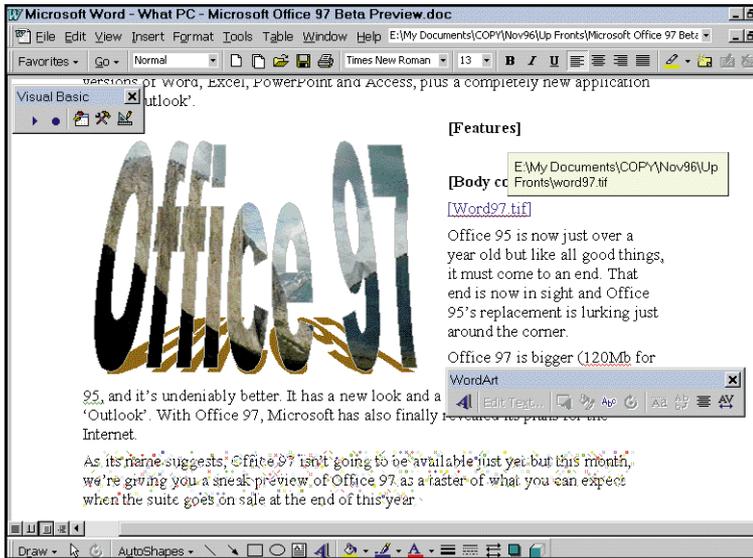


# up front

Among the new products under review are: Microsoft Office 97, Pentium PCs from Olivetti and Mesh, two voice-recognition systems from IBM and Dragon, a Black Widow scanner, Omnipage's OCR system, and HP's top-of-the-range Omnibook portable PC



## Microsoft Office 97

Julian Prokaza

*The latest edition of Microsoft's Office Suite for Windows 95, incorporating new versions of Word, Excel, PowerPoint and Access, plus a completely new application called 'Outlook'.*

Office 95 is now just over a year old but, like all good things, it must come to an end. That end is in sight and Office 95's replacement is lurking just around the corner.

Office 97 is bigger (120Mb for a 'typical' install) than Office 95, and it's undeniably better. It has a new look and a brand-new application called 'Outlook'. With Office 97, Microsoft has also finally revealed its plans for the Internet.

As its name suggests, Office 97 isn't going to be available just yet. However, this month, we're giving you a sneak preview of Office 97 to give you an idea of what you can expect when the suite goes on sale at the end of the year.

### Interface

The most obvious change to Office 97 is with the interface, at least as far as Word and Excel are concerned. Gone are the old three-dimensional buttons, replaced with Internet Explorer 3-style ones that are flat until you move the cursor over them. The new interface is also more consistent between the applications, and much more customizable. Buttons can still be dragged and dropped between toolbars, but now so can menus and their

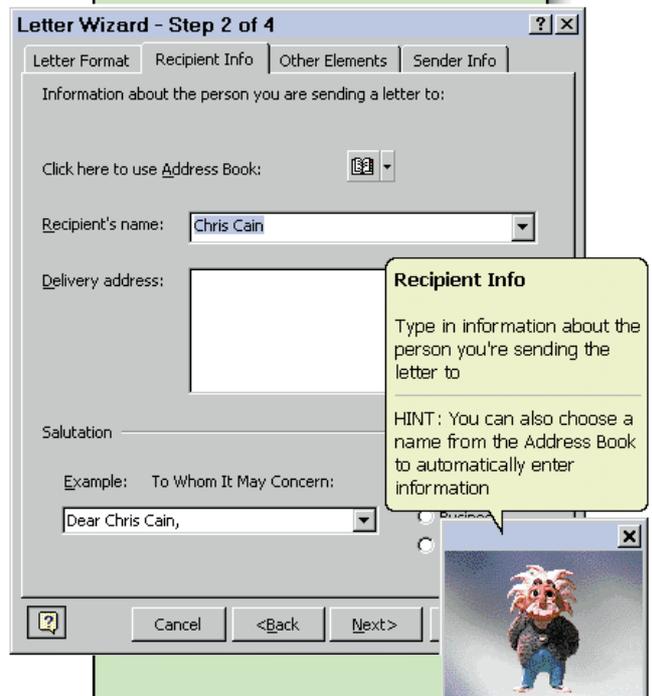
entries, and you can even place buttons in menus and vice versa.

Start up an application and the next thing to strike you is the animated figure sitting in a window in one corner of the screen. This is the Office 'Assistant' and it has the job of providing a friendly face for users in search of assistance. The old-style help system is still there; the Assistant just 'assists' it.

For example, start a new Word document with 'Dear Sir', and the Assistant springs into life and asks if you want help with writing a letter. If you do, it will take you through a Letter Wizard that prompts you for such things as the salutation and the style, and then will create a suitable structure for you to type into. Click on the Assistant's window and a search box appears. Type in 'how do I create a mailmerge' and it will provide a list of options and offer a step-by-step guide for what you have to do. There are several Assistants to choose from and, although they're a little gimmicky, they're very useful during that initial steep learning curve. They can, of course, be switched off.

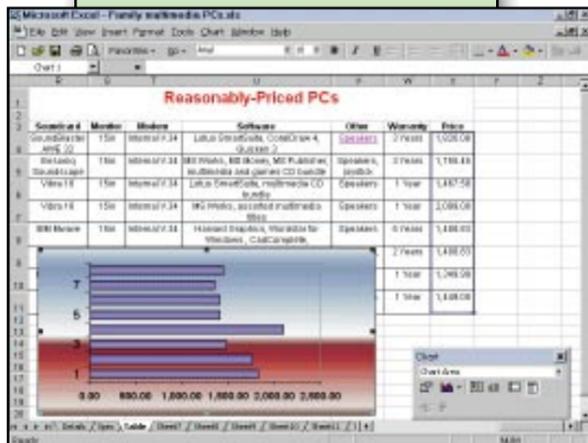
### Performance

Microsoft has paid close attention to performance with its development of Office 95, and the mini-



# Microsoft Office 97

(continued)



- New Windows 95 versions of Word, Excel, PowerPoint and Access
- New 'Outlook' application for e-mail, scheduling and contacts
- Fully customisable interface
- Animated Office 'Assistant'
- IntelliSense extended to grammar checking
- Improved document sharing
- Integrated Internet tools and hyperlinking between documents
- New Office Art clip-art and formatting tools
- Visual Basic available in all applications
- Faster than Office 95 on 486DX/33

mum PC specification to run it is a 486DX/33 with 8Mb of RAM. With such a configuration, Office 97 applications are quicker to load than their Office 95 counterparts (around 14 seconds for Word 97, as against 17.25 for Word 95) and the use of shared code between each application makes them less demanding on memory.

That said, once loaded, Office 97 could hardly be described as swift on such a machine, and we even noticed lags in some operations on our test machine – an IBM P166 Aptiva with 16Mb of RAM. The software was, however, a technical beta release and far from a finished product.

## Word 97

Word is perhaps the Office application most people are familiar with and, as if the Assistant wasn't enough, Word 97 also has a whole host of new features designed to help users to produce better documents in less time.

The IntelliSense spell-checker is still there, but it's now been extended to include grammar. The use of natural language processing allows Word to analyse a sentence and determine if it's grammatically correct. Type: there are two dog's and dog's will be underlined in green, signalling a problem. Right-click on the word and you can correct it, just as you would with a spelling mistake. Go on to type there are two dog's bones here and the underline will vanish, since the sentence is now grammatically correct.

IntelliSense also includes other handy features, such as automatically completing words for you. Type Mon, for example, and you can complete it to Monday by pressing the return key. The most useful feature of IntelliSense, however, is part of a much bigger addition to Office 97. Type a Web address such as <http://www.msn.com> and it will be formatted as a proper underlined hyperlink. Even better, it will also function as a hyperlink, which means that when you click on it, the

Web page will be opened in Internet Explorer 3 (IE3). Objects in any Office 97 document can be formatted as hyperlinks to point to remote or local objects. So, for example, a line in Word could be linked to an Excel 97 worksheet, which in turn could include a link to a Web site.

Office 95's Internet Assistants allowed the applications to save documents as HTML files. With Office 97, this is no longer necessary as, with IE3 at least, every Office document is also a Web document. Using IE3, documents stored on a PC's hard drive can be viewed directly in their native format – there is no need to convert them to HTML first. Documents stored on a server can also be viewed remotely in the same way. However, the big difference is that, not only can documents be viewed in IE3, they can also be edited. Whenever a Word document, for example, is opened in IE3, it appears complete with Word menus and toolbars.

