**If you're looking to buy a PDA this is the best place to discover the pros and cons of the 15 palmtops, handhelds and laptop replacements we've put to the test**

# Pocket

I f you're one of those people who spends a great deal of their time travelling, you've probably considered buying a personal digital assistant (PDA) to store important contact details and to keep track of meetings and events. For many of us, PDAs are becoming essential to help organise our hectic lifestyles.

When you do find the time to nip down to the shops to try one out, you'll most likely be met by shelves awash with a range of devices, each with its own unique features and stylish looks. Some come with built-in keyboards, modems and expansion slots, while others are purely stylus-driven and easily slip into the average pocket. The software varies widely, too.

Initially you have four different operating systems to choose from (EPOC, Palm OS, and Microsoft's WinCE and newer Pocket PC), which all appeal more or less depending on what you intend to use the PDA for. Add to this the fact that a whole host of third-party software houses have got in on the act, and you're presented with almost unlimited options. The one thing you can be sure of is that they all have touch-sensitive screens.

Deciding on the one most suited to you is therefore a tricky task, so in order to hack clear a route through the PDA jungle and help you make the right decision, we have rounded up 15 of these portable pleasures and given them a thorough going over.

# Power

## contents

• *PDAs tested and reviewed by Clive Akass, Jason Jenkins, Gordon Laing, David Ludlow, J Mark Lytle, Richard McPartland, Scott Montgomery, Lars-Goran Nilsson, Julian Prokaza, Nik Rawlinson and Jalal Werfalli*

PHOTOGRAPHY HUGH THRELFALL

## *Casio* **Cassiopeia E-115**      *PALMTOP*
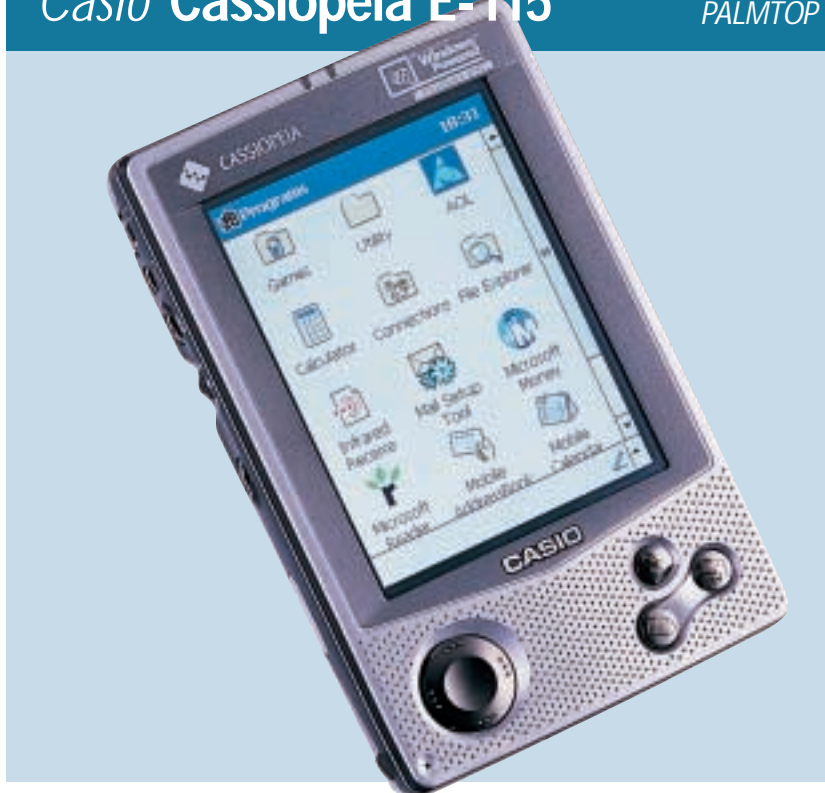
**QUICK TO TAKE** advantage of the success of the WinCE-powered E-105, Casio recently released the E-115 to replace it. Using the same 131MHz CPU, robust casing and TFT display the E-115 is essentially the same as the E-105, but differs in that it uses the Microsoft Windows Powered Pocket PC OS. WinCE 3.0 remains at the core of Pocket PC, but this has been modified with a new graphical user interface tuned to the specific requirements of palmtops. The RAM remains at a decent 32MB, which makes this one of the fastest palmtops here. Like all new Pocket PC devices the processor is backed up by 16MB of application ROM.

In the hand, the E-115 is a little chunky when compared to the slinkier offerings from Palm. In fact it is the biggest palmtop here, measuring 131.2 x 82.5mm (h x w), and boasting a full 20mm depth. It also tips the scales at a bulky 255g but this includes the lithium-ion battery, which has a quoted life of six hours on a full charge. Battery life will vary though if, for instance, you have the screen constantly set at its highest contrast level or use the power save mode.

