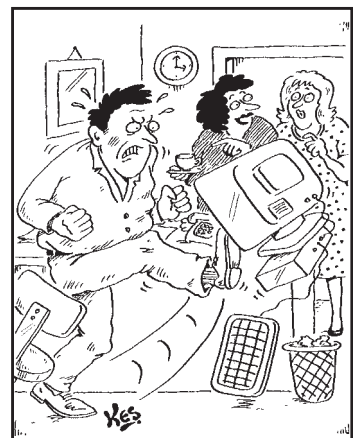
In case you're feeling a little desperate yourself, he has set up a local-rate helpline at 0845 270 4114. CLIVE AKASS

► APPLE MOBILES

Apple has launched two new G3-based PowerBooks but a long-awaited iMac-style mobile has been delayed.

● Review, page 96

● Tim Bajarin, page 44



'Don't worry, it's just a spare. He keeps it to vent his computer rage.'

short stories



If you think this looks like a cross between a CD and a visiting card, you're spot on. The MediaCarD holds 18Mb or 30Mb, depending on size, and can be read by standard CD drives. Prices range from £1.99 each for a minimum 500, to 99p each for 3000.

Maxim 01273 827777

NEW 192 DISK

UK Info, the cut-price phone and address directory, has been extended to cover Eire and Northern Ireland. The £39.99 CD boasts improved searching, new business data, and better maps. A more detailed map module costs £495 ex VAT.

Sales 0800 980 7100

Boost for GSM data services

A new technology will speed up transmission of multimedia data across GSM cellular networks, says the developer, Lucent.

But claims that the Packet GSM system will delay deployment of fast, so-called third-generation (3G) cellular data services are wide of the mark, the company says.

PacketGSM will provide some 3G-like services, and

some analysts believe it might discourage cellphone companies from coming up with the considerable investment needed for 3G networks. These promise mobile links of up to 2Mbit/sec — well fast enough for video. Britain is expected to be the first country to get 3G.

'We call [Packet GSM] two-and-a-half G,' said Lucent's Yvonne Diaz. 'It will

give people a glimpse of what's to come, but it isn't going to replace 3G.'

Packet GSM will allow the development of services mixing voice, video, fax and data, providing a more flexible upgrade path for companies planning to move to 3G.

The first systems are expected to be deployed next year.

Klik! drives clock in at last

Omega is unlikely to repeat the impact it made with the Zip drive — although its mini Klik! disks [right] might have got close if they'd been launched when the company began talking about them, at least three years ago.

Klik! was intended to be to portable devices what the Zip was to desktops. But, unlike the Zip at its launch, it does not have the market to itself. The 40Mb disks

are only £8 each, but IBM's Microdrives could work out cheaper overall and use the more versatile CFII slot. Our reviewer Scott Colvey [p115] thinks Klik! will still be a winner. Tim Bajarin [p44] thinks the Microdrive will transform mobile computing.



POINT OF VIEW

Cable manners

Recent news broadcasts have shown how astonishingly different perceptions of the same events can be. You know in theory how one person's war crime can be another's heroic defence of a sacred homeland, but the vehemence of contrary views can still take you aback.

I've been up against a rather more mundane example in a series of acid conversations with Cable & Wireless.

I'd found out that C&W was about to launch interactive services. It was not yet publicising the fact, but it was happy to talk about it... up to a point.

C&W told me it would start to roll out set-top boxes equipped with cable modems on 1 July. Interactivity would at first be limited to 100 chosen sites and would spread to the wider web.

Impressive, I thought. A hundred sites exploiting the full possibilities of broadband had to be interesting, even if many were souped-up catalogues. Then I asked: 'So what about PCs? Are we

going to be able to plug PCs into the STBs? Will you be offering standalone cable modems?'

I felt like Oliver asking for more. The press officer sounded shocked, and gave me to understand that PC cable links would not be available until next year.

Eventually I got through to Martin Graham-Scott, head of broadcast communications. He sounded hurt and angry that I should talk PCs when obviously what the market wanted was STBs.

He knew this because he had conducted a survey, including people who would never think of buying a PC, and was focusing on the bigger market.

It seemed to me that UK cable companies had taken five years to begin to catch up with what PC users had been doing on the net. All this time we had been begging them to give us broadband access. We kickstarted the

revolution they were about to cash in on, and they were still ignoring us.

C&W, a telecoms company, doesn't even have the excuse that its roots are in entertainment. It ought to know better.

People will find all sorts of uses (video phones, remote surveillance) for broadband once they get it. Asking them about it now, when they have only the haziest notions of the possibilities, will hardly produce reliable answers.

I am still unclear what C&W is offering. Graham-Scott eventually emailed me to say PCs will be able to link to the STBs 'via an extra lead'.

This should not be an afterthought. Cable is part of our national infrastructure, like roads. You don't build the M1 and then tell people they can use it only in family cars built under your licence and stop them going further than the Watford Gap. Or, if you do, you should expect to hear questions raised in Parliament.

Clive Akass



on the long haul towards PC cable links

Ye olde PC fades into history

Take a close look at your PC, because you may never see its like built again. The last vestiges of the original IBM PC will disappear as we enter the millennium.

This has become clear as details emerge of the Easy PC initiative launched by Intel and Microsoft, ostensibly to woo non-users who perceive the PC as being hard to use.

An unstated aim is surely to counter the interest in cheap, simple, task-specific devices which could hit sales.

The Wintel giants have introduced a number of exotic 'concept designs', using a tiny (7in x 9in) FlexATX motherboard, to get away from the ubiquitous grey system box.

And they are co-operating on a bid to make starting and stopping a PC almost as simple as switching a light on or off (perhaps this time Microsoft will not expect people to exit by pressing the Start button).

The drive for simplicity is not new. But previous moves have, paradoxically, made PCs *more* complicated. The PCI bus and USB were both intended to get away from devilish interrupt and other resource



Never mind the costumes, look at the machines ... concept PCs being shown off at an Intel developers conference

conflicts, as well as boost data flow.

PCI was meant to supersede the ISA bus, and USB was expected to push out both the serial and parallel ports. But in practice, PCs sport the new features as well as the old.

This is partly because many legacy peripherals are still in use, and, in the case of USB, because devices supporting the port were slow to emerge.

PC vendors are also to blame, according to Intel's UK-born PC initiatives manager, Stephen Whalley. 'The problem is that if one vendor leaves off the serial and parallel ports, another can claim more features because he has left them on,' he said.

This attitude is changing. The ISA bus is expected to go this year, and the serial and parallel ports may linger on into next year.

'We'll have a period where a lot of USB-based serial and parallel ports will be sold so people can use their old peripherals. But then they will disappear,' said Whalley. Also ousted by USB next year will be the games/MIDI, mouse and keyboard ports.

A question hangs over the floppy disk. It may become a USB option, as on the iMac. Or it may be superseded. 'We haven't yet decided what will replace it. The market will decide,' said Whalley.