The main use of Word is, of course, as a text editor and if you use it to edit, rather than just write text, you'll be impressed. Word can now track changes in a document, highlighting new and deleted text accordingly. Once your editing is complete, you can go through accepting or rejecting each change in turn. This also applies to documents that are shared, so it's possible to see what changes someone else has made and then either accept or reject them.

## Excel

The changes in Excel may be a little less obvious than those in Word, but they are there. It may be stating the obvious, but Excel's biggest use is to deal with numbers and, although previous versions have done this more than capably, Excel 97 has really tightened things up.

Word has its IntelliSense to correct mistakes; Excel has AutoCorrect. If you type in a formula that contains a mistake, Excel will suggest a correct version. Speaking of formulae, previous versions of

Excel used to rely on cell references for their construction. For example, calculating the total of a column of sales figures might require the formula '=Sum(E3:E27)'. This is more than a little cryptic for some people and even seasoned Excel users could have a hard time looking at a complex spreadsheet and figuring out which formulae applied to which cells. Not so with Excel 97. If a row or column is headed by the words 'Sales', then totalling them is as simple as typing '=Sum(Sales)' and Excel will automatically choose the correct cell range.

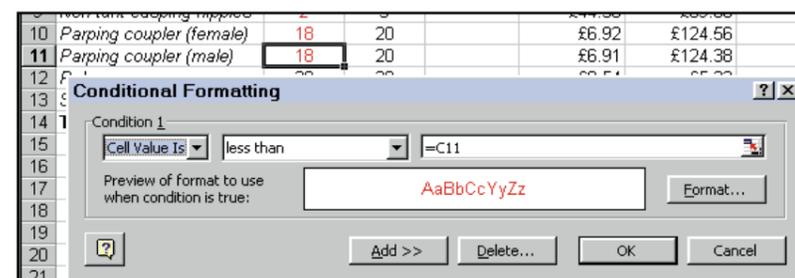
Another useful feature is that when a cell containing a formula is double-clicked, Excel will highlight the cells it refers to.

A common requirement for a

Cost	Value
5.25	£63.00
10.02	£1.56
5.96	£405.28
10.06	£14,887.44
14.50	£89.00
16.92	£124.56
16.91	£124.38
10.54	£5.22
17.10	£8,187.40
<b>=SUM(Value)</b>	

spreadsheet is to track values and alert the user when they reach a certain amount. Changing the colour of a product's stock level when it reaches a certain point, for example, used to involve macro writing. Now, it is done using the 'Conditional formatting' menu and simply choosing cells and colours.

As with Word, document sharing has seen some big improvements in Excel 97. Changes made to a worksheet can now be tracked and viewed in pop-up boxes whenever the pointer is held over a



changed cell. In addition to the last several changes, the person who made the change is also displayed and it's possible to accept or reject any of the alterations.

## Outlook

Outlook is a completely new addition to Office. Essentially, it's a personal information manager and, as such, has done away with Schedule Plus, but it goes much further.

Take a moment to think about it and you'll realise that 'personal information' covers more than just a contact list and appointments. Files on your hard drive or network servers, e-mail or remote computers, Web-sites halfway around the world – if you use them they count as personal information and Outlook is Microsoft's attempt to pull them all together into one place.

The Outlook window consists of a strip of icons down the left and a viewing pane occupying most of the right. The icons represent Outlook's different functions – contacts, calendar, notes, mail, and so on, and clicking one displays the appropriate information in the viewing pane. Click on the 'InBox', for example, and you can see any messages that you've received; or on the 'Task' icon and your to-do list is displayed. So far, this is pretty standard stuff but it's when Outlook is used in a group environment that it really comes into its own.

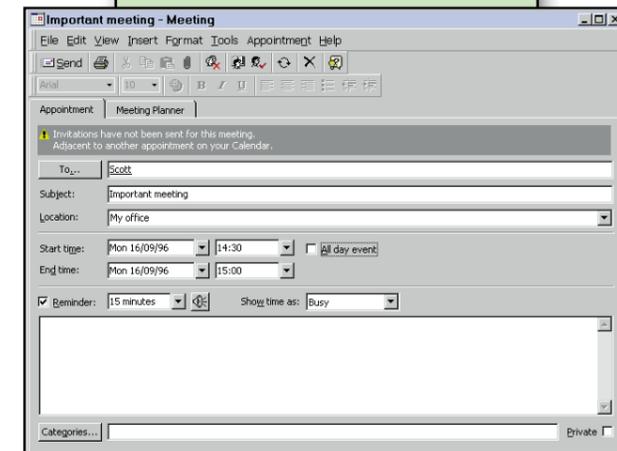
Outlook is extremely versatile. For example, suppose you were to arrange a meeting with a colleague, 'Pat'. To do this, drag her name from your contacts list onto your calendar and complete the details. Clicking the 'Send' button then sends it to Pat via whatever e-mail system you have configured (either internal or external). Pat receives incoming mail in the form of a meeting request.

By choosing to accept the meeting, an appointment is booked in Pat's calendar and a suitable response returned to you.

Other such tasks can be completed just as easily and involve little more than clicking, dragging and dropping. The whole process is remarkably intuitive and it makes other group scheduling tools look very clumsy indeed.

# Microsoft Office 97

(continued)



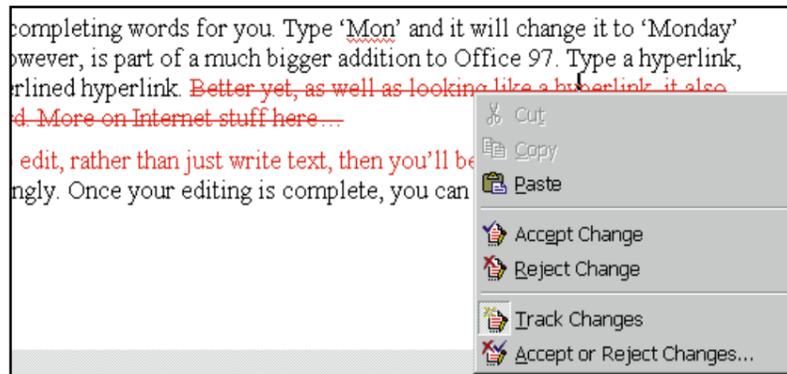
**Office 97 is perhaps Microsoft's most significant piece of software to date, and Outlook alone makes it an extremely useful and versatile product. It almost goes without saying that it will be a roaring success when it becomes available for Windows 95 later in the year, but will the same be true when the Mac version goes on sale six months later?**

- UK pricing for Office 97 has yet to be announced, but US prices for the various suites have been given. Office Standard (Word, Excel, PowerPoint and Outlook): around \$249; Office Professional (Word, Excel, PowerPoint, Access and Outlook): around \$349. There will be various upgrade deals available.
- Microsoft: 0345 002000

## Microsoft Office 97

Performance	n/a
Ease of use	★★★★★
Features	★★★★★
Value for money	n/a
<b>Overall</b>	<b>★★★★★</b>

Minimum requirements: 486DX/33, 16Mb of RAM, 120Mb of free hard drive space.





**W**hen Hewlett-Packard first launched the OmniBook 300 back in 1993, it was something of an innovation. Smaller than an issue of *What PC?* and barely twice as thick, the 386-based notebook PC was both lighter and smaller than the majority of its contemporaries, and we thought it was great.

The OmniBook 800 is Hewlett-Packard's latest version of the sub-A4 notebook and, although it retains almost all the styling cues of its predecessors, that's as far as the similarity goes. First of all, the 800 range is Pentium-based; from a Pentium 100 in the entry-level 800CS 5/100 to a Pentium 133 in the top-of-the-range 800CT. 16Mb of EDO-RAM is now standard across the board, as is a 128-bit NeoMagic PCI graphics controller with 1Mb of RAM.

Physically, the OmniBook 800CT is probably about as compact as a notebook PC can get without losing its functionality. Open the case and the first thing to strike you is the screen – it fills almost all the available space. The 10.4in active-matrix panel on the 800CT (other models have a 10in DSTN panel) is crisp, with good contrast, and can display 8-bit colour at 800x600 and 16-bit at 640x480. Plug in an external monitor, and 8-bit colour at 1,024x768 (non-interlaced) is possible.