The casing is very similar to the E-105 with a pewter-type finish and grey border to the screen. Under the display are three application launch buttons giving you one-touch access to the main Casio menu, the calendar and the contacts application. These are joined by a four-way pad used for game playing or navigating icons and menus. Another launch button is located on the left side of the unit, giving a direct route to the

Pocket PC Start menu. All of these buttons are programmable, and so can be used to open any alternative application. An IrDA port is on the side accompanied by a bi-directional selection controller and a button to activate the in-built voice recorder.

The 65bit colour, 240 x 320 resolution active-matrix TFT display provides a bright image and enough contrast to easily read text – a boon when viewing the Cleartype text employed in the Microsoft Reader applet that comes with the Pocket PC OS. In this way, the Casio can be used as an electronic book, albeit displaying only around 100 words at a time. Nevertheless, we could imagine using it on the train to work. Available titles are rather limited at the moment but Microsoft does bundle 29 in the Extras folder on the ActiveSync 3.1 CD-ROM supplied with each Pocket PC.

ActiveSync is the synchronisation program that links Windows-based PCs and the Pocket PC operating system. We had no trouble installing the software, which continuously and automatically synchronises your personal information, keeping everything up to date. Linking this up to a PC, we found that it didn't take long to synch with our Outlook database and transfer our contacts to the E-115. The only gripe we have is that Casio has packaged a serial cradle and therefore data exchanges are slower than the USB-enabled cradles that come with the Visor, Jornada 548 and Compaq iPAQ.

If you're in need of an MP3 player, you have all you need in one handy unit, backed up by 32MB of storage. With the

new Windows Media Player for Pocket PC you can play files in MP3 format as well as asf (advanced streaming format), wma (Windows Media Audio) and wav (waveform) formats. Bear in mind, though, that downloading MP3s over the serial cable does take a while. Although the audio quality produced by the small built-in speaker is rather poor, the stereo output from the earphone jack is good. Extra multimedia offerings can be found on the Casio CD. As well as a demo golf game, this contains copies of Casio's Mobile Video player, Enterprise Harmony 99 and Mobile Camera. The video player lets you play cdf (Casio Digital Format) movies, while Enterprise Harmony allows you to convert PIM (Personal Information Manager) data from a Palm to the Cassiopeia. Mobile Camera supports Casio's optional digital camera card that slips into the Compact Flash (CF) slot located at the top of the E-115.

This slot supports both Type I and Type II CF devices, which means more expansion with the possibility of using Compact Flash modems, Ethernet cards and hard drives such as IBM's 340MB Microdrive module. Plug in one of those and your MP3 library will have a second home.

On the right-hand side you'll find the rather non-descript stylus, which can be used to tap around the icons, scribble notes or tap on the graphical Qwerty keyboard. With the extra speed the E-115 packs in we found it could easily keep up with our stylus movements, but using the text-recognition software did slow things down somewhat.

Overall we are fairly impressed by the Casio, and especially with its multi-media functions. All this comes at a price, though, and some may not want to fork out £499 for a PDA that would stretch most shirt pockets. On the other hand it has expansion possibilities, is easy to use, and is pretty fast.

**JALAL WERFALLI**

## DETAILS

**PRICE** £499 (£424.68 ex VAT)
**CONTACT** Casio 020 8450 9131
**www.casio.co.uk**
**PROS** Nifty processor; 32MB of RAM; Compact Flash slot; excellent display and stereo sound
**CONS** Serial cradle; fairly bulky and a tad overpriced.
**OVERALL** Sticking with a formula that worked for the E-105, Casio is hoping that the new Pocket PC-driven E-115 will fare even better than its illustrious predecessor. However, its pricing and size may hold it back

| | |
|---|---|
| FEATURES | ★★★★ |
| EASE OF USE | ★★★★★ |
| VALUE FOR MONEY | ★★★ |
| OVERALL RATING | ★★★★ |

# *Compaq* **Aero 1550**

*PALMTOP*



**IN THE RUSH** to get machines to market, Microsoft's Pocket PC launch partners were, to be honest, a little unimaginative. Take Compaq, for example. While its recently released iPAQ has all the bells and whistles to get the very best from the OS, in contrast the Aero 1550 looks and acts (and to all intents and purposes is) exactly the same as earlier Aeros that shipped with Windows CE. That's not to say it's an awful machine – far from it. As with all the other units on test, it all depends what you want from a PDA.

OK, it won't win any design awards – but the sleek silvery casing does the job and as it measures just 130 x 79 x 12.7mm (h x w x d) it'll fit nicely into a bag or even a pocket. At last, a true, 'pocket PC'. It's also one of the lightest machines on test, weighing in at just 150g (battery included). Of course, looks alone do not a great machine make. Luckily, the 1550 also has a respectable specification to match with a 70MHz MIPS R4111 processor and 16MB of RAM under the hood. It might not be the most powerful unit on test but the fact remains that it runs the OS perfectly well.