CLIVE AKASS

short stories

BOOKS ONLINE

More than 260,000 literary texts spanning 1400 years have been placed online at publisher Chadwyck-Healey's flagship website. They are searchable and come with dictionaries and web links. <http://lion.chadwyck.co.uk>

EUROPE CATCHES UP

Europe will have as many people online as the US in three years, says Roberto Masiero, president of analyst IDC. He said the boom will create major opportunities.

DEAD CERT

CWS Funeral Services has gone online to enable the bereaved to get instant information on facilities. www.funerals.co-op.co.uk

ASK AGAIN

Ask has asked us to point out that its A4 Compact projector has a brightness of 650, not 560 lumens, and that its number is 01753 701050 — we left out the '1'. www.ask.no

APEX

The number of Apex, which sells a link which allows you to run a Mac and a PC from a single keyboard, was printed wrongly. It is 01753 708896.

Merced allies unveil IA-64 architecture

The instruction set for the new 64-bit Merced processor has been unveiled by developers Intel and Hewlett-Packard. The idea is to get developers working on code before the chip ships in volume next year.

Merced is the codename of the first of a range of IA-64 processors. They are based on an architecture called EPIC, which stands for explicitly parallel instruction computing. The 'explicit' refers to the fact that the processor can be given information to help it, for instance, fetch data before it is needed, or to know which instructions



can be processed in parallel.

The developers claims this overcomes some of the shortcomings of RISC (reduced instruction set computing) architecture. But it is said to place more demands on the programmer and compiler. Internal resources include 128 integer

registers, 128 floating point registers, 64 predicate registers, and support for MMXTM and stream SIMD extensions.

It has been optimised for video encoding, cryptography and other tasks which are expected to fall on next-generation servers.

IA-64 chips will run legacy 32-bit apps using either a 32-bit or 64-bit operating system [see diagram]. But it will run HP's PA-RISC code only by using an emulator.

Details are at www.hp.com/go/ia-64 and developer.intel.com/design/ia64/index.htm

● See next month's PCW for more details.

short stories

CHIP DRIVES STANDARD NET CABLE TO 1GB

A new chip will allow Gigabit Ethernet links over common Category 5 unshielded twisted pair (UTP) wiring, says developer Broadcom.

The BCM5400 transceiver will enable companies using 100BaseT cabling to boost their network speed tenfold without a costly upgrade.

The £46 chip will be used in network interface cards and switches. Alteon has already demonstrated a card using the chip; it will be launched in Britain later this year for about £400.

www.broadcom.com



TEACHER'S PET

Asymetrix, set up by Microsoft co-founder Paul Allen, began four years ago to focus on

training and education. ToolBook II Assistant 7, its latest offering, is a tool for authoring

multimedia training material for use on the internet, intranets or CDs. It supports DHTML and Java, but is designed specifically to be used by non-programmers.

Asymetrix Learning Systems 0171 345 1500; www.asymetrix.com



1.5 TERABYTE STORAGE

ASIC's new tape autoloader, Fast Stor22, claims 50 percent more capacity, 25 percent cheaper, than its rivals. With normal 2:1 compression it packs up to 1.5Tb on a total of 22 tape cartridges. Prices start at £6295 plus VAT.

ADIC 01344 422282

New dialling chaos looms

Britain's new phone numbers went live last month in a move which could herald a new period of costly disruption.

The last big change, just four years ago, cost an estimated £500 million in lost calls and changes to software and hardware.

Both the new and the old numbers will work until next April, to give businesses and other users a chance to update their systems.

But, even discounting the fact that as many as one in six companies are unaware of

the changes, there are many potential problems.

All freephone and special rate services, for instance, will begin with 08. But many switchboards bar all 08 numbers except 0800 for freephone, so even if your software is primed with the new numbers, they may fail.

Similarly, London's 0171 and 0181 become an all-embracing 020, which your equipment may switch erroneously. Other calls may be charged at the wrong rate, and ISDN calls may not get through.

The change also presents a problem for people ordering headed stationery: if they put the new number on, it may not work for all callers; if they leave the old one on, the stationery will go out of date; and if they put both on, it could be confusing.

Oftel has set up a web site at www.numberchange.org listing potential problems and their fixes.

Big Number, an industry body co-ordinating the changes, has set up a help line at 0808 2242000.

CLIVE AKASS

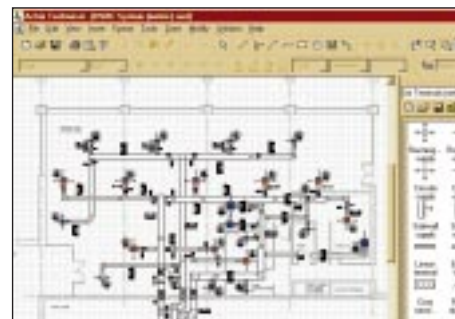
Actrix takes on the CAD Visio

Autodesk has finally released Actrix Technical, the CAD package designed to counter the success of Visio, in Britain.

The company's expensive AutoCAD dominates the professional drawing market, but Visio, with its smart shapes, appeals to untrained people who need to make drawings.

Visio can also import AutoCAD drawings of, say, an office — allowing staff to populate them with furniture so as to plan layouts. Drawings can also be controlled with Visual Basic for Applications.

Actrix provides similar smart shapes [see screen shot, right] and VBA support, and it claims far better Auto CAD compatibility — as you would expect from Autodesk. Launch price



is £249 plus VAT. Watch out for comparative reviews in our group test next month.

Autodesk 01483 462600

E-clips eclipse old file systems

A Belgian company has unveiled what it claims is a revolutionary file system which gets round the problems of storing and accessing unstructured information.

The FilePool system, from Wave Research, stores documents under what it calls e-clips, the electronic equivalent of paper clips. These guarantee that their contents, which may be one file or a group of files, are



unchanged. FilePool stores the e-clip and allows it to be accessed by content rather than address. Trikke van Roey

[pictured], international general manager of Wave Research, claims FilePool Iso gets round problems like broken links and wrong file versions. He said: 'Filepool is to unstructured information what SQL is to the relational database.'

Even more revolutionary is the pricing structure: you pay for the number of files you store, not for the software.

www.waveresearch.com

Symbian unveils Windows CE killer

Symbian has released the first developer's kit for its Epoc release 5 (R5) operating system, seen as one of the main competitors to Microsoft CE in the devices market.

It was launched at the first Epoc developer conference since Symbian was founded last year in a tie-up between Psion, Ericsson, Motorola and Nokia.

It followed news that Matsushita, perhaps better known by its brand name Panasonic, has joined the alliance, giving it a huge slice of the mobiles market.

David Wood, executive vice president of technical consulting, said licensees have been working with the kit for six months, but he could not say when R5-based products will be released.

Symbian is bringing together the two markets that are driving the next wave of IT – the internet and the mobile phone – chief executive Colly Myers told the Epoc conference.

He predicted: "This will lead to a new networked economy. This new wave of computing

Creating the new wave?

will be bigger than the current wave driving the internet."

He said that in less than a year Symbian had got together a global group of shareholders, partners and licensees and was working with key stand-

ards such as Bluetooth, Wireless Application Protocol (WAP) and Java.