Hunt around for a pointing device on the OmniBook 800CT and you may be perplexed. Like previous OmniBooks, the 800CT eschews such pretenders to the pointing throne as touchpads and trackballs in favour of a much more useful device. Press a button at the top right of the keyboard and a chunk of plastic pops out from the right of the case. Lift and lock its hinged surface and you have a fully-functional, if somewhat small, mouse. Unlike a normal mouse, however, this one is

merely something to hold on to – it's the thin plastic strip linking it to the PC that determines the pointer's position on screen. It's a peculiar arrangement, but it does work very well, either on the desktop or off it and, although the strip looks fragile, it's strong and flexible enough to withstand the twists and yanks of everyday use.

Given the small size of the OmniBook, few concessions have been made in terms of the keyboard. It's a little narrower than usual, but the keys are still reasonably large with a broad surface. Key travel is also reduced, but this is barely noticeable and, in use, the action is positive and pleasant.

Obviously though, in a PC this size, something has got to go and in the OmniBook 800's case it's the floppy disk drive. There simply isn't room to squeeze one inside the case so, instead, an extremely compact external drive is supplied that plugs into a socket at the rear of the machine. For most notebook users, this is perfectly acceptable as the drive is light enough to slip into a bag or briefcase and can be connected without having to switch off the OmniBook.

Floppy drive aside, the OmniBook 800CT is well-equipped when it comes to getting data to and from other devices. A 4Mb-per-second IrDA-compatible infra-red port is fitted, as are two Type II PC card slots. There's also a SCSI interface but, unfortunately, this is a non-standard socket that doubles as a connector to the optional docking station (a £39.95 converter cable is available that turns it into a standard port).

The small Lithium Ion battery pack used by the OmniBook 800 provides around three hours of use, depending on screen brightness and what ports are used, and recharges in under two-and-a-half hours.

## HP OmniBook 800CT

**Julian Prokaza**

*Hewlett-Packard's top-of-the-range sub-A4, ultra-portable PC, now with Pentium processor.*

- Intel Pentium 133MHz processor
- 16Mb of EDO-RAM, expandable to 48Mb
- 850Mb hard disk drive
- 10.4in TFT active-matrix display, 800x600, 16-bit colour
- 128-bit PCI graphics controller with 1Mb of RAM
- 16-bit Sound Blaster-compatible sound
- Windows 95-compatible keyboard
- Hot-swappable external 3.5in floppy disk drive
- Two Type II/one Type III PC Card slots
- Optional external quad-speed CD-ROM drive
- Optional docking station
- Ports: 9-pin serial, 25-pin parallel, SVGA-out, IrDA-2 infra-red, docking station/SCSI-2, dedicated floppy drive
- Dimensions: 282(w)x183(d)x38(h)mm
- Weight: 3.75lb

**The OmniBook 800 is a perfectly-realised solution to the problem of portable computing. It's been designed to be both small enough and light enough to carry in a briefcase, without sacrificing features or, more importantly, performance. A real winner.**

- £3,642.50
- Hewlett-Packard: 01344 369222

### HP OmniBook 800CT

Performance	★ ★ ★ ★ ★
Build quality	★ ★ ★ ★ ★
Features	★ ★ ★ ★ ★
Value for money	★ ★ ★ ★ ★
<b>Overall</b>	<b>★ ★ ★ ★ ★</b>

# Corel Click & Create

Terry Pinnell

*An innovative program for creating a wide variety of multimedia applications, simplified by using predefined objects and drag-and-drop techniques.*



- Drag-and-drop editing
- Personalised menus
- Step-through editor
- Animation and morphing
- Large font and clip-art library
- 1,400 sound files and 250 video clips
- Hundreds of transition effects and backgrounds

**Click & Create combines powerful tools with drag-and-drop usability, allowing even non-programmers to create professional-looking multimedia applications - providing, of course, your PC is generously specified.**

- £581.63
- Channel Market Makers: 01703 814142

### Click & Create

Performance	★ ★ ★ ★ ★
Ease of use	★ ★ ★ ★ ★
Features	★ ★ ★ ★ ★
Value for money	★ ★ ★ ★ ★
<b>Overall</b>	<b>★ ★ ★ ★ ★</b>

Minimum requirements: 386/33DX; 8Mb of RAM; CD-ROM drive; Windows 3.1 or Windows 95; 26Mb of free hard disk space.



Click & Create is an application that provides just about everything you need to produce multimedia applications of all types. Games, tutorials, screensavers, animated sales displays, company presentations, children's storybooks and so on are all within its scope.

Click & Create lets you combine any text, graphics, video, animation and audio into a finished project. Each of the constituents can come from either the program's generous libraries or from your own endeavours. If you've tried your hand at a coloured 3D drawing of a spaceship, talking frog or racing car recently then you'll appreciate the libraries. Once you've finished the assembly of all the elements and their logical connections, that's it. There's no need for a separate compiler stage - your project should run immediately with a click on the 'Run' button or menu. Then you can save it for later use as either a stand-alone application or a screensaver.

The program comes in both Windows 3.1 and full 32-bit Windows 95 versions, with the appropriate version being installed automatically. The manual seriously understates the hard drive space requirements though, and you'll actually need about 26Mb for a normal installation or a whopping 200Mb for a full one. A full install also gives you faster performance by placing everything from the CD-ROM onto your hard drive. On start-up, you're presented with Click & Create's Storyboard Editor. Its purpose is to give you an overview of your application, with thumbnails representing the application's frames. Each frame might become a page in an all-singing, all-dancing corporate presentation, for instance.

A new Click & Create application consists of a single blank frame, and clicking this displays the empty Frame Editor. From here you choose

and position the objects that will appear in that first frame. This is great fun, as there are more than a thousand objects in the library at your disposal, organised in about 120 sets, including many complex 3D images and video clips. You simply select each one you need, such as an appropriate background, text, menu buttons, high-quality graphics, animations, and so on. You drop them in turn into your Frame Editor and, when satisfied, you return to the Storyboard Editor and proceed with the next frame.

To set up the links between frames you then need to use the Events Editor, the powerhouse of Click & Create. Everything that happens when an application is run is controlled by the list of events entered here. For example, if you want your application to play a sound and jump to a new frame when the user clicks on an object, you would specify this information in the Events Editor.

Don't expect to turn out a 'Doom' on your first session with Click & Create, though. You'll have to invest a fair time learning how to use its powerful capabilities effectively - especially if you are planning to use it for games development. As you might imagine, things can get complicated and both care and practice will pay dividends. You do, however, get a lot of support, particularly from the excellent tutorials. Naturally, these are themselves Click & Create applications, and consist of a guided tour plus multimedia, games, and screensavers. They're intended to be used alongside Click & Create, and include a spoken narrative telling you precisely what to do. Unfortunately, your progress will occasionally be hindered by a few bugs but, overall, these flaws are an acceptable price to pay in the first version of such a ground-breaking program.

## Mesh Elite Ultima 133

Paul Wardley

*A solidly-constructed Pentium 133MHz PC equipped for multimedia, TV reception, and fax and data communications.*

- Pentium 133MHz processor
- 16Mb of RAM
- 1.2Gb hard drive
- 8-speed CD-ROM drive
- TV and Teletext tuner card
- 28.8Kbps modem
- Vibra 16 sound card
- Altec Lansing-powered speakers
- Windows 95
- Lotus SmartSuite
- Three 3D games

**The Mesh Elite Ultima is amazing value for money. A ready-to-go PC equipped with just about all the hardware and software you'll ever need. Minor grumbles may include a modem that can't be used as an answering machine and fragmented documentation, but then nobody has ever made a perfect PC.**

- £1,404.13 (incl VAT)
- Mesh: 0181 452 1111

### Mesh Elite Ultima

Performance	★ ★ ★ ★ ☆
Documentation	★ ★ ★ ☆ ☆
Features	★ ★ ★ ★ ★
Value for money	★ ★ ★ ★ ★
<b>Overall</b>	★ ★ ★ ★ ☆



**W**ith a name like 'Elite Ultima', Mesh's latest machine has something to live up to. From the outside, the computer looks pretty ordinary, housed in a big, angular desktop case that eschews some of the more futuristic aspirations of other PCs. Fortunately, appearances are deceptive and, inside at least, the Elite Ultima is well-equipped.

Powered by a Pentium 133MHz PC and the now-standard 16Mb of memory and 1.2Gb hard disk, the Ultima has a decent enough specification that delivers a roughly average performance for this class of PC. In other words, it's good enough to handle anything the home or office user might care to throw at it.

