

PDA's & HPCs

3Com PalmPilot Professional

Hewlett-Packard 320LX

Nokia 9000 Communicator

Philips Velo 1

Psion 5

Psion 3c

Psion Siena

Today's PDA's let you do more than just organise your life. You can browse the Web, write a novel or catalogue the entire contents of your house, if you choose. We take a look at the current offerings



Photography by Bruce Mackie

Pocket POWER

Just as the Filofax was the best way to keep organised in the 1980s, Personal Digital Assistants (PDAs) are the modern equivalent. If you still use a paper diary, address book or notepad for your important info, then it's time to step into the 1990s and computerise it.

A good PDA can not only replace your diary and address book, it can offer word processing and spreadsheet facilities, a database, calculator, spelling checker, and even games. Some even have software that will let you connect to the Internet, send and receive e-mail and surf the World Wide Web. What's more, unlike the traditional bulging pile of paper, most will comfortably

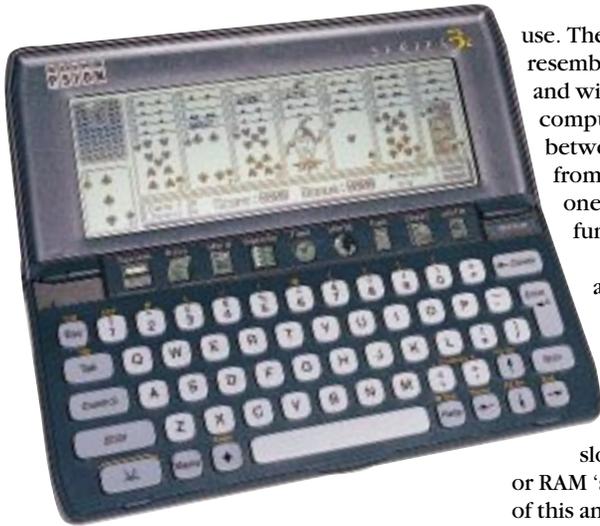
fit into a trouser or jacket pocket, and you don't have to be a yuppie to use one.

Over the next nine pages we test and compare the latest models on the UK market, including the new Microsoft Windows CE-based Hand-held Personal Computers or 'HPCs'. Although only two are officially available in this country at moment, from Hewlett-Packard and Philips, there are others around the world and Microsoft hopes these will become the industry standard. You can read more about the new Windows CE 2.0 on page 81.

So which PDA is the right model for you? Read on to find out.



Psion Series 3c



use. The 3c's menu system bears a close resemblance to the drop-down menus and windows of today's Macintosh computers and PCs. You can switch between applications by selecting from file lists or icons, or by pressing one of the nine touch-sensitive function keys below the screen.

Like the 3a before it, the 3c has a 480x160 display (black and white plus grey), and the now-famous double-hinged clamshell case. You won't find any PC Card slots here - Psion has opted for two proprietary slots which accept flash-memory or RAM 'solid-state disks' (SSDs). In spite of this and the fact that the built-in word processor, spreadsheet, and database aren't industry-standard applications, it isn't difficult to share files with your desktop PC. The file format is PC-compatible, the spreadsheet will read and write CSV or Lotus 1-2-3 documents, and Psion Word can load and save Rich Text Format (RTF) documents. This means you can transfer documents to and from Microsoft Word without losing formatting, such as bold text, different

Although it has recently been superseded by the Series 5, in some ways Psion's Series 3c is the better machine. Last of a long line of Series 3 machines, this model comes with backlit screen, infra-red communications, fast serial port and a comprehensive suite of built-in software applications.

Although there's no pen or mouse, this is a remarkably intuitive machine to

fonts, underlines, and so on. Psion supplies optional PsiWin software and a connector cable for backing up your files, or printing via your PC.

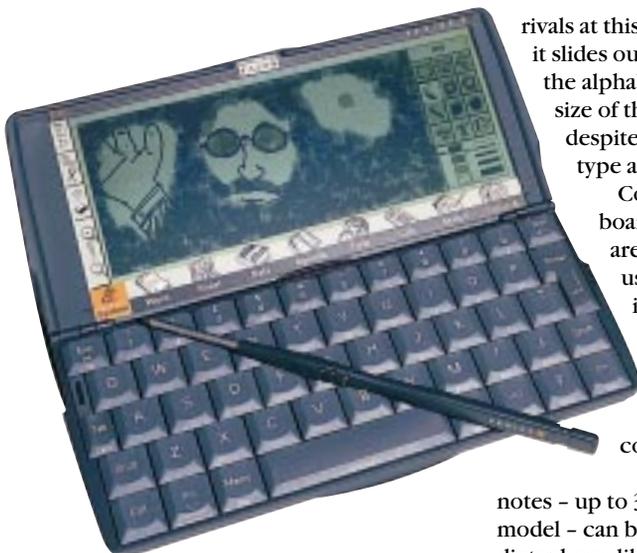
Finally, a big advantage the Series 3 range has over its rivals is its easy-to-use built-in programming language (OPL) with which you can write your own fully fledged software applications. As a result of this there are, to date, thousands of programs and utilities, available either commercially or on the Web.