He claimed: "Epoc is the only software platform that has been tested and evaluated by all mobile manufacturers worldwide."

'Licensee product announcements are not for us to make,' he said. Symbian has already developed reference designs for four device families: a pen-driven smartphone called Emerald, a similar

device called Sapphire which uses a keypad, and two communicators called Quartz and Crystal, based respectively on a keypad and a keyboard.

A new major Epoc release is due in October. In the meantime, engineers will work on more reference designs for wireless information devices.

'All ... will include the same software engine, communication software and core operating system. Only the user interface will differ,' said Wood.

He would not say how many companies had licensed the Epoc. 'I'd like to make it clear that we're quite choosy ... we're concentrating on quality products.' **JO PETTITT**

www.symbian.com



Sparc of inspiration

Sun chairman Scott McNeally shows a first sample of the UltraSPARC III 64-bit processor which is due to ship in volume later this year. It will clock 600MHz and is designed to work in systems using up to 1000 processors – and, presumably, to stave off the threat from increasingly powerful Intel processors.

New language will speed up chip design

A new high-level design language (HDL) aimed at revolutionising system-on-chip design has been launched by a UK start-up.

Co-Design Automation, which has offices in Silicon Valley and Britain, was founded by Peter Flake and Simon Davidmann, who worked with Brunel University's Professor Gerry Musgrave on Hilo, the first commercial HDL-based simulation system.

They formed the company in 1997 to develop Superlog HDL, which is based on the high-level languages VHDL and Verilog. It is needed because designers often cannot write code quick enough for new chip designs, said David Kelf, vice president of marketing.

Superlog will also enable designers to get round problems peculiar to a system on a chip, which contains both the microprocessor and

the software that runs on it. There is a need, for instance, to test the software running on the hardware before the chip is actually made.

'This is called unification of the design process, providing one language to do all these things,' he said.

Some observers doubt if engineers, using the likes of C, C++ and Java, will adopt a new language. Kelf acknowledges there are alternative approaches, but

believes Superlog will bring a familiar feel to designers who have used Verilog and VHDL. Superlog will be available free to encourage use.

Co-Design is in the throes of securing a second round of finance. Initial investors included Andy Bechtolsheim, a co-founder of Sun Microsystems and now vice president of the gigabit switching group at Cisco Systems.

ELSPETH WALES

Users barred in Demon libel row

Several Demon users have had their newsgroup connection suspended in the wake of legal wrangling over a posting which allegedly defamed lecturer Laurence Godfrey.

Godfrey has sued, claiming Demon did not immediately remove the posting when told about it. The case has left Demon caught between British libel law and the net tradition of free speech.

Phil Payne, IT analyst with Isham Research, was suspended after publishing the address of Dejanews, where past exchanges can be read and the topic discussed further.

'It seems that all you have to do to get your Demon

Internet service suspended is to post a reference ... to a public archive,' said Payne.

'It's like being penalised for telling someone there's information on a subject in the British Library. It means that anyone can get access to information banned, simply by alleging it's defamatory.'

Payne said at least 11 users have been suspended. They include Kurt Adkins, a retired paramedic who criticises both Godfrey and Demon.

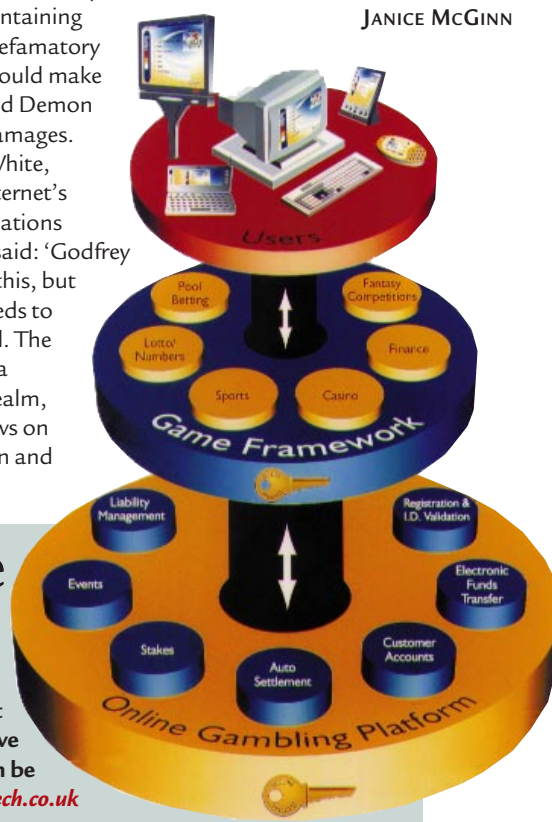
He said: 'Usenet etiquette is to either engage in debate, ignore it, or ridicule the perpetrators. The course chosen by Godfrey has persuaded Demon Internet to go over the top.'

A letter from Demon's legal department on 1 June said 'the law as it stands' meant failure to remove Payne's link to a site containing allegedly defamatory material would make both he and Demon liable to damages.

Alyssa White, Demon Internet's communications manager, said: 'Godfrey is chasing this, but the law needs to be clarified. The internet is a different realm, and the laws on defamation and directing

someone to something that is potentially defamatory were not designed for this environment.'

JANICE MCGINN



Orbis bets on net gambling craze

Orbis hopes to cash in on the growing craze for online betting by providing sites with the necessary backend systems. It has set up a site at www.bluesq.com where bets can be placed on a variety of games and events. Unlike many similar sites, it is based in Britain. This means that betting is subject to British taxes — but, in the case of disputes, you have recourse to British law. The three-tier OpenBet system [pictured] can be adapted to any form of betting. www.orbis-tech.co.uk

Off-site web servers outasight

Enterprise companies are being urged to house vital web servers direct on the internet backbone in purpose-built server farms. Advantages include fast access by any number of users, guaranteed power

supply, and 24x7 management and security, says Karl Meyer, UK business development manager for UUNet.

He reckons the UUNet Co-Locate Express service is suitable for companies of all sizes, not least because charges are based on level of activity rather than a flat rate.

Another big advantage is that companies don't need to upgrade, or risk overloading, their existing networks. Users can choose their own hardware and software.

Red Bus, started by Demon founder Cliff Stanford, has launched a similar service called Interhouse, which is independent of line provider. It can be used for as short a time as a month, for £200, to encourage businesses to try it out.

Red Bus 0171 531 8787, www.interhouse.redbus.co.uk
Uunet 0500 567000, www.uk.uu.net

NatWest sets up 'e-wallet' service

A new NatWest service, called Magex, will unlock the potential of net commerce and create a low-cost delivery channel, the bank claims.

It will enable companies to sell information, controlling factors like whether it is read only, print only and/or save-enabled. 'Companies offering music, software, publishing, voice and video can place their work on the internet with far greater protection against piracy or illegal use,' says NatWest.

The system wraps content in a 'Digibox' for protection, allowing you to see before you buy. It uses NatWest's own micropayment system, based on an electronic 'wallet'.

JAN HOWELLS

Microsoft Y2K web site

Microsoft has launched a new web site to help non-professional users prepare for Year 2000, including an analyser you can download to report on your PC's Y2K status and links to any updates needed.