The graphics system, however, is far from average. The controller handling the production of the picture on the screen is the ATI 3D Xpression (Rage) card. Get past the technical mumbo jumbo and this card is specially designed to get the best out of 3D games. It really needs games written especially for it to make a visible difference and, since you're unlikely to have any lying around the house, three are supplied with the machine. 'Actua Soccer', 'Assault Rigs' and 'Mech Warrior' all use 3D graphics – and very good they are too. More are promised, but with so many different graphics standards about, the ball is in the court of the software companies – they'll only develop the games if enough people buy the graphics card.

Open the Ultima up and next door to the graphics card, connected by a short cable, is a rather unusual item in a machine of this price – a TV tuner card. With an aerial connected, this allows the PC to

receive television and Teletext broadcasts, as well as capture video and store it on the hard disk. All the controls you'd normally find on a TV/Teletext remote control are duplicated on the PC screen, and the software is pre-installed.

However, if you've never seen a TV picture on a computer, you're in for a shock as the picture quality is well below that of a TV. This is because a monitor's screen is optimised for still, not moving, images and, while Windows 95 may look crisp and steady, TV pictures look like they're coming from a video tape that's been played a few times. Programmes look okay if they're in a small window, but expand them to full screen size and they have a slightly grainy appearance. Mesh supplies a 15in Microscan 4V monitor which has a bright, clear image, good colour contrast and a comprehensive set of manual and push-button controls for adjusting the picture.

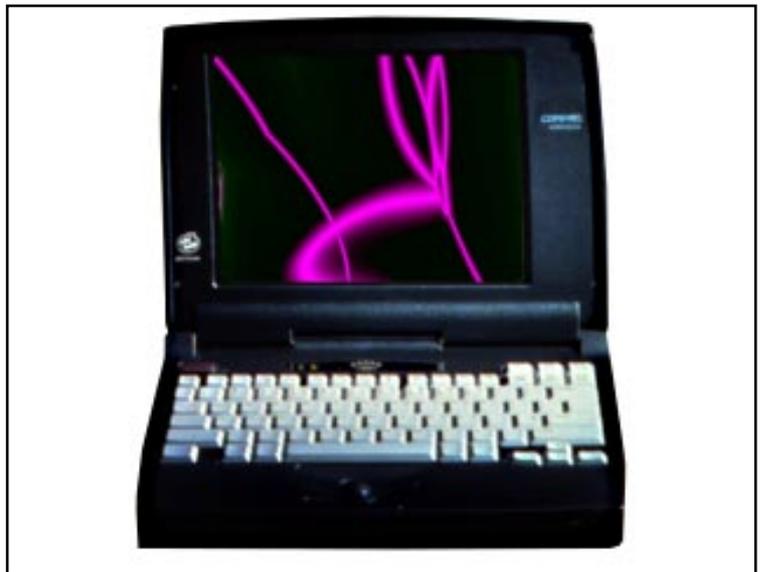
Not content with 3D graphics and the TV and video facility, Mesh has also included a fast internal modem that can be used for faxing or getting onto the Internet. All the above is in addition to the standard multimedia features provided by a 16-bit sound card, an eight-speed CD-ROM drive and a pair of amplified external speakers.

Windows 95 is pre-installed, as is Lotus SmartSuite (a set of office software) and the utility programs to operate the TV and modem. Our only real complaint about this feature-packed computer is that it comes with a box full of manuals covering each component separately, most of which assume rather more technical knowledge than is appropriate for a first-time buyer. ▶

## Compaq Armada 1100

Dominic Bucknall

*A new entry-level notebook from Compaq, aimed at budget-conscious users who want a brand-name portable.*



- 75MHz Pentium processor
- 8Mb of main memory
- 810Mb hard disk
- Two Type II PCMCIA slots
- 1Mb Cirrus Logic graphics (GC7543 chipset)
- VGA-resolution dual-scan colour screen
- NiMH battery pack
- Software includes Windows 95 and Compaq utilities
- Weight: 6.3lb
- Size: 302(w)x183(d)x56(h)mm

**Essentially an upgraded Contura with a Pentium 75 processor, the Armada 1100 retains its predecessor's pleasant keyboard and practical overall design, but it is let down by a rather unimpressive screen.**

- £1,644
- Compaq: 0181 332 3000

### Compaq Armada 1100

Performance	★ ★ ★ ★ ★
Build quality	★ ★ ★ ★ ★
Features	★ ★ ★ ★ ★
Value for money	★ ★ ★ ★ ★
<b>Overall</b>	<b>★ ★ ★ ★ ★</b>

**W**hen we first heard about the Armada, we expected a new product. However, as soon as it arrived, we realised that, to all intents and purposes, the Armada 1100 was simply an updated version of the Compaq Contura. The resemblance is apparent in the shape of the distinctive bevelled case and spacious keypad and, as far as we could recall, the layout of the power stud and battery compartment as well.

This is by no means a bad thing as the Contura was one of the more well-designed notebooks of its day and the Armada has certainly inherited its ergonomic plus points. Like its predecessor, the new machine is fairly robust, with a strong, rigid body and an unyielding lid surface to protect the screen during transport. Fortunately, the strength of the case doesn't seem to have translated into bulk and the Armada weighs a relatively portable 6.3lb.

In some ways though, this is a reflection of the rather sparse configuration – this machine doesn't have a CD-ROM drive or the option to fit one, nor does it have integrated audio or stereo speakers. Compaq has clearly gone for the basic package approach and the Armada's 75MHz Pentium processor, 8Mb of RAM, 810Mb hard disk and VGA dual-scan screen bear this out.

This lack of advanced features means that, externally, the Armada is a relatively straightforward piece of design. The PCMCIA slots and floppy drive are at the left and the usual array of ports at the rear are permanently exposed as there is no dust flap. Everything is as you would expect – the PCMCIA slots can take a pair of Type II cards or a single Type III and the ports include a mini-DIN mouse/keyboard connector and a 9-pin serial interface, but there's no expansion bus for use with a docking station.

We found the Armada quite comfortable to use, thanks to its well-spaced keyboard, broad palmrest and the provision of tilt feet to improve the typing angle. The quiet, but pleasantly firm action and absence of wobble in the keys also helped to make typing less of a chore than it can sometimes be on notebooks. We were less keen on the traditional-style trackball, which doesn't compare very well with the now-common touchpad approach. Its buttons also suffered from being slightly stiff and unresponsive, although you'd probably get used to this quite quickly.

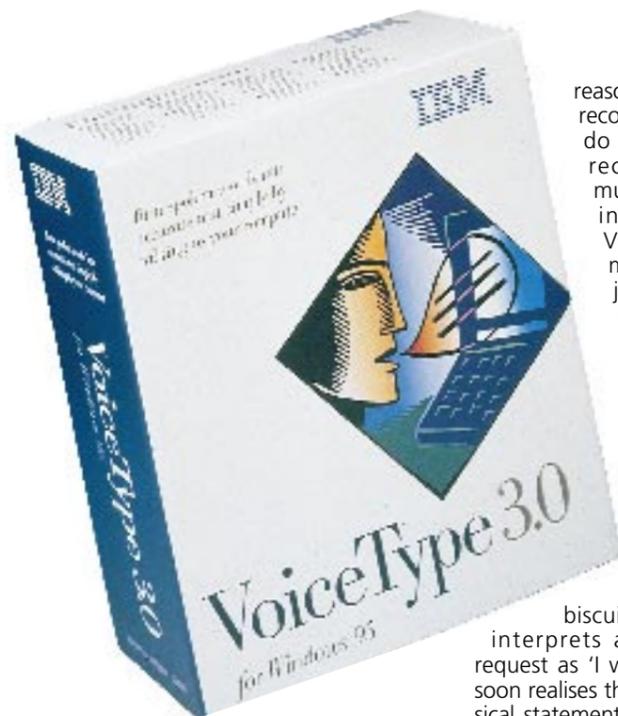
Unfortunately, the Armada's screen isn't a particularly impressive example. For a start, it operates at a 640x480 VGA resolution, despite 800x600 SVGA fast becoming a standard for notebooks. It isn't really bright enough to cope with anything but dull ambient light, and the image appeared rather coarsely grained with ghost lines extending from the edges of screen objects. In short, we've seen considerably better passive panels.