Great software, great design, great battery life, small form factor. This may not have all the bells and whistles of the Series 5, but it is a very well-rounded machine and, with the recent price reductions, excellent value for money.

- £299.95 (inc VAT)
- Psion: 0990 143050

Psion Series 3c					
Build quality	★	★	★	★	★
Ease of use	★	★	★	★	★
Features	★	★	★	★	★
Performance	★	★	★	★	★
Value for money	★	★	★	★	★
Overall	★	★	★	★	★

Psion Series 5



rivals at this size. As you open the case it slides out to give a stable platform, the alphabetical keys are almost the size of those on a notebook and despite the close spacing, you can type at a reasonable speed.

Complementing the keyboard, the in-built applications are notable for their ease of use. They use a windowing interface - although it's not Microsoft Windows it does look instantly familiar - and are easy to control using either keyboard commands or a touch-screen pointer (provided). Voice notes - up to 30 minutes with the 8Mb model - can be recorded on-screen or by dictaphone-like buttons outside the case.

The built-in word processor mirrors many of Microsoft Word's key commands. It includes style-sheets and the ability to insert drawings from Sketch, spreadsheets and voice notes, making it a very capable package. The database is a trifle slow, but its split screen lets you see all the results of a search at once, and the diary, Agenda, isn't bad, although it still sorely lacks a month view.

Sheet, though, has come in for the most criticism. It has a good range of functions, is easy to program and generally resembles an early version of Excel. However, it doesn't have a sort function, which is essential if you want to order your data. Bugs include the inability to enter certain times correctly.

The biggest obstacle to usability is the Series 5's screen. It's very reflective and has poor contrast, making it almost unusable outside. The backlight helps, but is heavy on power. Around 15-20 hours from a pair of AAs seems about normal, even with only sporadic use of the light.

The keyboard lifts the Series 5 far above the level of just another competent PDA. Buy it now - as long as you don't need to sort your data.

- £439.95 (4Mb), £499.95 (8Mb) (inc VAT)
- Psion: 0990 143050

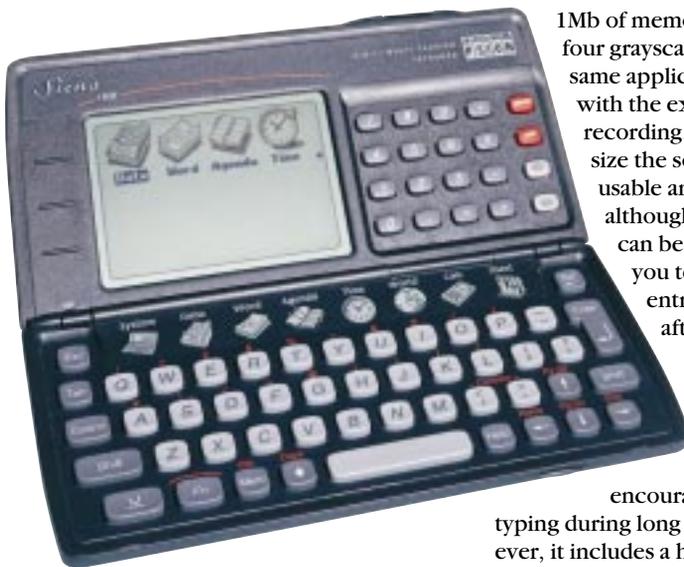
Psion Series 5					
Build quality	★	★	★	★	★
Ease of use	★	★	★	★	★
Features	★	★	★	★	★
Performance	★	★	★	★	★
Value for money	★	★	★	★	★
Overall	★	★	★	★	★

It's an oft-quoted rule of product journalism that, wherever possible, your review should be written using the product itself. With a notebook this is easy; with voice recognition software it's interesting. But with many PDAs it's nigh on impossible.

The Series 5 is different, boasting a notebook-style keyboard that has no



Psion Siena



The baby of the Psion organiser family, the Siena, was introduced at the same time as the bigger 3c. Sporting a more compact and stylish design, it can easily slip into a shirt pocket or handbag and yet offers just about everything you could want from a PDA.

The Siena comes with either 512Kb or

1Mb of memory, a 240x160 pixel four grayscale display, and the same applications as the 3c, with the exception of sound recording. Despite the screen size the software is perfectly usable and powerful, although the Agenda display can be a little cramped and you tend to customise entries to fit the display after a while.

The machine's smaller size also makes the keyboard a little fiddly at first, and encourages two-thumb typing during long periods of use. However, it includes a handy numeric keypad for quick entry of phone numbers and calculations that others don't have.