A free Y2K resource CD, including the analyser and updates, is also available. Microsoft has had to issue a series of patches to make its desktop products Y2K compliant. It also faced criticism after admitting its NT Terminal Server Edition was not Y2K ready. JO PETTITT
computingcentral.msn.com/guide/year2000/msy2k/Introducing/y2khome.asp

Web satellite feeds challenge cable

Low-cost satellite feeds, highlighted on page 26, are emerging as **a serious alternative** to fast land-based data links as the UK moves towards digital TV. Millions of satellite dishes purchased for TV reception can also receive web data, with little or no modification.

A factor working in favour of satellites is the slow and spasmodic rollout of land-line technologies such as ADSL and cable modems [see opposite].

The satellite company Eutelsat, with London service provider Easynet, pioneered what are called 'turbo internet' services which deliver web pages at around 400Kbit/sec. At the moment, users have to request pages via a standard (usually 56K) land-based web link.

Easynet's Easysat service was launched two months ago after an extended trial. It costs £50 a month, while start-up costs will depend on

what aerial and PC Card you are using.

This pricing will come under pressure from a rival £20-a-month service launched this month by Communicado Data and hosted by Europe Online. Communicado has yet to demonstrate that it can match Easysat's service levels, but its service may also give complacent cable companies (stand up Cable & Wireless) a thing or two to think about.

Start-up costs include £299 + VAT for a Telemann Skymedia 200 PC Card, which can also receive free-to-

air TV, plus the cost of a dish — the same dish which receives BSkyB [see below].

A more expensive solution is provided by two-way satellite links. Tachyon is offering a variety of packages for businesses, providing quality-assured links of up to 2.4Mbit/sec, at prices up to \$1200 a month.

But Armstrong Satellite Data Services has just launched Web-Sat, a two-way satellite-based web service, for £115 a month plus a start-up cost of around £1000. Data rates are 350Kbps downstream and 16Kbps up;

you are allowed 200Mb downstream and 20Mb up per month, after which you pay a per-megabyte charge, yet to be decided.

Unlike new cable or ADSL services, satellite access is available now and anywhere. Even the more expensive offerings can be a good option for schools, small companies and blocks of flats, where the cost-per-user can work out quite low.

www.web-sat.com;
www.tachyon.com;
www.easynet.net;
www.eutelsat.com;
www.astra-net.com



How to make your dish more versatile

Rupert Murdoch is giving away satellite dishes, together with set-top boxes, with sign-ups to his new digital TV services. But the dishes are not suitable for data services — at least, not as they stand.

Dishes have to point roughly at their target satellites, and **there are three directions** PC users in the UK need to bother about. Eutelsat has 'birds' (satellites) at around 13 degrees. Rival Astra broadcasts BSkyB analogue television and data services like Communicado's £20-a-month web access, from 19 degrees.

To cover the necessary frequency range to receive these, your analogue TV dish needs what is called a Universal Low Noise Block (LNB), a curious term for what is in effect an amplifier for the weak satellite signal.

Costing a few pounds, these devices are fitted on many of the more recent dishes. MediaStar product manager Geoff Emmett said: 'My advice would be to suck it and see. If the aerial doesn't work, change the LNB.'

Astra also broadcasts BSkyB's digital TV from 28.2 degrees. Murdoch has

bought up all the capacity there, apparently determined to prevent others beaming to his punters.

It is possible to receive signals from all three directions using a single dish. Each aerial has at least one LNB. For an extra £20 to £40 you can add a second LNB which, with judicious placing of the aerial, will allow you to receive from two closely separated directions — say 13 degrees and 19 degrees, or 19 degrees and 28.2.

This will work even with the smallest 60cm dish, according to Eutelsat's Mike

Locke; with three LNBs and an 80cm dish you can receive from all three directions.

If you spend upwards of £200 you can also get a motorised aerial which will point in any direction — although you must check whether your DVB card supports all the necessary DiSEqC control signals.

A movable dish will point to still more satellites, but if it is doubling as a home TV aerial, you may not be popular with your family when you try tuning into Ulan Bator News during Coronation Street.

the expanding possibilities of satellites

Broadcasting power for the masses

Turbo internet services are a good option for people who want fast web access now, rather than when cable or ADSL reaches their area — and for the significant proportion of the population that is unlikely to get either. But the full potential of satellites lies more in broadcasting.

This is as natural to satellites as one-to-one links are to land-lines. Currently, data broadcasts, as opposed to traditional TV and radio, are used mostly by companies to send information to dispersed locations. The reception is passive: you don't need a back channel to request information. Web content can be delivered similarly and the advantages are obvious: fast data flow, no clogged lines, no jammed servers, no phone bills.

Obviously suitable is 'push' content, such as the news or music feeds already available on the web. Eutelsat is already beta-testing software which allows reception of less obvious material such as Usenet news groups and even



TV can be broadcast using internet protocols. This is TV's Channel 5 rebroadcast by Eutelsat as an experimental video-over-IP stream

email. You snatch what you want out of the data stream.

Paid-for content might require you to supply a decryption key, perhaps on a smart-card plugged into a conditional access module (CAM) on your receiver. This might be a satellite-enabled PC, a data-savvy set-top box, or some kind of 'data mains' terminal [see page 40].

The system promises nothing less than the democratisation of the airwaves: you, too, can be a broadcaster. Even at today's prices, with few economies of scale, you can send data nationwide for about £1.50 per megabyte. That

data could be anything from music, software, a daily newspaper or a multimedia catalogue. You could broadcast a concert nationwide for less than the hire of a small concert hall.

The satellites are up there; all that is needed to create a new stratum of economic and cultural activity is what the entertainment industry calls 'bums on seats' — a critical mass of users with the necessary equipment.

Wherein lies an irony. Rupert Murdoch, seen by many as the Great Satan of the airwaves, has been trying

to corner the digital TV market, partly by buying up satellite capacity, and partly by ensuring that his digital TV broadcasts (including our own BBC, financed by our licence fees) can be received only on his equipment.

This means you will not, for the time being at least, be able to receive BSkyB using a digital TV card on your PC, although it will pick up hundreds of other TV and radio broadcasts, some of them free. PC Cards with a universal CAM interface can access any paid-for service except BSkyB.

Murdoch is pushing digital TV for all his considerable worth, and if Astra and Eutelsat play their cards (or rather, their aerials) right, they could ride his marketing bandwagon to promote wider use of satellites. So while trying to monopolise the airwaves, Murdoch may actually be opening them up. The joke would be if his analogue viewers switched to terrestrial OnDigital services, which do not need an aerial, and used their old Astra dishes for data.

Land speed record

Fast land-based, as opposed to satellite, links will take a long time to cover the UK.

ADSL will be available only within a mile of local exchanges and will not reach some areas until well into the next millennium.

Of the Big Three cable companies, only NTL has launched a cable-modem service. Cable & Wireless launches a cable-based digital TV service on 1 July, with set-top boxes equipped with cable modems.