The screen's problems are offset to a certain extent by the properly implemented power management setup. This is accessed, logically enough, from the power icon in the Windows Control Panel. Instead of just the usual basic APM (Advanced Power Management) on/off options, you get a tabbed dialog box which lets you set both mains and battery power-saving options. These consist of the usual time-outs and controls for lowering the processor speed and screen brightness, and you have a choice between using a range of quick pre-sets or creating your own settings. Under typical usage, the Nickel Metal Hydride (NiMH) battery should last for around two-and-a-half hours with a medium level of power management enabled.

## IBM VoiceType 3.0 versus Dragon Dictate Classic Edition

Scott Colvey

Two voice-recognition systems designed for high-powered desktop PCs.



reason, it is necessary for recognition software to do more than simply recognise words; it must also be able to interpret context. VoiceType actually makes a reasonable job of this, but there is one niggle. As the program 'listens' to your voice, it continually changes recognised words as the context in which they are spoken is further established. For example, if you say 'I want two biscuits' and VoiceType interprets and displays this request as 'I want to biscuits', it soon realises that this is a nonsensical statement and so swaps 'to' for 'two' accordingly.

Controlling a computer using your voice alone is hardly a new idea. The original series of *Star Trek* had computers that could act upon spoken commands and HAL, the ship's computer in *2001: A Space Odyssey*, could even hold conversations with the crew. Although, sadly, speech recognition of this complexity is still a long way off, there are currently systems available that can turn spoken words into written ones, making voice dictation and simple computer control a reality.

Two leading products in this field are IBM's 'VoiceType' and 'Dictate' from Dragon Systems, and this month we've taken a detailed look at them. Both systems can be bought with varying sizes of vocabulary (the words they can recognise), but to keep our assessment balanced, we've settled on the 30,000-word versions of each.

Once installed, choose the 'Enrol' option in IBM's VoiceType and you have to laboriously read through a list of over 200 sentences displayed in sequence by the system. There's little doubt that this process will eventually condition you to speak in the monotonous broken-speech pattern that these systems deal with best, but we're not sure what effect it will have on your social intercourse. However, VoiceType's recognition improves considerably once you've completed the enrolment, and you only have to do it once.

The process of voice recognition is fraught with problems. For example, take the words 'to', 'two' and 'too' – they all sound the same when spoken, but each has a different meaning and could be used in any number of ways. For this

This correction is done on-screen, which makes watching your recognised text appear a somewhat distracting process. IBM suggests that looking away when you dictate would prevent this, but then it seems a little pointless to display the half-recognised text at all. Mis-recognised words can also be corrected using simple voice commands such as 'delete'. Errors tend to appear several words behind the current cursor position, but you can navigate back and forth using directional commands. Once you've highlighted an error, VoiceType plays a recording of what you actually said, and a pop-up list appears with a number of alternatives. Choose a word from this list and VoiceType matches the recorded voice pattern to that word to aid future recognition.

Most of your interaction with VoiceType is carried out through the 'VoiceCentre'. This is a small row of voice-activated icons that allow you to start applications, add commands or simply switch the system off (with the very satisfying 'go to sleep' command). Commands can be issued using unbroken voice patterns so, saying 'Start Lotus 1-2-3' in natural speech would do exactly that. You can also use predefined voice commands in supported applications to access their menus and functions. The supported applications are too numerous to mention, but all the common Windows 95 packages can be controlled almost entirely by voice commands.

We found the supplied microphone headset to be an uncomfortable fit and the microphone arm has a limited positioning angle that pokes into the side of your mouth if you're not careful. One

handy feature is the on-off switch positioned midway down the connecting cable. As voice recognition software is hard-pressed to distinguish between your voice dictation and shouting across the office, the ability to switch the microphone off quickly is very useful.

The headset supplied by Dragon is a much better piece of apparatus. It has a bigger earpiece and the microphone is attached to a totally flexible arm. This can be rotated through 180 degrees, which means the earpiece can be used on either ear, but there isn't an on-off switch.

On the surface, Dictate's interface and operation are very similar to IBM's VoiceType. Indeed, until you actually start dictating, and more importantly, correcting, the differences are barely evident. Following an optional – but strongly recommended – enrolment-cum-familiarisation process, you are presented with the 'Voicebar'. From here, you can access and customise Dictate's settings, or you can simply proceed by saying 'Bring up' followed by whatever application name or command you want. Dragon Systems has ensured that most Windows 3.1x/95 commands and popular application names are available from a fresh installation, but you can add as many others as you might need. As with VoiceType, commands (such as 'Bring up Wordpad') are accepted in continuous speech, but dictation is expected to be in 'discrete' (ie, broken) speech.

During dictation, the Voicebar can be minimised or placed anywhere on top of the active application. When it is on top, the Voicebar displays a small meter showing your voice level – too soft and it turns yellow, red when too loud and green if you're speaking just right. The voice-level tolerance seems very tight, though, and we found it nigh on impossible to keep the indicator shimmering in the green area. However, this didn't seem to affect Dictate's recognition capabilities too much, and minimising the Voicebar eliminates this distraction.

Dictating through Dictate is much more fluid than with VoiceType. The most noticeable point is that when you say a word

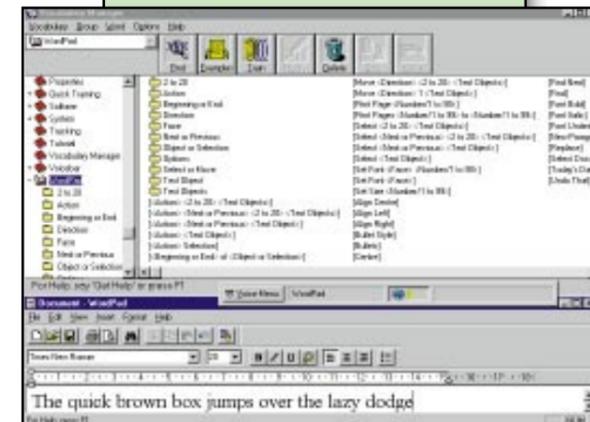
it appears more or less immediately on screen. Unfortunately, this tends to result in less accurate results as – we have to assume this as Dragon Systems is keeping the actual techniques close to its chest – Dictate performs less context-checking than VoiceType.

Dictate takes the crown when it comes to editing and correction of your work. With Dictate, this can be achieved 'on the fly' so, should you spot an error, say 'oops' and you pop a list of the previous few words, each labelled with a number. Say the appropriate number and you are presented with the word, together with a further numbered list of possible words in order of likely correctness. Say the number corresponding to the correct replacement and you can continue your dictation. Although it might sound long-winded, this process actually takes very little time and it's quite intuitive.

A point to bear in mind with both these packages is that their recognition and interpretation abilities should improve considerably with extended use. As they accept and recognise speech, both programs 'learn' from experience and extend their vocabularies. In a test such as this, where time is unavoidably limited, the results are obviously going to be less impressive than they would prove to be in ordinary use. That said, neither package performed badly – although the companies' respective claims suggesting an off-the-shelf accuracy of over 80 percent are overestimated.

## IBM VoiceType 3.0 versus Dragon Dictate Classic Edition

(continued)



For its consistent and easy-to-use interface, Dictate scored highly, but VoiceType provided more accurate recognition. The high price tag of both, however, makes them an expensive option and, for the moment at least, they're not really suited to general-purpose use.