The Siena has no removable storage options, and so data must be backed up to a PC to keep it safe. The PsiWin cable and software are sold separately and will set you back extra £79.95. You'll also need this to add third-party applications.

The only real problems we found with

the Siena's design were both related to the battery compartment. First, whenever you replace the batteries the lid has to be snapped off, which makes you think you are going to break it. Second, our model occasionally decided that its backup battery was running low even when it wasn't - removing and replacing the battery cured the problem for a while. We've seen this on other Psions before, which could indicate a fault in the power management circuitry.

The Siena is an excellent machine and a perfect replacement for your bulky diary or address book. Its styling also makes it one of the most desirable looking models you can buy.

- £129.95 (512Kb); £199.95 (1Mb) (both prices inc VAT)
- Psion: 0990 143050

Psion Siena					
Build quality	★	★	★	★	★
Ease of use	★	★	★	★	★
Features	★	★	★	★	★
Performance	★	★	★	★	★
Value for money	★	★	★	★	★
Overall	★	★	★	★	★

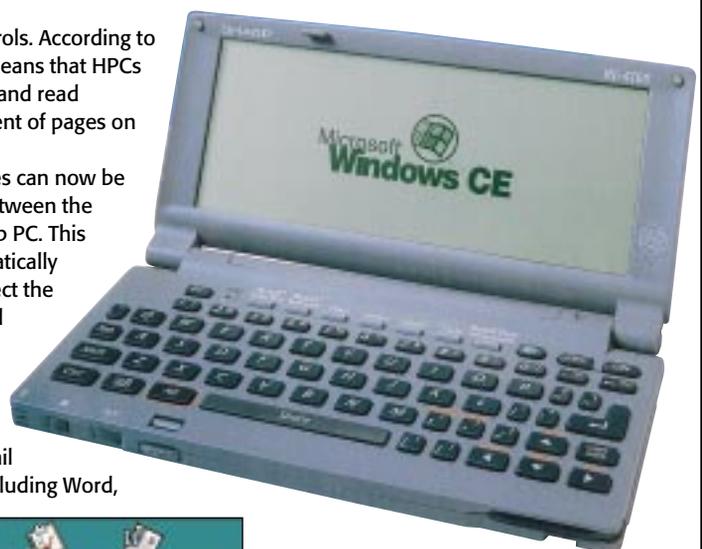
Windows CE2

Microsoft has recently updated its Windows CE operating system for HPCs (Hand-held PCs). CE2 includes support for colour screens, and a customisable user interface, as well as better memory handling, Ethernet access, and the ability to print directly from the HPC. The built-in software has also been updated, with improvements to Pocket Excel, Word and Explorer, and the addition of a new HPC application - Pocket PowerPoint. Using a special VGA adaptor, you can display full-screen presentations on a colour monitor or LCD projector.

Pocket Internet Explorer has been enhanced, with frames, cookies (personal preference files stored on your PC), and

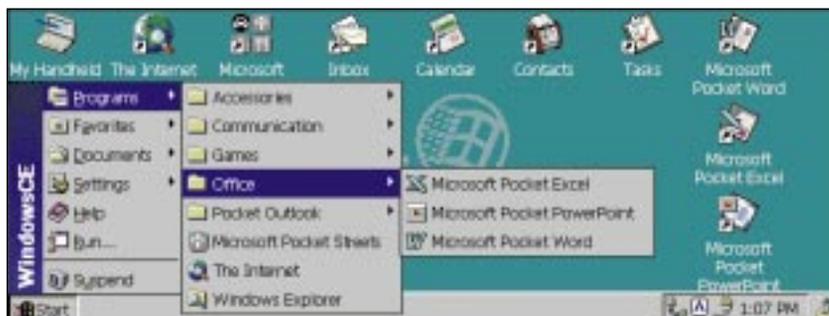
embedded controls. According to Microsoft, this means that HPCs can now access and read roughly 80 percent of pages on the Web.

E-mail and files can now be synchronised between the HPC and desktop PC. This happens automatically when you connect the two devices. And there's a new version of Pocket Outlook, which has support for e-mail attachments, including Word,



Excel, PowerPoint, and Web documents.

These improvements will close the gap between the seriously lacking CE1 and Psion's more advanced Epoc 32 operating system and applications (used in the Series 5). Expect to see a raft of CE2-based hand-helds in the first quarter of 1998, from companies such as Sharp, Philips, Compaq, LG, and Toshiba.



3Com PalmPilot Professional



The 3Com PalmPilot stands out from the other PDAs in this group test for one reason – it sets out to be an accessory to a desktop PC, rather than a replacement.

Physically, the PalmPilot is the smallest true PDA around and fits comfortably

in all but the smallest of hands. The reason for its compactness is the lack of keyboard – the PalmPilot's top surface consists entirely of a crisp, backlit screen.