But it risks driving PC users

(as many as one in four potential customers) to satellite-based services by not opening its cable lines directly to PCs until next year.

Initially, C&W boxes won't even be linked to the web: interactive services from 100 sites will be available from the autumn. Direct cable modem access for PCs will be available next year.

The third big cable company, Telewest, promises to start rolling out a cable



▲ SET-TOP BOX FROM NTL, THE ONLY CABLE COMPANY YET TO OFFER CABLE MODEMS FOR PC USERS

data service from the end of this year.

Complicating the picture is a general assumption that at some point these three will merge to present a united front to BT. C&W has said it

will focus on providing business data links, indicating a possible sell-off of its domestic cable service.

● *Comms group test, page 188*

Continuing our special report on satellites

Comms piped straight to the home

Satellite communication dominated last month's Mediacast convergence exhibition in London. But also on show were a variety of **set-top boxes**, notably from Nokia and Pace, for interactive digital services delivered via cable and terrestrial aeri-als.

These STBs are modular in structure so vendors can easily tailor them for cable, phone and satellite services. Current designs betray the

concerns of traditional broadcasters, still thinking in terms of conglomerates pumping out tat to couch potatoes slumped around the living-room telly.

IT companies like Nokia, IBM, Siemens and AMD have what may turn out to be a better idea of what the communications revolution (which is not too strong a word) will mean in the home.

A common picture is that of some kind of 'data mains',

fed by phone, cable and wireless and distributed around the building by a choice of networking technologies.

A big question is about the nature of the gateway device that will receive and distribute the signals. IBM has suggested a specialised portal, perhaps subsidised by utility companies, which could use it to monitor and control energy consumption in the home.

A set-top box seems a more likely candidate, although some believe this will disappear into the television.

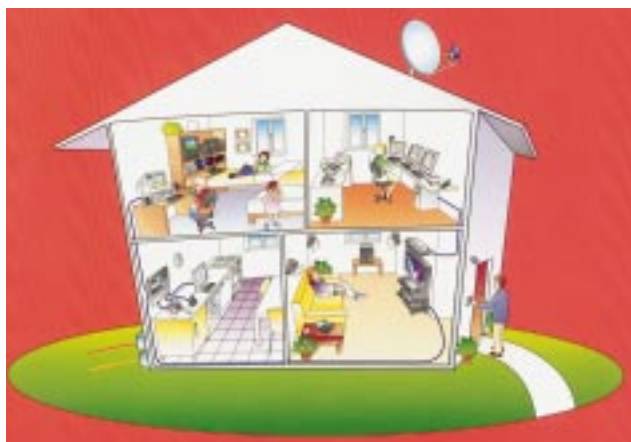
Toby Farrand, chief executive of Adaptec spin-off

BroadLogic, which produces digital TV cards, reckons a box based on PC architecture is the best option.

'All the technology, all the I/O, is already there and well tested. There is no point in inventing a new architecture,' he said.

But the UK's Pace Micro Technologies, which makes more than one out of five set-top boxes in Europe, uses a variety of RISC chips. The company is sitting pretty whatever happens.

Director of technology and strategic planning Andy Trott said: 'We'll be ready to make whatever the market decides it wants.'



The wired home as seen by ST Microelectronics

<www.st.com>, which makes highly integrated chips for convergence devices. Data from the dish aerial and the cable and phone links is distributed round a variety of devices in the home using a 1394 (aka Firewire) daisychain as proposed by the HAVI consortium. Wireless links (DECT and IEEE 802.11), ethernet cable, and even mains or phone lines can be used instead. Bluetooth and infra-red are likely to be used for short-range links.

Living in a digital world

Digital television (DVB) cards for PCs are still much more expensive than analogue TV equivalents but many more companies are making them, which may start to push prices down.

Models shown at Mediacast included BroadLogic's Satellite Express 2030 and 2035, updated versions of the 1030 that was highlighted in PCW last year during the first turbo internet trials. Higher on-chip integration allows a faster data rate and they have a CAM slot. The 2035 differs in packing MPEG decompression in hardware.

These two will cost about £150 and £250 respectively from Microtronica.

Mediastar's Sat Vision Plus 1 offers similar DVB and MPEG capabilities, with video capture and teleconferencing features and a CAM for £255 including VAT. The £145 Sat Cruiser is designed for turbo internet access and on-demand data downloads.

Hauppauge will launch a £199 (inc VAT) card this month with DVB and MPEG decompression. Siemens, Philips, and the South African company UEC also offer cards.

Evesham Micros sells a high-spec fully configured Satellite Pro PC, fitted



► **BROADLOGIC'S 2030 CARD. NOTE THE SLOT FOR CAM CARDS**

with a BroadLogic 1030, from £1600.

Communicado is selling what is described as a combined PC and set-top box, the Telemann PTV3000, from just £600. It uses a 333MHz or 366MHz

Celeron processor. There is also a Telemann PC card.

Microtronica 0118 963 3783;
Mediastar 0181 814 0811;
Hauppauge 0171 378 1997;
Philips Digital Video Systems +31 40 272 24 20; UEC +27 31 508 2800; Evesham 0800 496 0800; Communicado 01844 293333; Telemann www.telemann.com

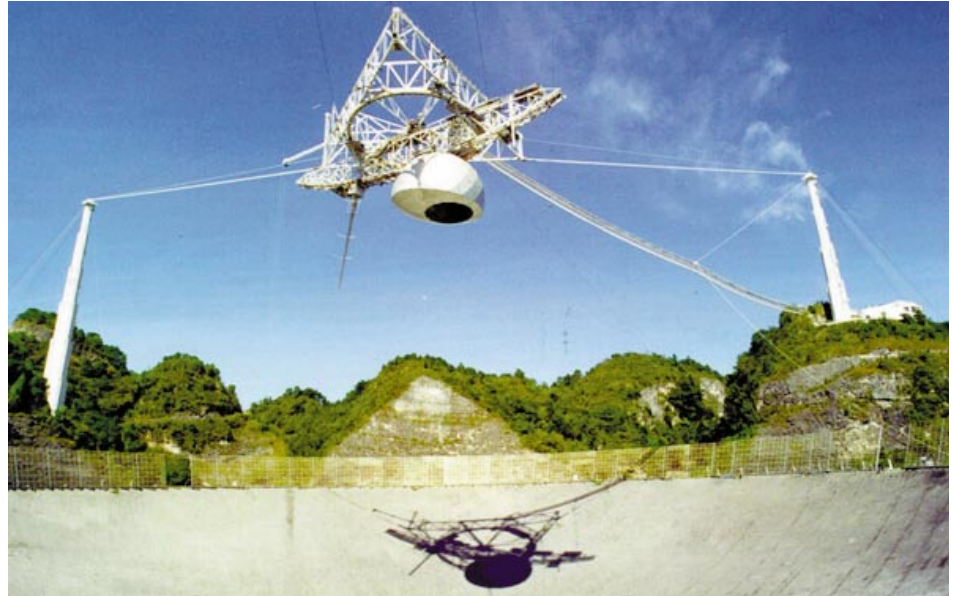
Prime your computer to seek ET

We've seen screensavers that feature everything from flying toasters, through virtual goldfish, to beer adverts. All rather entertaining, and ultimately completely useless: still, perhaps that's their charm.