- £652.13 (IBM VoiceType 3.0)
- IBM: 01705 492249

### IBM VoiceType 3.0

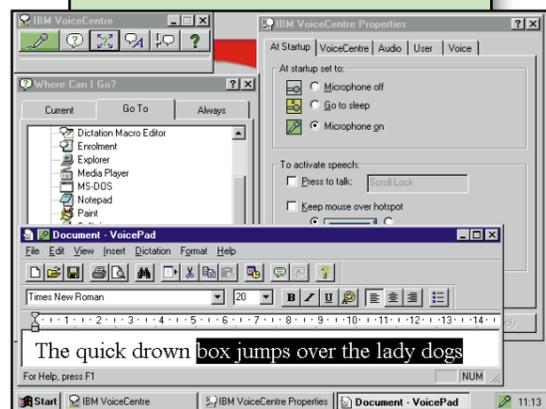
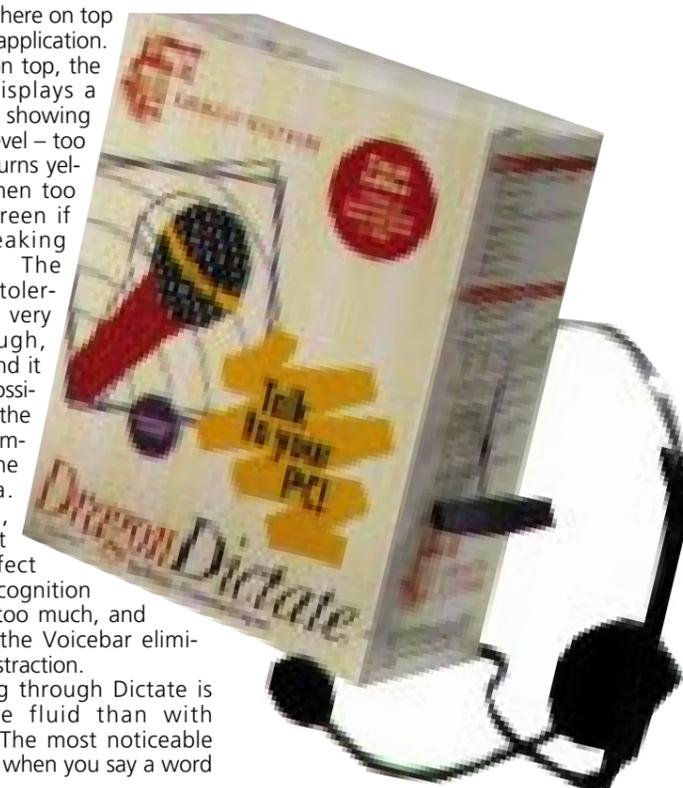
Performance	★★★★☆
Ease of use	★★★★☆
Features	★★★★☆
Value for money	★★★☆☆
<b>Overall</b>	★★★☆☆

- £774.33 (Dragon Dictate 2.1)
- Dragon Systems: 01242 678575

### Dragon Dictate 2.1

Performance	★★★★☆
Ease of use	★★★★☆
Features	★★★★☆
Value for money	★★★☆☆
<b>Overall</b>	★★★☆☆

Minimum requirements:  
**IBM VoiceType 3.0:** Pentium 90MHz with 256Kb of L2 cache; 8Mb of RAM; 38Mb of free hard disk space and a Sound Blaster 16 or compatible card.  
**Dragon Dictate 2.1:** 486/66 (Pentium recommended); 12Mb-20Mb of RAM (depending on version); 21Mb of free hard disk space and 16-bit sound card.



### IBM VoiceType 3.0 for Windows 95:

- Headset included with in-line on-off switch
- Allows for direct dictation into Windows applications
- Customisable 27,000-word user vocabulary

### Dragon Dictate 2.1 Classic Edition:

- Reversible headset included
- On-the-fly error correction
- Built-in Netscape Navigator commands facilitate hands-free Web surfing

# HP DeskJet 820Cxi

Scott Colvey

*Colour inkjet printer with a maximum print resolution of 600x600dpi.*



- Dimensions: 444(w)x396(d)x226mm(h)
- Weight: 6.5kg
- Maximum resolution: 600x600dpi
- 150-sheet paper tray
- Envelope feed slot
- 50 TrueType fonts included
- ColorSmart colour-matching technology

**The DeskJet 820Cxi produces crisp text prints and its graphics output is also good. However, there are better colour inkjet printers available at this price.**

- £415.95 (incl VAT)
- Hewlett-Packard: 01344 369222

### HP DeskJet 820Cxi

Features	★ ★ ★ ★ ☆
Build quality	★ ★ ★ ★ ☆
Ease of use	★ ★ ★ ★ ☆
Value for money	★ ★ ★ ★ ☆
<b>Overall</b>	<b>★ ★ ★ ★ ☆</b>

**H**ewlett-Packard is a veteran of the computer industry and is particularly well known for its wide range of printers. The 820Cxi is the latest in its DeskJet series – Hewlett-Packard’s popular range of inkjet printers designed for the desktop.

The 820Cxi is quite a bulky machine and weighs a hefty 6.5kg. Prominent at the front is a rather unsteady paper tray that can hold up to 150 sheets of A4 paper and, above this, the paper catch tray. This whole unit can be detached to give access to the roller mechanism, should you experience a paper jam. In all these respects, the 820Cxi is much like any of the other printers that make up the DeskJet range, but the design is more curvaceous than that of previous models.

Raise the 820Cxi’s cover and the print carriage automatically slides into view to reveal a pair of ink cartridges. Like many other inkjet printers, the 820Cxi employs two cartridges – one for cyan, magenta and yellow and a separate one for black. This is an important consideration if you intend to do a lot of text printing. Three-colour printers have to mix cyan, magenta and yellow to produce black, which is a little wasteful, whereas the 820Cxi can produce it on demand. This not only works out cheaper (black cartridges are cheaper than colour ones), but it also produces a truer black.

To the right of the cover are a couple of buttons that are used for clearing miscellaneous problems and switching the printer on and off. Each button is accompanied by an LED that lights up or blinks, depending on the 820Cxi’s status. A third LED also flashes when the 820Cxi has a problem with the ink cartridges, such as one that is empty or not properly fitted.

The 820Cxi can only be used from within a Windows environment but, somewhat surprisingly, it does not make use of the Windows Printing System. HP has implemented a proprietary system called Printing Performance Architecture (PPA). PPA is a set of control commands that lift the processing burden from the printer and place it with the PC. During printing, this does have a marginal effect on the PC’s operating speed, but the advantage is that the 820Cxi can start printing almost immediately.

An important part of PPA is a technology called ‘ColorSmart’. This is not a new feature – it has appeared in previous HP printer driver incarnations – but it is now integrated with PPA to further reduce the time spent waiting for print jobs to start. HP claims ColorSmart provides the best possible colour-for-colour match from the screen to the printed page. From our tests this would appear to hold true, but the transference is best when printed on HP’s glossy paper – particularly when using the 820Cxi at its highest resolution of 600dpi. On plain paper, the results were still admirable but some banding was visible on darker areas. Also, the ink tended to take longer to dry on plain paper than we have come to expect.

As far as inkjet printers go, the 820Cxi is reasonably fast. Using our text test document, it averaged 2.8 pages per minute in ‘Best’ quality mode and a swift 4.6 in ‘EconoFast’ mode. EconoFast is HP’s ink-saving mode and it uses about half as much ink as Best mode. However, the quality of output using this mode is nothing more than adequate and is really only suitable for draft printing. Graphics speeds were less impressive with the 820Cxi labouring for nearly four minutes over our test page. ▶

# Power Utilities with Crash Proof 96

Paul Wardley

*A set of five utility programs for Windows 3.1 and an extra one for Windows 95, all designed to make Windows a safer and more stable place to put your data.*

- Six separate utilities
- Potential hardware problems diagnosed
- Fixes some problems automatically
- Identifies and removes unneeded files
- Performs background checks on system integrity
- Contains simple benchmarking routines
- Helps resolve installation conflicts
- Explains Windows error messages

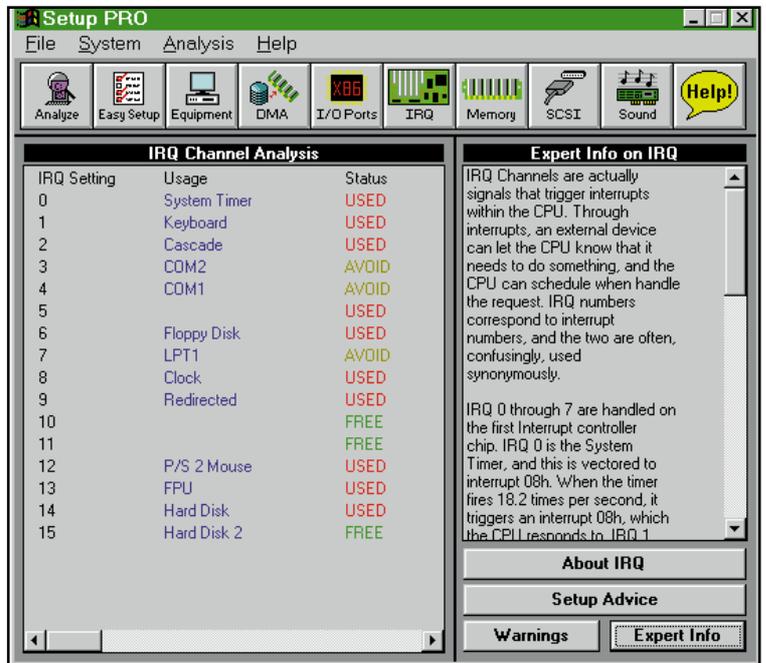
**We've got mixed feelings about this program. Its diagnostic and tuning features don't justify the purchase price, but there might come a day when Crash Proof gives you just the protection you need.**

- £52.86 (incl VAT)
- POW! Distribution: 01202 716726

### Power Utilities/Crash Proof 96

Performance	★ ★ ★ ★ ★
Ease of use	★ ★ ★ ★ ★
Features	★ ★ ★ ★ ★
Value for money	★ ★ ★ ★ ★
<b>Overall</b>	★ ★ ★ ★ ★

Minimum requirements: 386; Windows 3.1 (or 95 for all features); 4Mb of RAM.