Because there's nothing to type with, the PalmPilot relies solely on a touch-screen and handwriting recognition for input. If this sounds a little risky, it isn't and the PalmPilot can attain a 90 percent recognition rate within half an hour of using it for the first time.

The reason for this success is that the PalmPilot doesn't recognise your handwriting at all but has you write in a way it can understand, using a system called Graffiti. This is a series of simplified characters written with a single stroke of the stylus on the bottom of the PalmPilot's screen. The basics can be picked up in 20 minutes and recognition is both fast and accurate.

The PalmPilot has the usual selection of applications, with the exception of a spreadsheet. Four buttons across the bottom of the case switch between the agenda, address book, to do list and notepad, and four on-screen buttons activate such things as menus and the 'find' function. It's a tribute to the Palm-

Pilot's programmers that all of the applications can be picked up without recourse to a manual and other manufacturers would do well to mimic its intuitive design.

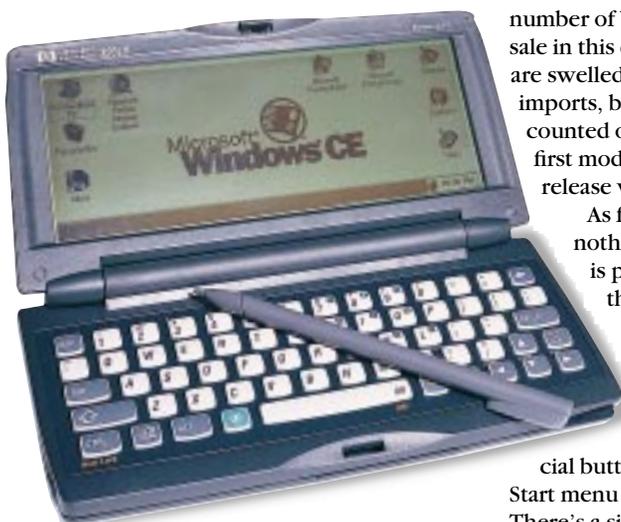
The final component in the PalmPilot's winning formula is the PC linking. It comes with a 'cradle' that connects to a serial port. With the software installed, drop the Pilot in the cradle, press the 'HotSync' button and information stored in the PalmPilot and mirror-image PC applications are rapidly synchronised.

Small yet perfectly formed, the PalmPilot Professional (and its cheaper siblings) is perfect for anyone who wants a pocketable PDA that doesn't skimp on features.

- £299 (inc VAT)
- 3Com: 0800 225252

3Com PalmPilot Professional					
Build quality	★	★	★	★	★
Ease of use	★	★	★	★	★
Features	★	★	★	★	★
Performance	★	★	★	★	★
Value for money	★	★	★	★	★
Overall	★	★	★	★	★

Hewlett-Packard 320LX



In the first half of 1997, Microsoft introduced a cut-down version of its Windows operating system called Compact Edition, or CE for short. It was designed specifically for use on so-called Hand-held Personal Computers (HPCs) and was seen as a serious challenge to Psion's stranglehold on the personal organiser marketplace.

Several months on, however, and the number of Windows CE-based HPCs on sale in this country is small. Their ranks are swelled slightly by so-called 'grey' imports, but the total can still be counted on the fingers of one hand. The first model to receive an official UK release was Hewlett-Packard's 320LX.

As far as palmtop computers go, nothing about the 320LX's design is particularly remarkable. It has the traditional clamshell-style case that flips open to reveal a liquid-crystal display (LCD) screen and a well-spaced Qwerty keyboard. This has 64 keys, and includes special buttons that call up Windows CE's Start menu and toggle the backlight. There's a single Type II PC Card on the left-hand side, and on the opposite side of the case is an IrDA-compliant infra-red port with a serial port nearby; a PC serial cable is also supplied in the box.

The 320LX has 4Mb of memory as standard, but this can be augmented by flash-memory cards. Two AA batteries power the unit on the move – providing around 20-25 hours of use – and a mains power supply is also included.

Like Windows 95, Windows CE provides the essential framework on which applications, such as a word processor or spreadsheet, can run. Unlike its desktop counterpart, however, Windows CE has some of these fundamental applications built into it. The main two – Pocket Word and Pocket Excel – are simply cut-down versions of Microsoft Office's anchor applications but others, such as the task list, have no PC relation. The applications look and feel much like desktop big brothers but on the 320LX at least, they tend to run quite slowly.

Hewlett-Packard's 320LX stands out as an admirable first attempt at making an HPC. Admittedly it's slow, but it is just like having a desktop PC in the palm of your hand.