Now, personal computer users can obtain a screensaver that is not only free, but **performs a service to humanity**.

SETI, the Search for Extra-Terrestrial Intelligence, is an initiative started in 1961 with US government backing. In 1993, however, NASA funding was terminated. Several independent bodies have continued to carry the SETI torch: notably the SETI Institute in Mountain View, California, and the SETI League. The latter, founded in 1994, is a privately funded group of over 1000 independent researchers.

Radio telescopes such as Arecibo in Puerto Rico are used to scan the heavens, searching for signals that might emanate from intelligent life forms: this could be anything from a purposed 'Anyone there?' message to



an extra-terrestrial version of EastEnders. The problem lies not in receiving the data, but scanning it to screen out the noise and Earth-originated interference. Hitherto this has been done in real-time using purpose-built super-computers.

This approach, however, does not permit the depth of analysis required to tease out weak signals. Which brings us to SETI@home, a project hosted by the University of

The dish of the Arecibo observatory <www.naic.edu> in Puerto Rico is 305 meters (1000 feet) across, and sunk into the mountainside. That gives it an aperture the size of 26 football fields to catch weak celestial signals and focus them on antennas 450 feet above. But it has a limited field of view and the SETI search covers only 28 percent of the sky.

California at Berkeley. Instead of using a single, huge computer for analysis, the idea is to farm the job out to thousands of small computers — in other words yours, mine and anyone else

interested. The data from the Arecibo telescope, around 35Gb per day, is sent to UC Berkeley, where it is broken down into 250Kb chunks. These are then downloaded by participants, and the screensaver performs the analysis while the machine is idle. This takes around 24 processor hours on a 233MHz machine.

When the analysis is complete, the program asks the user's permission to connect to the SETI@home site, report the results, and download a fresh chunk. You can download the screensaver and your first chunk of data, as well as find out more information, from

<http://setiathome.ssl.berkeley.edu>.

Should you discover a message from deep space, the organisers ask you to stay calm and contact them, not the press. Fame will follow in due course.

TIM NOTT

Don't wait for an answer...

This is the display you see when SETI@home is running. The program is using a number of algorithms to strip away the noise of earthly transmissions.

Details are at the SETI site <<http://setiathome.ssl.berkeley.edu>> but it is looking for strong, narrow bandwidth signals showing the characteristic growth and fade pattern of off-earth sources — rather as the sound of a car changes in pitch and volume as it passes you on a country road.

If other intelligent life forms are found, conversation will be slow: they are likely to be several light years away, so messages will take years to arrive. A planet 50 light years away — next door, in galactic terms — would only now be receiving our earliest television



broadcasts. If the inhabitants decided to try to make contact, their message would not arrive here for another 50 years — and even then, the chances are it would not be noticed. On the plus side, Star Wars scenarios are extremely unlikely.

CA

Big move in a small world

IBM's Microdrives are the next **big leap forward** in mobile computing, as Tim Bajarin explains.

My mobile computing began with a Tandy TRS 80 portable, which had a tiny 40-characters-wide screen and 128Kb RAM. Back in 1983, it deployed the best technology of the time. A few years later, the advent of the LCD screen dramatically changed portable computing.

Up to that time, the gas-plasma displays were the only flatpanel screens available and they ran so hot that you could fry an egg on them — and they hogged too much power for true mobiles. In 1986, Toshiba introduced the T1000 with its LCD screen, and the rest, as they say, is history.

Other technologies that helped drive portable computing included integrated pointing devices and 2.5in hard drives with multiple platters that today give as much as 18Gb of storage on a laptop.

IBM's Microdrives are the next big leap forward. They begin to ship this summer and they will have major ramifications. They are true hard disks, in a 1in form factor, and logically compatible with the compact-flash standards (CF 1 and CF 2.0) though they will fit only a CF 2.0 slot, or a Type II PC Card adapter.

They will come in 170Mb and 340Mb capacities and cost about \$1 per megabyte compared with \$5 for compact flash. So 340Mb of storage on a handheld will cost about \$350 by the end of this year.

More important still is the fact that this drive will add new capabilities to existing mobiles and perhaps spawn new devices.

The first products that will sport these new drives this year will be digital cameras and Hand PC based computers, all devices which currently boast 4Mb to 8Mb of flash memory. The Microdrive will allow them to store hundreds of pictures or richly formatted documents.

And imagine what they could do for a smart cellphone. Even the latest ones rely on flash memory. When Microdrives



◀ IT'S A SMALL DRIVE FROM IBM BUT A GIANT LEAP FOR PORTABLE COMPUTING. THE MICRODRIVE COULD USHER IN THE E-BOOK

on my PalmPilot so I can carry much more data with me in this tiny form factor. I also want to see these drives end up in eBooks so that I can carry more than the 8-10 book minimum I can today due to flash RAM restrictions.

And, with a 340Mb Microdrive on my eBook or SoftBook, I could also download hundreds of web pages for reading at my leisure in a mobile setting, as well as hundreds of documents that I might need at my disposal. I could even use the eBook as the primary place I view email if I had the room to store it on these potentially powerful and new mobile-computing platforms.

become available, we could end up with smart cellphones that can hold large faxes and email attachments.

They could also pack recognition software so that the phone can become a voice transcriber, allowing you to dictate a document for emailing.

And, imagine having a GPS system that could hold on its Microdrive all of the maps of the country you are in, so that you don't need to download specific maps each time you go to a new destination.

Personally, I want a 340Mb Microdrive

These Microdrives could also hasten the introduction of wearable computers. MIT's Media Lab is pioneering products in this area, and although they still need technology breakthroughs in the realm of tiny viewing systems, this Microdrive gives them the ability to create a pocket-sized pack powerful enough to drive the wearable computer of the not-to-distant-future.

Clearly, this new drive represents a key technology in the evolution of mobile computing.

Apple looks to Generation Y

Apple didn't show off its much anticipated consumer portable at its developers conference in San José, disappointing many. Insiders say the reason was a scarcity of displays and that the laptop will be unveiled this month at Mac World.

Lips are tight about this new portable, but sources say that it has the same colour scheme and similar styling as the iMac, which continues to get strong demand from Apple's

current users. But Apple realises it needs to broaden its appeal to the new Generation Y, defined as 16- to 29-year-olds who have grown up with computers.

They succeeded with my son, Ben. He's in college and has access to any type of PC he could ever need, and uses one for his part-time job as webmaster for a local bank. But he bought a tangerine iMac with his own money because it was cool.

short stories

► **THERE'LL NEVER BE ENOUGH BANDWIDTH**
Telecoms providers are never going to keep up with demand for bandwidth as processing power increases, says IDC analyst Gigi Wang.

Hard-disk performance and corporate networks have managed to keep up as processor development follows Moore's law, doubling in power every 18 months, she told the IDC's Storage Perspectives conference in San José.