Unlike newer Pocket PCs, the Aero has a mono screen with a 4.02in viewable diagonal. This is capable of displaying 16 greyscales. There's also a backlight with two settings ('ambient' and 'on', the former of which is a half-strength light) and this illuminates the display effectively. Truth be told, we'd rather play a game of golf where the green is, well, green, regardless of how quickly our batteries drained, but as a budget choice the 1550 is hard to beat.

Elsewhere the Aero boasts the standard compliment of programmable buttons, although the fact that there's no joypad-style directional navigation pad means playing games isn't as easy as on, say, the Cassiopeia. The Aero's stylus is a sturdy number, held conveniently out of harm's way in a slot that runs from the top of the unit down the back. When compared to the 'coffee stirrer' that comes with HP's Jornada, we know which we'd prefer using on a day-to-day basis.

The unit's Type II Compact Flash slot is conveniently located at the top of the machine, and this provides access to a wide number of peripherals as well as storage cards. However, before you plug in your card make sure you remove the 'dummy' card provided to prevent damage to the slot. There's also an IrDA port for transferring files to other PDAs or notebook computers.

When it comes to battery life, the benefits of running a monochrome screen are clear. Compaq claims the unit can eek 14 hours of normal usage from a full charge of the 1,000mAh lithium-ion battery, which is hidden behind a compartment at the base of the unit. In our tests we just about met Compaq's target. Compare this to the eight hours promised by most colour PDAs. There's also a backup battery to provide some data security should your main battery run dry.

Recharging the unit is a simple matter of popping the Aero into its cradle and then plugging in the AC adaptor. You can also charge the unit independently if you so choose. The cradle allows you to synchronise data with or even back up your device to your desktop PC. Unfortunately the serial lead is moulded into the cradle itself, so if it gets damaged you'll need to shell out for a completely new cradle. When it comes to transferring data, the unit relies on the latest version of Microsoft's ActiveSync software, which is simple to use and easy to set up to meet your requirements.

Like most other Pocket PC manufacturers, Compaq has provided its own utilities to fill what it considers to be gaps in the Pocket PC OS. In Compaq's case this means QMenu and QUtility. The former allows you to switch between tasks, close programs, adjust settings and check on your battery life. The latter includes system diagnostics, the ability to change application button functionality and a handy utility to back up your device to Compact Flash cards. There are also a number of viewing utilities, calculators and the like on the CD-ROM that comes with the machine.

Overall, the Aero is hard to fault. It's a handy, compact machine that brings you all the benefits of the Pocket PC operating system at a (comparatively) reasonable price. This said, running the OS in monochrome seems a bit of a waste. If you just intend using the device for contacts and the like, you may as well go for a cheaper system as it will probably suit your needs just as well. If it's a Pocket PC device you crave, it could be worth going the extra mile for a colour screen. It's also worth pointing out that with quite a few applications onboard, the Aero 1550's system does slow down to a crawl (particularly when you're multitasking). Although it's easy enough to uninstall some of your least used programs, if you see yourself as a power user then going for a 32MB device would be a better bet.

**RICHARD MCPARTLAND**

## DETAILS

**PRICE** £269.08 (£229 ex VAT)
**CONTACT** Compaq 0845 270 4000
**www.compaq.co.uk**
**PROS** A competitively priced Pocket PC system; slimline unit
**CONS** Not a machine for power users; monochrome screen doesn't get the best from the Pocket PC OS
**OVERALL** This is a machine for the non-demanding user who likes what the Pocket PC OS can offer but doesn't want to shell out excessive amounts of cash

| | |
|---|---|
| FEATURES | ★★★ |
| EASE OF USE | ★★★★ |
| VALUE FOR MONEY | ★★★ |
| OVERALL RATING | ★★★ |

## Compaq iPAQ H3630

*PALMTOP*



**PROBABLY THE MOST** distinctive palmtop, the iPAQ H3630 doesn't fail to turn heads. The slender silver and chrome case is definitely pleasing to the eye, while its size just passes our coat and shirt-pocket test. Not everything about the iPAQ is about aesthetics though. Beneath the hood is Intel's beefy 206MHz StrongARM SA-1110 RISC processor – equivalent to that found in Hewlett-Packard's Jornada 720. This is backed up by a full 32MB of RAM making this, at least on paper, the quickest Windows Pocket PC here.

To test its speed and multitasking abilities a copy of Pocket TV was loaded from www.mpegtv.com allowing us to play mpeg files. This didn't trouble the iPAQ, so to make things a little trickier we triggered an MP3 to run in the background. Impressively the iPAQ could handle both at the same time. An added bonus is that you can upgrade the operating system when new versions become available. This is because the OS is stored in the flashable ROM. It also means you don't have to use the Pocket PC OS, with some users already trying out Linux on their iPAQs.