- £528.75 (inc VAT)
- Hewlett-Packard: 0990 474747

Hewlett-Packard 320LX					
Build quality	★	★	★	★	★
Ease of use	★	★	★	★	★
Features	★	★	★	★	★
Performance	★	★	★	★	★
Value for money	★	★	★	★	★
Overall	★	★	★	★	★

Software and add-ons

Nowadays PDAs are expected to do a lot more than simply help you to organise your life. There's an increasing trend among PDA manufacturers to produce peripheral devices which connect through either a PC Card socket or another proprietary expansion slot.

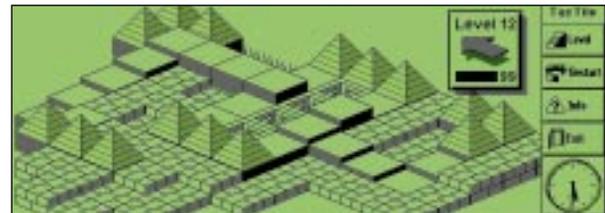
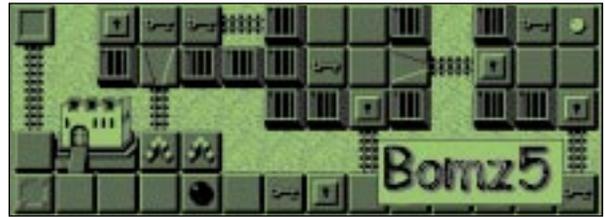
An example of this is Psion's Travel Modem device. The Travel Modem allows you to send faxes, and can also be used as a 14.4Kbits/s modem for data communications.

Software, too, is an area where there's plenty of scope for enhancement. Numerous third-party software developers are writing software packages for the leading PDAs. The Psion 3x series easily has the lead in this area, with well over 200 software titles available, and the range of titles for the Psion 5 is rapidly expanding. The kind of applications around include money management packages, Web browsers, route planning, foreign dictionaries, currency, the Bible and even games.

Others are catching up with Psion, though. The 3Com PalmPilot has spawned a barrage of Web sites

Right: Games are among the many applications available for the Psion series.

dedicated to the machine, and most of them carry shareware and freeware programs that can be downloaded. The same is also true for the Windows CE-based machines.



Left: Peripherals such as Psion's Travel Modem are becoming more common.

Nokia 9000 Communicator



It may look like a child's novelty pencil case but the Nokia 9000 Communicator is one of the most sophisticated PDAs around.

Externally, the Communicator resembles a standard, if rather chunky, mobile phone but release a catch on the right-hand side and its secret is exposed. The top half of the case hinges open clamshell style



to reveal a large LCD screen and Qwerty keyboard. Nokia's marriage of mobile phone and PDA means Communicator more than lives up to its name.

The phone part of the Communicator is based on the Nokia 2110 and it works just like any other GSM phone, using either the Cellnet or Vodafone networks (an Orange version is also available). PDA-wise, the Communicator offers a variety of applications,

encompassing such things as a notepad, contact list and calendar, all accessed by a row of blue buttons above the keyboard. The interesting buttons, though, are those labelled 'fax' and 'Internet'.

Unlike other PDAs, the Communicator has fully functional communication applications. It can send and receive faxes (via a separate telephone number) and has a graphical Web browser. Unfortunately, the 9.6Kbits/s communication speed limits what you can do on the Web but the browser can be switched

to text-only for improved performance.

Although the PDA applications are rather basic, they serve their purpose and have the useful extra of also being integrated with the GSM side of things. Make an entry into the contact list, for example, and the name and telephone number also appears in the telephone list. Any number can then be automatically dialled and you can use the Communicator as a hands-free speakerphone as you take notes on the notepad.

If you can't bear to be incommunicado for any length of time, then the Nokia 9000 Communicator is the simple answer. Beware though – although it's now much cheaper, browsing the Web over the GSM network is still pricey.

● £200-250 (inc VAT) with airtime agreement

● Nokia: 0990 0021 10

Nokia 9000 Communicator					
Build quality	★	★	★	★	★
Ease of use	★	★	★	★	★
Features	★	★	★	★	★
Performance	★	★	★	★	★
Value for money	★	★	★	★	★
Overall	★	★	★	★	★

Philips Velo 1



The Philips name might not have the highest profile in the computer industry but the company is one of the largest consumer electronics groups in the world. Its Velo 1 HPC was launched earlier this year, pitched as a direct competitor to Psion's Series 5 and HP's 320LX.

The machine's design is neater than that of the 320LX but its screen is consid-

erably smaller. Whereas its main rival's 15.7cm-wide screen can display 640x240 pixels, the Velo 1 can only manage 480x240 on its 11.8cms.

In all honesty, the screen size isn't a major handicap in most applications but it can prove to be a bit of a hurdle when it comes to browsing the Web. Most Web sites are designed for viewing on desktop PC monitors, which typically display at resolutions of 640x480 and beyond. On the plus side, the Velo 1 uses a software modem for hooking up to the Internet, which contrasts with a power-sapping PC Card modem necessary for similar operations on HP's unit. We must also point out that the Velo 1 can still make use of PC Card devices with an extra attachment.