'But [telecoms] bandwidth has not kept pace,' she said. 'Bandwidth demand doubles every six months, and we also increase the number of users supported: this is Moore's Law squared.'

LINDA LEUNG IN SAN JOSÉ



► **THANK YOU, FRIENDS**
Feeling lonely, or unwanted? Or just want to make some new friends? Sony has what it claims is the answer. It's a site called the Friend Factory, where you can meet new people online. It's free, so you lose nothing by trying it. www.friendfactory.co.uk

► **HYPER EDITOR**
Visual Vision has released iPer 3WH, a WYSIWYG hypertext editor for Windows 9x/NT which can be used to build web pages and help files. It costs \$29.91 from www.visualvision.com

► **CHESS MATCH LIVE**
Chess master Viswanathan Anand will play what is said to be the fastest commercial chess PC, a Siemens Primergy 870 NT server, live on the net on 3 and 4 July at <http://lostcity.nl/chess/chessclassic.html>

Grave rush for ancestral details

A new site helping people trace their ancestors was swamped with millions of hits within days of being launched.

The **Family Search** site was set up by the Church of the Latter Day Saints, also known as the Mormons, which has collected genealogical records in Europe and the US because of its belief that the souls of ancestors can be saved by retrospective baptism.

Its records and CDs had long been in demand by non-Mormons wishing to trace their ancestors. The growth in the use of computers also seems to have stimulated interest in the field; the web is awash with related sites, and family-history software regularly features in the top-seller lists.

But even the Mormons were surprised by the interest in their site. They claimed it was

getting five million hits a day even during its unpublicised eight-week trial period, and was designed to cope with five times that amount.

But only days after its launch, it was getting an estimated 40 million hits, and UK Mormon spokesman Brian Grant reckoned: 'Additional demand from people not being able to log on because of the huge volume of traffic is estimated at another 60 million hits, making it one of the most sought-after sites on the internet.'

Technicians are working closely with site host IBM and LavaStorm, developer of the system, to help resolve the problem, system director Randy Bryson said.

Information on the site is by no means comprehensive, but it does include data from uncollated sources like parish records.

The full database is said to include details of more than 400 million people — all dead. With more to come.

www.familysearch.org



Web faxing gets free and easy

A new 'free' messaging service allows you to pick up fax, voicemail and email over the internet. But calls into the service, by someone sending a fax, for instance, are charged at mobile phone rates. You can however pick up your messages at near zero cost over the web, and you don't need a fax machine.

The Digital Mail service will take several messages at once, and allows you to record outgoing messages and fax identities. And calls can be redirected to any other number, where they can be taken 'live'.

The Panasonic DX-1000 [pictured] approaches web messaging from the sender's end. This functions as a normal fax machine, but can also be used to send faxes, image



files, or normal email by the web. Prices have yet to be announced but it will be available in July.

Panasonic 0500 404041; www.digitalmail.com/um

More than ten million British people are now online, according to a new report from Fletcher Research.

The figure, released at the Internet World Show in London in May, is roughly consistent with a

10m net users put UK ahead

National Opinion Poll survey, published late last year, which reckoned one in five homes in Britain have web access.

The total is less than Germany or France in actual

numbers, but ahead of them and much of the rest of Europe in percentage terms.

The estimate was based on a survey of more than 33,000 users in Britain.

Showing that 2D into 3D does go



Notice anything strange about these pictures? The one on the left is a two-dimensional view of Washington. The one on the right is in 3D. If you viewed it on a PC, you would be able to spin it to see it from all angles. Yet the picture was generated entirely from the picture on the left. It's the party trick of a £495 package from MetaCreations, called Canoma. The idea is that you can convert any



photograph — of a product or place — into a 3D picture for posting on the web. The software 'cheats' by filling in the unseen portion on the basis of the 2D picture, and the 3D version is said to be enhanced if you provide more than one picture. We'll review it in *PCW* as soon as we get our paws on the software — probably next month.

<http://metacreations.com>

Costly perils of email

Emails dashed off at work can spell trouble for both you and your employers, lawyers warn.

Two-liners sent to friends are particularly perilous as most people see them as private conversations, said Steve Gibbons, head of employment law services at research company Incomes Data Services (IDS).

The problem is that others tend to see the emails, either accidentally or because they are forwarded to them, which is done far more easily with email than paper letters. If an email is libellous, both you and your employer can end up in court.

People write in emails what they would not think of setting down on headed notepaper. They can accidentally commit their company to a contract, or careless working may be taken the wrong way by recipients, an IDS report warns. Companies cannot always

protect themselves by banning private email. If someone is sacked for sending email, when it has been tolerated in the past, the company can still be liable.

'The only answer is to have a policy on email which is both clear and consistent,' said Gibbons.

Harassment can be a big problem. A smutty joke or picture sent to Jack the Lad may be deeply offensive to his neighbour.

On the other hand, a company may not simply be able to sack an employee for downloading pornography. 'If it's something clearly illegal, like child pornography, there's no problem. But if it's borderline material, downloaded in his own time, there may be problems in making a case [at an industrial tribunal],' said Gibbons.

www.incomesdata.co.uk

The growing popularity of gardening programs on TV is reflected in a flowering of sites on the web. Latest is the Virtual Chelsea Garden on the Marie Curie Cancer Centre at www.mariecurie.org.uk/garden.

The site will contain a pictorial

The virtual garden

record of the garden from fresh earth to summer growth.

The idea is that the site can also be enjoyed by patients who are too ill to see the garden for real.

Elvis auction to rock the web

An auction of Elvis Presley memorabilia from The Graceland Estate is taking place online in September. It is being run by Icollector on behalf of prestigious New York auction house Guernsey's for Elvis Presley Enterprises. Icollector is believed to have beaten rivals like eBay, Amazon and Yahoo for the contract.

Approximately 2000 lots from Graceland's archives will be featured in the sale, including cars, clothes, papers and furniture. Icollector will host the catalogue online at www.icollector.com, enabling Elvis fans to place bids via email prior to the auction.

'This is the strongest possible endorsement of Icollector's business to consumer e-commerce strategy on the internet,' said James Corsellis, chief executive of Icollector. Every item in the auction will be accompanied by a certification indicating that the items are from the Presley estate.

The primary goal of the auction is to establish a building fund for the creation of Presley Place, a transitional housing development in Memphis.

JAN HOWELLS

On track for memory by the Gigabyte

A Hitachi-funded team has made a **breakthrough in memory technology**. The Anglo-Japanese group, with members of the Microtronics Research Centre, part of Cambridge University's Cavendish Laboratory, believes it will help create a thumbnail-sized chip capable of storing an entire video film — or an operating system, allowing you to boot a PC in the time it takes to switch on a TV.

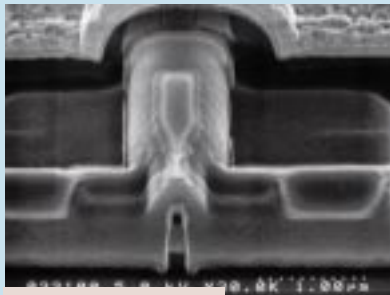
The Phase-state low electron-number drive memory (PLEDM) retains data for up to 10 years after power is switched off, and requires little driving power, making it suitable for mobile devices such as handheld computers, mobile phones and games systems.