The unit isn't boxy and possesses rounded sides that feel very comfortable in the hand. The metal front gives the device an element of quality and robustness. It is a shame that the plastic back doesn't get the same treatment. Nevertheless, this does keep the weight down to 190g – lighter than its closest rivals, the Casio E-115 and the HP Jornada 548. The layout of the buttons is well thought out, too, with most positioned on the front of the unit, except

for the voice recorder button located on the left side. The four-way control pad can also be pressed to select items and doubles up as the speaker unit.

The sound quality from this is OK but plugging a pair of headphones into the 3.5mm earphone jack will do your MP3 collection more justice. The on/off button is in the top right-hand corner and if held for a second or so switches on the backlight. The remaining four buttons are application launchers that are now a familiar sight on the majority of Pocket PCs. These launch the calendar, contacts, program menu and Compaq's own quick-launch utility.

Along the top of the H3630 are the stylus silo, stylus eject button, IrDA port, microphone and 3.5mm earphone jack. On pressing the eject button, the stylus tip pops up allowing it to be easily slipped out. One note though: the stylus is asymmetrical so should only fit into the silo one way, but it doesn't. In fact, it is possible to slide it back incorrectly, causing it to get stuck. If you fall victim to this minor design fault, you'll need a good pair of fingernails to pull the stylus back out. The IrDA is in our preferred 'top' location and is good for connections of up to115Kbits/sec.

Compaq has not built in an expansion slot, but instead has included a socket designed to interface with its own expansion packs, which are available as optional extras. These are Compaq's answer to the Springboard modules designed for the Handspring Visors. Currently there's a choice of two packs (also known as jackets) – the PC Card and battery combo (£76 ex VAT)

and Compact Flash card module (£31 ex VAT). These jackets slot over the back of the iPAQ and grip its sides, making the device a little bit larger. Nevertheless, these do promise to diversify the H3630's role in terms of storage and connectivity, and should let it take advantage of future technologies such as GPRS and Bluetooth.

The touch-sensitive TFT LCD screen has a resolution of 240 x 320 pixels and with the backlight on it looks great. Contrast is also good and we were able to read it outside in the sunshine. In addition, Compaq has built in a unique ambient light sensor that automatically optimises the brightness and contrast of the display. The screen only has 4,096 colours while the Casio can handle 65,000. This is not a major niggle but the display on the Casio does look a little richer.

Resembling a horse's hoof, the cradle complements the iPAQ perfectly and is USB-enabled for faster data transfers and tight synchronisation using Microsoft's ActiveSync 3.1. Two stylus holders are also positioned on its front, but you have to question the need for these. Still, it's another design touch indicating Compaq's attention to detail.

In terms of software the usual Pocket PC programs are present, together with some of Compaq's own custom applications: QUtility, QStart and Picture Viewer. QUtility is a suite of utilities that let you backup or restore to a CF card, run system diagnostics, reassign the application buttons and adjust the screen contrast. QStart is a handy application that enables users to create a customisable menu, while Picture Viewer lets you display jpeg and bmp image files.

In summary, the Compaq iPAQ H3630 has been one of our favourites since its launch. However, supply has become limited as a result of high demand and if you can get your hands on one then consider yourself lucky. We have been informed that Compaq plans to release another wave of iPAQ handhelds in the coming months.

**JALAL WERFALLI**

## DETAILS

**PRICE** £448.85 (£382 ex VAT)
**CONTACT** Compaq 0845 270 4000
www.compaq.co.uk
**PROS** Pleasing aesthetics; fast processor; quality screen and flashable ROM
**CONS** No built-in expansion slots; asymmetrical stylus can get stuck
**OVERALL** Excellent design and performance – the only downfall is the bulkier jacket expansion system that comes as an optional extra

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|---|---|
| **FEATURES** | ★★★★ |
| **EASE OF USE** | ★★★★★ |
| **VALUE FOR MONEY** | ★★★ |
| **OVERALL RATING** | ★★★★ |

# *Handspring* **Visor Deluxe**   *PALMTOP*



**THE VISOR'S GENERAL** layout is rather similar to that of the Palm models. This isn't surprising since the Handspring company was set up by Jeff Hawkins – who started Palm Computing in 1992 – and Donna Dubinsky (former CEO of Palm Computing). In 1999, they launched the Visor line of PDAs. These include the Visor Solo, which has 2MB of RAM onboard and comes without a cradle; the Visor, which includes a cradle; and the Visor Deluxe, on test here, which comes with a USB cradle and 8MB of memory. The ROM remains at 2MB in each case. The Visor we tested was called the 'Ice' flavour, but the unit is also available in translucent blue, green, orange and an opaque graphite. The CPU is a 16.6MHz Motorola Dragonball – identical to that in the Palm M100 and IIIe.