Thanks to the Windows CE operating system, using the Velo 1 is much like using the 320LX but it's obvious that more thought has gone into the design of Philips' machine. There are keyboard shortcuts for all the applications and on the outside of the case is a button that initiates CE's sound-recording applica-

tion, so voice memos can be made without opening up the machine.

A few months ago we would have found it difficult to criticise the Velo 1's keyboard because most palmtop computers had similar designs. But with the release of the Series 5, Psion showed that a small form factor did not have to mean sacrificing a quality keyboard. With that in mind, although it's certainly no worse than most other palmtop manufacturers' efforts, the Velo 1's keyboard is a spongy disappointment.

Smaller screen aside, the Velo 1 is a better HPC than the 320LX. It is fast, has a bigger base memory (8Mb) and is overall a more stylish product.

- £599 (inc VAT)
- Philips: 0800 961445

Philips Velo 1					
Build quality	★	★	★	★	★
Ease of use	★	★	★	★	★
Features	★	★	★	★	★
Performance	★	★	★	★	★
Value for money	★	★	★	★	★
Overall	★	★	★	★	★

Geofox-One

Cambridge-based Geofox is the latest entrant to the PDA market with the almost eponymous Geofox-One. Rather than develop it entirely from scratch, Geofox has taken the easier approach of licensing the Epos 32 operating system used in the Psion Series 5. Round this software base, however, Geofox has put together a completely different system.

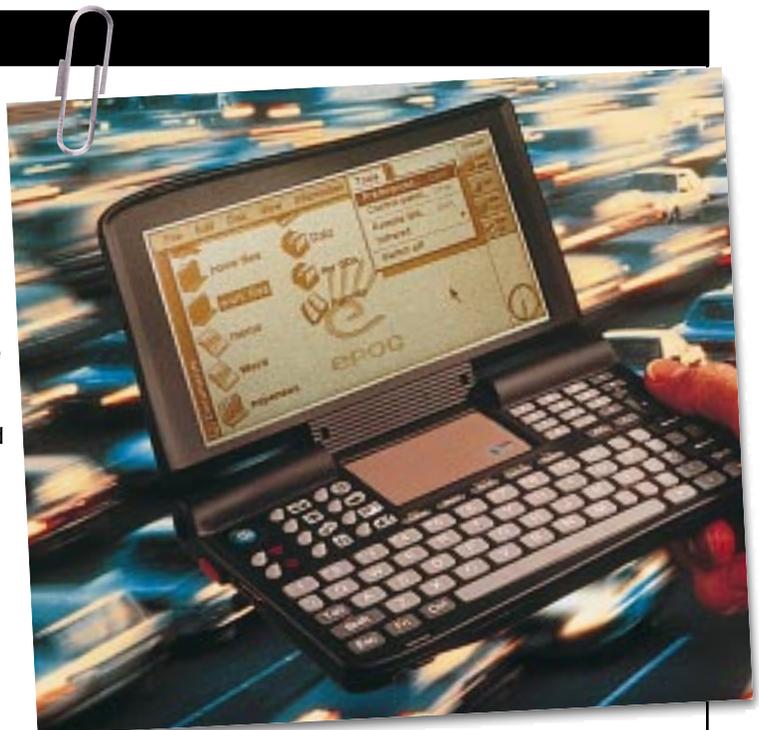
Although marginally thinner than the Series 5, the Geofox-One is longer and an inch wider. Much of this space is taken up by a screen that, at 640x320 pixels, is the largest fitted to any current PDA. Lacking a touch-screen membrane, this is much clearer than that on the Series 5 and has better contrast.

There's no pen, which has the advantage that there is one less thing to lose. To navigate there's a touchpad similar to that found on most notebooks – it is flanked by easy-access keys for the included applications and a numeric keypad. Unlike the Series 5, the keyboard has little rubber calculator-style keys: these are reasonably widely spaced and the overall impression is that it's not too different from the 3a or 3c.

The Geofox's applications are much the same as those built into the Psion, with

the addition of fax and e-mail software (available for the Series 5 by free download) and En Route route planning software for the UK and USA. Any applications developed for the Psion can also be run on the Geofox, and there's a good range.

Rather than use Compact Flash cards for expansion, the Geofox has a standard PC Card slot: using this for a modem will also require the mains adaptor. Memory shouldn't run short though: this baby is available in 4Mb and 16Mb models, while the Professional versions include both the mains adaptor and a PC Card modem.



- 4Mb standard £435; 16Mb standard £565; 4Mb Professional £605; 16Mb Professional £735 (prices inc VAT)
- Geofox: 0845 844 0109
www.geofox.com

Budget buys

If you like the idea of a PDA but can't stretch your budget to the models reviewed here, all is not lost. Several electronics manufacturers produce cheaper machines with many of the same functions on a smaller scale.