Dr David Williams, senior researcher and group leader, reckons it will take five years for the technology to supersede today's RAM — by which time, chip capacities will be in the multigigabits. He sees the devices eventually being able to replace today's hard disks.

PLEDM involves a totally new type of structure which replaces the conventional memory cell of one transistor and a capacitor, with a two-transistor structure.

This consists of a newly developed Phase-state low electron(hole)-number drive transistor (PLEDTR), stacked onto a conventional MOSFET (metal oxide semiconductor field effect transistor).

'Until now DRAM memory has used one transistor and one capacitor per



► MICROPHOTO OF ONE OF THE PLEDM MEMORY CELLS

problems looking at needs in the mid-term future because that big capacitor is difficult to scale down if you want to reduce all components on a chip.'

The Hitachi team used a type of transistor with an unusual polycrystalline silicon and silicon nitrate structure.

'It enables chip design to be much smaller. Whereas in existing DRAM technology you use half a million electrons to store each bit of information, in this one only 1000 electrons are used,' said Williams.

www.hitachi-eu.com

● See feature, page 128

Cambridge Silicon Radio, a spin-out from Cambridge Consultants, is designing single-chip short-range radios for communicating between mobile phones, PDAs and

bit,' Williams explained.

'We ran into

PCs. It believes it will be the first company to integrate 2.4GHz radio, base-band and microprocessor functions on one CMOS chip.

The chips are expected to persuade a number of industries to radio-enable their products for the first time.

CSR has been established with \$10 million of backing from venture capitalists 3i, Amadeus Capital Partners and the Dutch Gilde IT Fund.

Co-founder and managing director Phil O'Donovan says applications range from cordless headsets to innovative applications such as wireless light switches and interactive toys. 'The incredible interest in emerging standards such as Bluetooth is proof of the potential for short-range radio,' O'Donovan said.

O'Donovan added that handheld computers and phones are not the only devices that could make use of Bluetooth's ability to swap within its 10-metre range.

It would be useful, for example, if a petrol pump could inform you that the pressure in your tyres is low, or that something is malfunctioning in the car, when you fill up. CSR is looking for digital RF and software design engineers to join its team.

www.CambridgeSiliconRadio.com

More information on the Bluetooth specification is available at www.bluetooth.com

Caroline Swift



continues her reports from **Silicon Fen**

New bid to send data via grid

A US start-up is developing technology that can send data, voice or video signals over electric power lines at 2.5Gb per second. **Media Fusion** has also signed confidentiality agreements with at least six power suppliers, and an unnamed European venture group has agreed to purchase a technology licence for \$65 million.

The company was established in 1998 to develop the technology, and will finalise the construction and installation of its first system by the end of this

month. William Stewart, Media Fusion's chief scientist, said problems of using the power grid for signals include line noise, load imbalances, and transformers which make signals difficult to control.

He claimed that Media Fusion overcomes these by inscribing data within the natural low frequency bandwidth of the electric wave.

The system will use a set of modem-like devices that plug into household electricity sockets.

JOHN GERALDS IN SILICON VALLEY

Netware perks up

Novell Netware seems to be fighting back against Windows NT. Sales increased by a fifth during the three months up to April, hauling in a profit of £24.2 million — twice as much as last year. Sales rose from £164 million to £197 million.

Chairman Eric Schmidt said: 'We had planned for growth, but the market's response to Netware 5 has exceeded our plans. Novell has never had a stronger new product.'

Novell may be benefiting from delays in the release of the next version of NT, to be called Windows 2000, and a reluctance to switch network operating systems in the shadow of the millennium bug.

GAMES NEWS

Thank Pod! Star Wars hits the games shelves



To some, it's the most eagerly anticipated film of all time; to others, it's over-hyped and over here. Whichever way you look at it, the great LucasArts marketing campaign is in full swing with the release of the first two games based on *The Phantom Menace*.

Star Wars Racer is a high-speed racing game based on Anakin Skywalker's pod racing in the film. With bright and crisp 3D graphics, it has you hurtling through spectacular landscapes in control of one of several peculiar pod racers.

The second game, **The Phantom Menace**, is an action adventure where, playing one of four roles including the young Obi-Wan Kenobi, you have to wield your light sabre around the stricken planet of Naboo, interacting with various characters as you go.

Check out www.lucasarts.com for more details.

Most new games, including the Star Wars releases, require 3D acceleration, so it's nice to see one that doesn't.

Outcast, from Infogrames, uses a technology known as pixellated voxels.

Assuming you have a relatively powerful processor and lots of memory, you'll be able to enjoy this atmospheric and expansive first/third person action/adventure game, released on 25 June. See www.outcast-game.com for more information.

The world of games is rarely without controversy, which brings us neatly on to **Kingpin: Life of Crime**, from Xatrix. It comes with a merited 18 certificate — extreme violence and extreme language is the order of the day in this first-person shoot-em-up based on the legendary Quake II games engine. *Kingpin* is due for release in later in the year, and it looks like the publicity will do it no harm. For more than just a snippet, see www.interplay.com/kingpin.

Finally, the inevitable is set to happen: a Half-Life mission pack. **Half-Life: Opposing Force** is essentially the same game, but played from the perspective of one of the soldiers rather than Gordon Freeman. It includes new enemies and weapons, and is due in the autumn.

JIM HARYOTT

• *Etelka Clark returns next month.*

Playtime for PCs

The E3 Show and Conference in Los Angeles highlighted the role game systems will play in the future of computing. Analysts and industry observers are paying close attention to pioneering concepts announced there.

The show highlighted ultra-fast 3D rendering and the way navigation is becoming more intuitive. Systems are also focusing on brilliant colours and animation. All of this can translate into mainstream computing. In fact, many of the things I saw at E3 are clearly on track to enter the PC market soon.

Another big development is online gaming communities. Users see interactive games and multi-user games as a way to find and make friends and interact with them. This is something that the internet lets people do well, but the gamers are taking the concept to new levels. They plan to create interactive 3D game environments with avatars representing individual players. These ideas could influence the next generation of conferencing, voting, meeting and chat software.

The hot topic of the show was **Sony's Playstation II**. This is such a powerful system that it could eventually take over the PC's role in the home. With the right internet connections, these new 3D game systems could present quite a challenge to the PC in this area. The Playstation II was shown only behind closed doors at E3, which gave it an even bigger cachet.

Online-only games such as *Quake III*, *Unreal Tournament* and *Everquest*, are also hot — so much so that some CD developers plan to move completely to this space.

A few years ago, the PC, with its ever-increasing power, appeared to be a real threat to dedicated game systems. But the tables are turning again. It is very possible that high-powered dedicated game systems could become the only computer many homes could want or need.

This is especially true now that the open source movement makes the internet a level ground for future applications. Game systems could become the Trojan Horse that brings the internet to the millions of homes which have so far managed to resist buying a PC.

Tim Bajarin



letter from **Silicon Valley**