The Visor comes with a protective cover that easily snaps on and off. This protects the backlit LCD screen and the HotSync port. Underneath the cover is a power switch, four application buttons and up and down scroll buttons, all sitting in the familiar Palm positions, hinting at the Visor's heritage. Upon closer inspection, the power button has a small green dimple on its surface allowing the user to activate the unit using the stylus. Indentations are present on the other buttons, too, except the ones used for scrolling. As with other Palm OS devices, if the ambient lighting becomes too low you can hold down the power button to activate the backlight. However, this works by reversing black characters into

a blue-green colour for a 'negative' appearance. This is fine at night but when some lighting is present it tends to make things harder to read. We would have preferred it if Handspring had chosen the more standard 'positive' backlighting as seen on other PDAs. The buttons themselves all respond positively when pressed, making an audible click to indicate that they have been operated.

The chrome and plastic stylus is located to the right side of the unit and slips smoothly out of its home. On first inspection this looks like any other Palm stylus but after a little fiddling we found that both ends screw off to reveal some useful tools. At the nib end is a small plastic prong for pressing the reset switch on the back of the Visor, while at the top is a small screwdriver for opening up the case. As for writing on the screen, it is the same as the Palms. The Graffiti area where you write the characters is also similar, although beside the Menu icon is a small half-shaded circle that, when tapped, invokes the contrast adjust application. Overall, the Visor's display is clear in good light and comparable in terms of sharpness to other monochrome screens.

Around the back of the unit, you'll find a compartment for two AAA alkaline batteries that should last for up to one month depending on use. Handspring also includes an infra-red port for sending and receiving data from other IR-enabled Palm OS devices. If you want to use the IR for HotSyncing you'll need the help of third-party software, or otherwise use the USB

cradle. For those without a USB-configured PC a serial cradle is available for around £25 ex VAT.

Moving the IR port over to the left side has allowed Handspring to accommodate the Visor's unique selling point – the Springboard slot. Positioned at the top, this 68-pin connector accepts the range of Springboard modules slowly filtering onto the market. These include an 8MB memory expansion module, a backup module, a digital camera and a golf game. When they become available, it will also accept an MP3 player, GPS receiver, Bluetooth and modem modules. These are hot-pluggable, and range in price from £118 for the EyeModule digital camera to £30 for the backup module, all ex VAT. You may question the need and price for some of these but there's no denying that the Visor is multipurpose. It remains to be seen how end users pick up on this technology.

Each Springboard module works with the Visor's version 3.1 Palm operating system. This version lacks some of the features of 3.3 and 3.5, such as support for colour screens, and since the Visor doesn't use Flash memory you can't upgrade it. However, Handspring has included some little extras, such as Datebook Plus, Advanced Calculator and CityTime. The Visor Desktop application is largely the same as Palm's software but has been tweaked to include support for the Mac and, of course, USB synchronisation. This means that your diary, contacts database or emails can all be uploaded directly to the Visor without too much of a problem.

On the whole, at £199 inc VAT the Visor Deluxe represents good value for money. For £50 more than the Palm IIIe you get a USB cradle for faster synchronisation, four times more memory, and the promise of multifunctionality thanks to Springboard. All in all, a decent PDA that's definitely worth a closer look.

**JALAL WERFALLI**

## DETAILS

**PRICE** £199 (£169.36 ex VAT)
**CONTACT** Handspring
020 7309 0134
**www.handspring.com/uk**
**PROS** Expansion possibilities; decent value; USB cradle and a neat little stylus
**CONS** Lack of Flash memory for OS upgrades; limited infra-red
**OVERALL** If you're looking for a pocket-sized organiser that has the potential to be a lot more, then you should consider checking out the Visor Deluxe

| FEATURES | ★★★★★ |
| EASE OF USE | ★★★★★ |
| VALUE FOR MONEY | ★★★★★ |
| OVERALL RATING | ★★★★★ |

## HP Jornada 548

*PALMTOP*



**WE FIRST TOOK A** look at the Jornada 545 in our July issue. The 548 is identical to that unit, but comes with 32MB of memory rather than the 16MB in the 545. HP was the first manufacturer to have an entirely new Pocket PC available at the launch of Windows CE 3.0. But even now that we've had a chance to take a look at the competition properly, we're still impressed. The 548 runs the palm-sized version of Windows CE 3.0. HP has customised this slightly, and solved the few problems we had with the basic version. It is much easier to manage the available memory, for example, the HP task switcher can be used to close down open programs much more easily than going into the system settings. HP has shunned Microsoft's Today screen in favour of its own Home Menu (although the Today screen is there if you want to use it). The Home Menu consists of a series of program shortcut icons to stop you having to go through the Start Menu, and speeds things up a bit.