For around £11.99, Casio's pocket-sized databank DC2000 will store up to 130 telephone numbers. It has a two-line display, Qwerty keyboard, memo function, currency converter, reminder alarm and clock. The more powerful DC7700 at around £21 has a three-line display, can handle up to 625 numbers, and has a separate calculator keypad to boot.

If your budget can stretch to about £60, the Casio Digital Diary boasts all of the above plus 64Kb of memory, a four-line display, a backlit screen and can communicate with your PC.

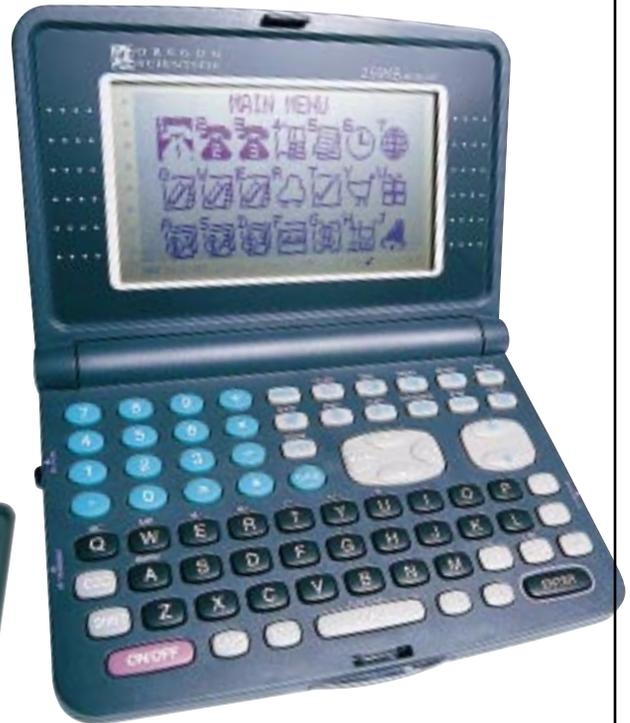
Oregon Scientific also makes a range of interesting gadgets, including the PC Pal organiser which works in conjunction with Schedule Plus.

Priced at £29.99, the Pal can 'read' information off the PC screen and download it into its own memory, allowing you to carry your contact information while you're on the move.

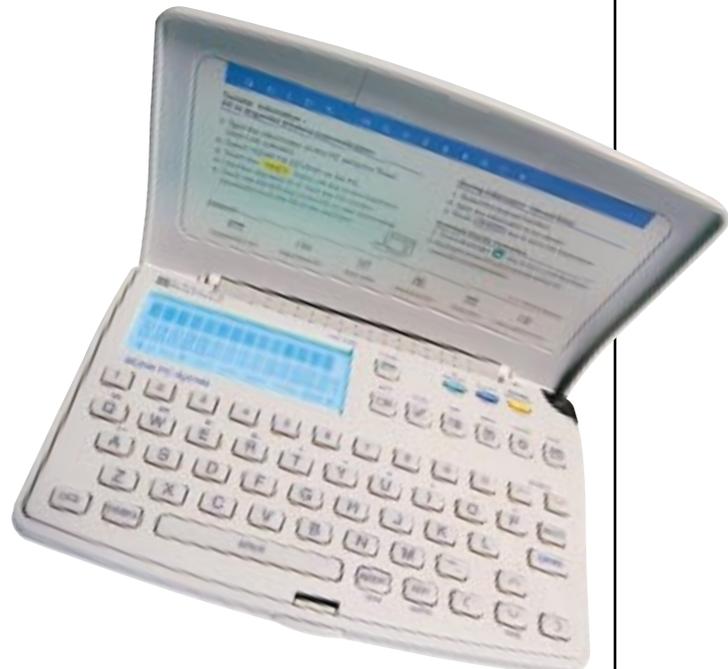
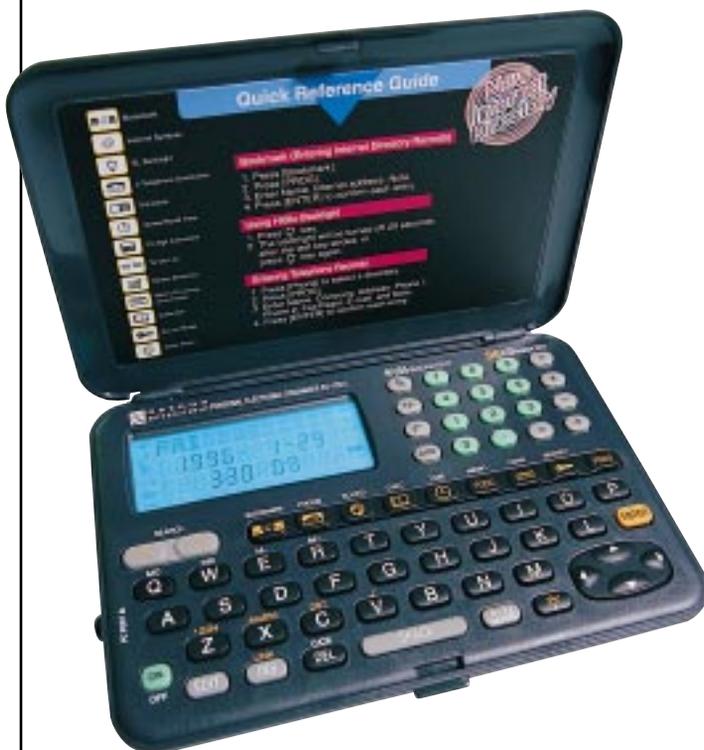
Oregon also makes a smart databank aimed at school children with storage space for over 300 addresses, metric conversion, alarms, world time and a built-in FM radio.