Power Utilities is not a new set of programs, but the individual utilities which make it up have been rewritten and a major addition made for Windows 95. It comprises six utilities, but only five are available to Windows 3.1 users.

Setup Pro is designed to help you answer some of those awkward questions that crop up when you're installing new hardware and software. It analyses your computer and can list odd tidbits of information, such as which interrupts and DMA channels are free, and while this is not information you need every day, it can be very useful on occasion.

Winfo Pro examines and displays the settings and conditions under which Windows is working. Some of this information is exceedingly esoteric. Do you really care how many classes are registered during the running of 61 active modules? We thought not.

Diagnostic Pro looks the same as the two programs already described, but this time, instead of listing information about the various bits of your computer, it tests them. These are not benchmark tests to return figures about things like hard disk speed, but simple acknowledgements that components are working properly.

Upgrade Pro conducts some very rudimentary performance tests of a PC's hard drive, memory, processor and video card and then reports on the bottlenecks and which items you should think of upgrading. It also suggests ways of improving the performance of your machine by tweaking its settings. Upgrade Pro even goes as far as helping you price your upgrade and choose components and suppliers. Unfortunately, all its prices are in

dollars and it's difficult to use it without a currency converter.

The four programs described so far don't constitute 50 quid's worth, but the next, Crash Proof, is potentially much more useful. It comes in two versions – one each for Windows 3.1 and 95 – and its aim in life is to prevent Windows from crashing by intercepting errors before they occur. The Windows 95 version runs all the time in the background, constantly monitoring the system, whereas the Windows 3.1 version only kicks in when there's a problem. Since installing Crash Proof, the only problem we've had is with Winfo Pro. Crash Proof intercepted the error it caused but couldn't fix it, so we had to close down the program, leaving Windows unaffected.

Crash Proof is certainly the best program in the bunch, but the one we've saved until last is also worth a look. Power Utilities 32 is just for Windows 95. It serves as a front-end from which the other programs can be launched, and it's also a sort of interactive diagnostic tool that can fix problems by testing components and software settings and offering a comprehensive on-line database of solutions. There are also sections aimed at boosting performance and customising Windows, though many of these tweaks offer only temporary benefits.

Power Utilities 32 works on a fairly routine set of assumptions about your computer and it's not always right. Its 'Clean' facility, which is supposed to remove redundant items from system files, incorrectly offered to delete several files that were still required by our test PC. It also misdiagnosed hard and floppy disk errors during its testing procedures and in inexperienced hands, could be very dangerous.

## Black Widow ScanPRO 9636 SP flatbed scanner

Gordon Laing

*This is Black Widow's top-of-the-range flatbed scanner boasting 36-bit colour, compared to the more usual 24-bit.*

- 36-bit colour capability
- 600x1,200 true optical resolution
- 9,600x9,600 interpolated resolution
- Single pass
- 8.5x14in maximum scanning area
- SCSI II interface card
- TWAIN scanner driver for Windows 3.x and 95
- Image Pals Go II image-editing software
- TextBridge V3 LE OCR software
- Optional transparency adaptor
- Optional automatic document feeder

**At £699 (excl VAT), the Black Widow ScanPRO 9636 SP is the cheapest 36-bit colour flatbed scanner available. Colour quality is very good – better than most 24-bit models – but it is slow and, if you want a good, fast all-rounder and can make do with 300 or 400dpi resolution, you could find a model for half the price.**

- £699 (excl VAT)
- Devcom International: 01324 825999

### Black Widow ScanPRO 9636 SP

Performance	★ ★ ★ ★ ★
Build quality	★ ★ ★ ★ ★
Features	★ ★ ★ ★ ★
Value for money	★ ★ ★ ★ ★
<b>Overall</b>	★ ★ ★ ★ ★



**B**lack Widow's ScanPRO 9636 SP is a 36-bit colour, single-pass flatbed scanner. Flatbeds are the most versatile type of scanner, able to capture photos, prints, pages of text for OCR, and accommodate thick originals, such as open books, under a half-open lid.

A scanner's true resolution is known as its optical resolution, and is normally either 300, 400 or 600dpi. Interpolation is the process of making up in-between values to increase the theoretical resolution, although interpolating cannot invent detail that wasn't in the original scan. The 9636 has an optical resolution of 600dpi, which can be interpolated to 9,600dpi.

Average colour scanners capture 24 bits of colour – that's just under 16.8 million possible colours. The 9,636, however, is 36-bit, boasting more than 68.7 billion colours! But what for, you may ask, since most computers and colour scanners can only make use of 24 bits? The answer lies in a simple analogy. A car with a top speed of 70mph can only comfortably do 50mph. If you want to comfortably do 70mph, then you should really be looking at a car with a top speed of over 100mph. The same thing applies to scanners. A 24-bit scanner may only produce 20 useful bits, while a 36-bit scanner should be able to come up with at least 24 good bits.

The 9636, like most flatbeds, is a SCSI device requiring a SCSI interface card fitted to your computer. You can use an existing SCSI interface to connect the 9636, or the supplied budget SCSI card. We successfully tried both.

Drivers are supplied for Windows 3.x or Windows 95. Under 95, cancel the 'found new hardware message' and run the supplied set-up program instead. You're asked to choose between Windows 3.x and 95, and the supplied SCSI card or the Adaptec SCSI card. The set-

up program then installs a suitable TWAIN scanner driver. Black Widow's TWAIN driver is excellent, with a huge range of options for the experienced user, or single-click auto exposure settings for the novice.

With the 9636 scanner, the supplier, Devcom, has included Image Pals II Go, an average photo-retouching application, and TextBridge V3 LE, a cut-down version of the popular OCR package. Many buyers will take up Devcom's offer of the superb full Adobe Photoshop 3 for an additional £149+VAT. Full TextBridge Pro is also available for an extra £129+VAT. It is possible to fit an optional transparency adaptor for scanning film, at £199+VAT, or an automatic document feeder, ADF.

The 9636 is hardly a speed demon. There are four quality settings, with the highest taking considerably longer. An A4 colour preview takes a lengthy 200 seconds in quality mode, compared to just 30 seconds in normal mode. An A5 colour photo scanned at 100dpi takes a minute-and-a-half in quality mode, or just under a minute in normal mode. Quality mode is worthwhile for final scans, but an infuriating waste of time for most previews.

Quality mode captures a full range of colours, as would be expected from a 36-bit model. However, the range is not as detailed in the dark shadow areas or generally as smooth as more pricey products from companies such as Agfa and Umax. Line-art resolving power is good, but not quite up to flatbeds costing a similar amount.

Even at the low price of £699+VAT, you're going to have to really want 600dpi and those extra bits of colour. True, the colour range is higher than any other flatbed at this price, but most users won't notice or care, and will be far better served by faster 300 or 400dpi 24-bit models costing half the price. ▶

# OmniPage Pro

Paul Wardley

The full Windows 95 professional version of the OCR program that comes bundled with many scanners in 'limited-edition' form.