Underneath the casing sits a 133MHz Hitachi SH3 processor that keeps everything moving at a usable pace, and the 32MB of memory is a good amount for the OS. The display looks very impressive. The 240 x 320-pixel backlit screen is extremely clear, with the pixels very finely defined. Text is extremely easy to read, and programs that make good use of colour look excellent. The screen itself is capable of displaying 16bit colour, but unfortunately the graphics chip inside the 548 can't support this, effectively making the image a 12bit

imitation. This fact only came to light after the launch of the 540 series, but it will only affect a small number of people. If you want to view high-quality colour images on your pocket PC, though, you'll need to look elsewhere. The backlight automatically dims after a user-defined period to extend battery life, which is quoted as eight hours.

On the side is a scroll/action wheel – this rocks up and down to scroll through the current window or menu, and you can press it inwards to select the current highlight. A button for recording memos is situated below. This is much more difficult to press accidentally than that on the previous Jornada, and is recessed. An IrDA infra-red port has been placed at the top left of the device, and next to this is a Type I Compact Flash slot. Ideally, we would prefer to see a Type II slot for IBM's Microdrive, but it is difficult to see how HP could have achieved this and still maintained the Jornada's thin form factor – the device is, after all, only 16mm wide. A headphone jack is provided next to the Flash shot. Four customisable hot keys are positioned on the front of the device, and these open up the most frequently used applications.

It is very easy to connect the device to your PC. Both serial and USB cables are supplied as standard. Fitting the Jornada into the supplied docking cradle automatically syncs it with the PC, depending on the options you selected when setting up the ActiveSync software. You can also plug the cradle into the mains to recharge the batteries at the same time – a very useful feature.

One of the most noticeable features of the 548 is the lid, which does not fold flush with the rear of the unit, something that we don't like, but this does have the advantage of shielding the fairly reflective screen from lights. If you don't like it, it is easily detached, but then the screen won't be protected from knocks and scuffs. The lid is also the repository for the stylus. We don't like the stylus – it is about the same weight and consistency as an average coffee shop disposable spoon. Some people do like it, though, and its lightweight nature keeps the unit's overall weight down, so maybe it's more a matter of taste.

HP has provided a massive amount of software that covers most of the conceivable uses of this device. In addition to the standard Pocket PC software, such as Outlook, Word, Excel, Internet Explorer and Media Player, HP has thrown in other programs including MusicMatch Jukebox 4.4, AudiblePlayer 2.0, PhatWare HPC Notes 3.03 Lite and ZIO Golf.

Compared to the other three Pocket PC devices on test, this one has some unique selling points. The iPAQ seems to run a little faster, but crucially does not have the expansion potential of the 548. The Compact Flash slot on the Jornada allows you to connect a multitude of products, and the fact that it is situated at the top means that it will be able to take protruding Compact Flash cards. If you want the extra functionality of Pocket PC, such as Media Player, Internet Explorer and Microsoft Reader, then the 548 is impressive enough underneath to deal with it. Syncing with Microsoft software, especially Outlook, is straightforward, and you'll even be able to play games.

There is no such thing as a perfect PDA. In an ideal world, we would like to have seen a true 16bit display and a Type II Compact Flash slot, but you can't have everything. If you are after a new Pocket PC, the HP Jornada 548 is a capable unit that meets the demands of the intensive OS, and is positioned at a very attractive price.

**JASON JENKINS**

## DETELS

**PRICE** £439 (£373.62 ex VAT)
**CONTACT** Hewlett-Packard
0990 47 47 47 **www.hp.com/jornada**
**PROS** Good screen; responsive; good synchronisation with Microsoft software; expansion potential; slimline
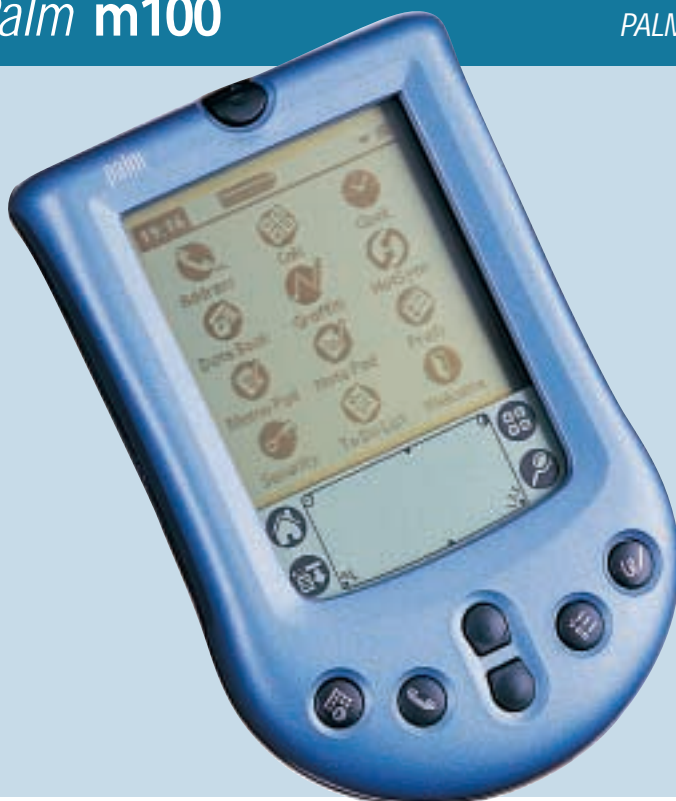**CONS** The lid and stylus will annoy some
**OVERALL** A well-designed, expandable PDA that shows off Pocket PC to the full