All of the products listed should be available in high street electrical retailers such as Dixons.

- Casio: 0181 450 9131
- Oregon: 01628 826688



There's a budget model for most tastes, from Casio's pocket-sized organisers to Oregon's databank for schools.



PDA's & HPC's compared

Product	3Com PalmPilot Professional	Hewlett-Packard 320LX	Nokia 9000 Communicator	Philips Velo 1 	Psion 5 	Psion 3c 	Psion Siena
Dimensions (wxdxh, mm)	120x81x18	183x94x29	65x174x36	173x96x30	170x90x23	165x85x22	150x73x19
Weight (grammes, inc batteries)	162	442	397	379	354	275	183
Screen resolution (wxh, in pixels)	160x160	640x240	640x200	480x240	640x240	480x160	240x160
Grey shades	black and white	4	8	4	16	4	4
Memory	1Mb	4Mb	2Mb	8Mb	4/8Mb	2Mb	512Kb/1Mb
Keys	None	64	71 (plus 20 for operations)	63	53	58	68
Quoted battery life (hours)	1,344-2,016	15-20	30	15-20	35	50	40
Card/expansion slots	None	1 x PC Card	None	Optional PC Card slot attachment	Compact Flash card slot, optional PC Card adaptor	2 proprietary	None
Pen based?	●	●	○	●	●	○	○
Diary/calendar	●	●	●	●	●	●	●
Word processor	○	●	○	●	●	●	●
Spell-checker	○	○	○	○	●	●	○
Spreadsheet	○	●	○	●	●	●	●
Database/contact index	●	●	●	●	●	●	●
Notepad/jotter facility	●	●	●	●	○	●	●
Drawing facility	●	○	○	○	●	○	○
Infra-red communications port	○	●	●	●	(IrDA)	●	●
Serial connection	●	●	Optional	●	●	●	●
Handwriting recognition	●	○	○	○	○	○	○
Mains input	○	●	●	●	●	●	○
Digital audio recording	○	●	○	●	●	●	○
Build quality	★★★★★	★★★★	★★★★	★★★★	★★★★	★★★★★	★★★★
Ease of use	★★★★	★★★★★	★★★★	★★★★★	★★★★	★★★★★	★★★★
Features	★★★★	★★★★★	★★★★	★★★★★	★★★★	★★★★	★★★★
Performance	★★★★	★★★	★★★★	★★★★★	★★★★	★★★★	★★★★
Value for money	★★★★	★★★	★★★★★	★★★★	★★★★★	★★★★★	★★★★
Overall	★★★★	★★★★	★★★★	★★★★	★★★★	★★★★★	★★★★

○ No ● Yes ★ = Poor ★★ = Below average ★★★ = Average ★★★★ = Good ★★★★★ = Excellent



The trouble with testing PDA's is that they're all pretty good nowadays. This is great news if you want to buy one but it made finding a winner harder than ever.

The Psion 3 series has always offered the most well-rounded package, but it looks dated now compared with its bigger brother, which comes with more memory and a larger screen. The HPC's are interesting, and the Philips machine is the best we've seen. The improved PalmPilot Profes-

sional is also great once you get the hang of its Graffiti handwriting system. In the end, our Best Buy award goes to the Psion 5 for its value for money, good applications, large storage space and outstanding keyboard.



With the Psion 5 taking the Best Buy award, the first of this year's Recommended devices has to be the Psion 3c. Although its design is quite old now it still

represents an excellent buy, and in many ways it is still better than anything else around at the moment, hence its five-star overall rating. If you can't quite stretch your budget to buy a Psion 5 then go for its older brother.

On the other hand, if you're looking for a Windows CE device then the best in the UK at the moment is the Philips Velo. It's fast, easy to use and includes a free upgrade to version 2 of the software in the box.

So our Recommended awards this year to Psion and Philips.