- Built-in British spell-checker
- Multilingual capability – understands the alphabets of 11 languages
- Can output to 40 word processor, spreadsheet and database formats
- OLE support enables graphics to be edited from within OmniPage Pro
- 'Save as HTML' option for Web page design
- Can recognise faxes received by Microsoft Exchange
- Thumbnail page images always on screen to make document management easier
- True Page option retains page layout of the original document

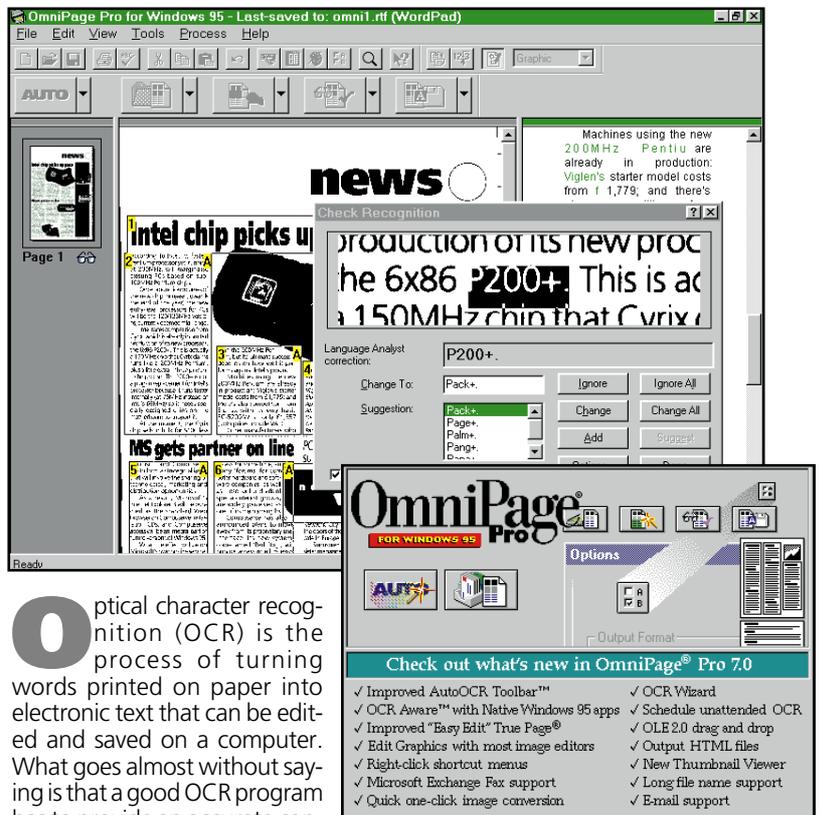
**OmniPage isn't perfect, but it is very good at what it does, largely thanks to the number of scanners and word processor formats it supports. Spend a day getting to know the program, and you'll soon have OmniPage working virtually automatically.**

- £470 (street price); £152 (upgrade from LE version)
- Caere: 0171 222 3200

### OmniPage Pro

Performance	★ ★ ★ ★ ☆
Ease of use	★ ★ ★ ★ ★
Features	★ ★ ★ ★ ☆
Value for money	★ ★ ★ ☆ ☆
<b>Overall</b>	<b>★ ★ ★ ★ ☆</b>

Minimum requirements: 386DX, Windows 95, 8Mb of RAM (16Mb recommended)



Optical character recognition (OCR) is the process of turning words printed on paper into electronic text that can be edited and saved on a computer. What goes almost without saying is that a good OCR program has to provide an accurate conversion of the printed text, but almost as important is how much of the job it can do for itself without human intervention. After all, an operator spending time tweaking an OCR program to make it work could just as easily be retyping the text.

OmniPage follows what has become the standard sequence of events in optical recognition. First, it loads a scanned image, then, in a zoning process, it works out how blocks of words and graphics are arranged. The next stage is to recognise the words and display them for checking, and finally, the resulting text is saved onto the hard disk.

OmniPage is extremely easy to use, thanks to its simple interface. There are five prominent control buttons, four representing the above tasks, with the fifth 'auto' button setting the whole chain of events in motion. Although OmniPage also sports the usual mass of menus and toolbars common to all Windows programs, in everyday use you can get by with just the main five buttons – and you can even arrange the screen so that these are the only controls you see.

Each button has two sensitive areas – the left-hand side starts the process and the right-hand side drops down a list of options. The loading button, for example, has two options – to scan a document now or use one you scanned earlier; and the zoning button offers a choice between manually selecting the zones or letting the program decide where they are. The best way of using OmniPage is to select all the options for all four stages,

and then click on the 'auto' button which runs through them one after the other. Once you've got the options set to your liking, similar documents can be recognised just by clicking again on 'auto'.

We tried OmniPage on different types of document, from simple laser-printed letters to difficult *WhatPC?* news pages with a complicated mix of columns, fonts and pictures. As expected, laser printing was recognised with almost 100 percent accuracy and, by choosing to retain original font and paragraph styles, the resulting documents needed little or no editing.

OmniPage can also use 'True Page' settings, for which it attempts to create the exact layout of the original document. So, if your paper document uses multiple columns with embedded graphics, OmniPage will save the page in your word processor's format, using frames to duplicate the original. This might look like the original, but can be quite difficult to edit because text will not flow from frame to frame as it does from column to column in a word processor. A workaround lets you remove frame frames when saving, but this can degrade the fidelity of the layout.

The *WhatPC?* news pages were only a partial success. OmniPage had problems with headlines spanning multiple columns and tended to split them up. In general, the program seemed to cope better with smaller fonts than large, and on certain kinds of closely-typed pages, it put in superfluous carriage-returns at the end of each line instead of after each paragraph.

## Olivetti M24 New

**Dominic Bucknall**

*A low-cost Pentium desktop aimed at the small business and educational user, named after the original M24 launched in 1984.*



- 133MHz Pentium processor
- 256Kb asynchronous secondary cache
- 8Mb of fast-page RAM
- 1.2Gb EIDE hard disk
- 1Mb D-RAM graphics controller
- 14in monitor
- Windows 95
- Microsoft Works 4

**As a plain, no-frills system offering adequate performance and storage at a relatively affordable price, the M24 New should find a number of takers. The monitor could be better and there isn't much room for expansion but, otherwise, this is a solid, if unremarkable machine.**

- £1,291
- Olivetti Personal Computers: 0800 447799

### Olivetti M24 New

Performance	★ ★ ★ ☆ ☆
Build quality	★ ★ ★ ☆ ☆
Features	★ ★ ★ ☆ ☆
Value for money	★ ★ ★ ★ ☆
<b>Overall</b>	<b>★ ★ ★ ☆ ☆</b>

**T**he press release describing the M24 New reminded us of a few facts that we'd forgotten over the years. The original M24, now 12 years old, was based on an 8MHz processor with 640Kb of RAM, had a 10Mb hard disk and cost over £4,000. In other words, if there are any of them left in service, they are most certainly showing their age these days.

However, its eponymous successor has a few things in common with the M24 Mk1, namely a stripped-down, no-nonsense approach. The basic 133MHz model comes with 8Mb of standard, fast-page RAM, 256Kb of asynchronous secondary cache and a 1.2Gb hard disk, but no CD-ROM drive, soundcard or external speakers. Apart from helping to keep the price down, this is also recognition of the fact that many people don't want audio capabilities on their PC. Even so, we were a bit concerned about the omission of a CD-ROM drive – so much software is now being distributed on CD-ROM that a drive is almost an essential component.

The system unit is housed in a slimline desktop case which had a noisy cooling fan, but didn't suffer from any unnecessary adornment and could be opened without tools. The narrow border keyboard was very light, hollow-sounding and obviously inexpensive, but it had a moderately firm and pleasant action.

Despite a general trend towards flatter, squarer tubes for computer monitors, Olivetti is still knocking out displays with old-fashioned looking screens that are distinctly curved in both planes. The 14in unit supplied with the M24 was no exception and the convexity of the screen imposed a degree of distortion on the image which it would have been better without. There was also a general

lack of focus, which became more noticeable when the resolution was stepped up to 800x600, and while the screen remained readable it could have been sharper. At least flicker didn't prove to be a problem as the tube supported a stable 75Hz vertical refresh and the Windows 95 display properties tool had been modified to allow changes to the refresh rate to be made easily.

Space is something of a premium inside the case, but there's a single 5.25in front-opening drive bay free, along with an internal 3.5in mount underneath the power supply. The expansion slots are mounted horizontally on a riser board because of the lack of height in the case. There are three usable slots in all, giving a choice of two ISA slots and one PCI or two PCI and one ISA, depending on how the single shared slot is used. The lowest card will be shortened to three-quarter length regardless of type, thanks to the processor cooling fan/heatsink assembly.

The motherboard uses the standard Intel Triton chipset rather than the new Triton 2 version and the integrated Trident graphics controller has 1Mb of memory, with sockets for an upgrade to 2Mb. The cache memory is mounted on a module for easy replacement and two of the four RAM sockets are available for an upgrade in the likely event that you opt for 16Mb rather than the working minimum of 8Mb.

Performance wasn't outstanding, but everything remained within acceptable bounds. The Trident graphics controller coped with Windows reasonably well at 800x600 running in 65,536 colours and hard disk speeds were adequate. Overall the M24 New should meet up to the typical requirements of the small office or educational user for whom it was designed.