| | |
|---|---|
| **FEATURES** | ★★★★★ |
| **EASE OF USE** | ★★★★★ |
| **VALUE FOR MONEY** | ★★★★ |
| **OVERALL RATING** | ★★★★★ |

# *Palm* **m100**

**THIS PEN-DRIVEN** palmtop neatly encapsulates Palm's design philosophy, which is to offer no-brainer organiser applications in a compact device you can carry unnoticed in a handbag or a jacket pocket.

It is pitched to challenge Handspring's Visor, which has been eating into Palm sales at the cheaper end of the pen-driven handheld market. The Palm m100 boasts 2MB of RAM and uses the Graffiti handwriting recognition system running on the hugely successful Palm OS.

The m100, at 118 x 79 x 18mm (h x w x d), is almost exactly the same size as both its Palm IIIe stablemate and the Visor, which are roughly in the same price bracket. However, it looks smaller because it is more streamlined, narrowing slightly at the waist to fit snugly into the hand. It is also 40g lighter than the Visor, a significant difference in a device you are likely to carry around all the time.

Less happily, its 50 x 68mm screen is appreciably smaller. Palm says a higher resolution compensates for the screen size and indeed the definition is good in a variety of lighting conditions. But small type, however crisp, is hard to read and there is no way to increase the size of the characters.

This will not bother clear-sighted people so much, but the m100 is not a device you should give to your grandmother. Even people with good eyes might baulk at using the screen for long, which rather limits the m100's potential as a word processor – a task otherwise perfectly possible with the aid of a slot-in keyboard. This is why we have given the m100 a relatively low ease-of-use rating.

A fragile-looking black lid protects the screen and flips back out of the way, flush with the rear. A scroll-button, accessible through a hole in the closed flap, brings up the time in a small viewing window. An infra-red port, next to the hinge on the upper edge, can be used to exchange electronic business cards and other information.

The face panel on the review machine was blue, but you can buy clip-on panels in other colours (silver mist, green mist, Pacific blue, ruby pearl) but at £19 inc VAT they are not cheap.

Beneath the lid is the familiar Palm layout: a screen divided into writing and display areas, below which are arrayed two scroll buttons and four application buttons. By default the latter access the appointments, address book, to do list, and a new NotePad that allows you jot down names and numbers without having to resort to the handwriting recognition system.

The buttons are easily configured to link up to other applets, though the m100 lacks the expenses and email apps of its more expensive stablemates. Just above the screen is the power-off button, which when held down switches on the backlight. To the rear of the device are a pinhole reset, a slot for the stylus and a bay for two AAA batteries.

Unlike the Palm IIIe the m100 does not come with a HotSync cradle by default. Instead you get an RS232 serial cable with software that syncs with Microsoft Outlook. This is simple to use but less elegant than the cradle, and more daunting for non-techies. You can buy a cradle for £28 inc VAT but the fact that you need to makes the m100 look poorer value than the Palm IIIe, putting it on a par with the Visor. The m100 comes with link software for the Mac but you need to buy an RS232-to-USB adaptor, which costs £35 inc VAT.

The RS232 link slots into a port on the lower edge of the m100. The port is uncovered, exposing the contacts to dirt and the weather, and it is not compatible with other Palms. This could be a bad mistake: a Pilot-owning user thinking of buying an m100 for a partner could not share peripherals and would have no reason not to look to Handspring instead. Visors, with their Springboard ports, are also designed from scratch for expansion. This is particularly important because any organiser bought now will date quickly when the emergence of Bluetooth connectivity finally allows the PDA to consummate its marriage to the mobile phone. By then the m100's RS232 link could look like something out of the Stone Age. Moreover, m100 owners will have to wait for peripherals to emerge. A fold-up keyboard is imminent, with a modem to follow.

The simplicity of the m100 is an asset in a mature market in which buyers, unlike early adopters, are not necessarily gadget freaks and may even be technophobic. Most are looking simply for the electronic equivalent of a Filofax, and in this the m100 should serve them well. It also has the looks to appeal to users who like their personal organisers to double as a fashion accessory.

However, many buyers of this ilk do not understand the need to back up a palmtop, as it can lose its data if you forget to change the batteries. There is currently no way of giving the m100 non-volatile storage, so users who do not own a PC or a Mac are at constant risk of losing all their information.

**CLIVE AKASS**

## DETAILS

**PRICE** £130 (£110.64 ex VAT); cradle £28 (£23.83 ex VAT); extra face plate £19 (£16.17 ex VAT)
**CONTACT** Palm 020 7365 9820
**www.palm.com**
**PROS** Has most of the features that made Palm a market leader
**CONS** Cradle not included in bundle; poor future-proofing; incompatible with other Palm peripherals; small screen
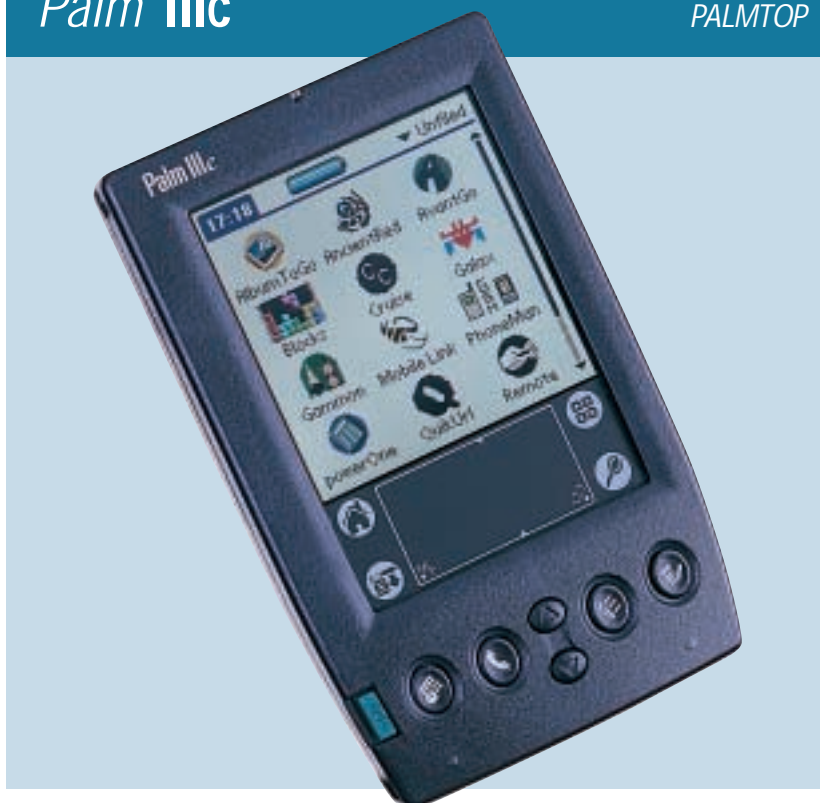**OVERALL** Elegant, simple organiser but, technically, not as good a buy as major rivals

| | |
|---|---|
| FEATURES | ★★★ |
| EASE OF USE | ★★★ |
| VALUE FOR MONEY | ★★ |
| OVERALL RATING | ★★★ |

## Palm IIIc

**THE PALM IIIC** was the first device based on the Palm OS to boast a colour display. Even though the Palm platform was not originally designed for colour, it does have its advantages. You won't gain much with a colour display, but it brings the Palm OS into the 21st Century and it might just appeal to enough people who prefer a colour device but don't get along with the Pocket PC range.

The IIIc is not very different from the Palm III except for details like the 8MB of memory and a built-in rechargeable lithium-ion battery. The unit's integrated battery and charging circuitry mean that the IIIc is slightly longer than the monochrome Palm alternatives. The charger that is shipped with the European version of the IIIc includes several different detachable power plugs, enabling it to be used in several European countries as well as in the US and Australia. However, you cannot use the charger as a standalone power supply. Instead you have to connect it to the serial cable on the HotSync cradle, so this is hardly the best solution if you travel a lot.

The biggest difference between the IIIc and the Palm III is, of course, the TFT colour display, capable of producing up to 256 colours. Now this might not sound very good compared to some Pocket PCs that can display 65,536 colours, but it doesn't seem to let the IIIc down in any way. The unit has excellent contrast as well as backlighting and you should be able to use it under most conditions. You can even adjust the brightness – just hold down the

power button for a few seconds and a slide bar appears on the display. The stylus isn't wonderful, but it does an adequate job and has a good overall feel.

The IIIc comes with the standard hard plastic lid and a serial docking cradle, though this particular one is not compatible with previous models because it has the built-in battery charger. The manuals supplied with the IIIc are excellent; a getting started guide covers basic functions as well as how to connect the IIIc to your PC. The 200-page handbook, on the other hand, covers every aspect of the IIIc in detail. It is very clearly written, though, and you shouldn't really require any previous knowledge of the Palm OS. There are instructions on how to set it up to sync with all kinds of applications on your desktop PC as well. Syncing the IIIc couldn't be much easier – simply install the supplied software on your PC, reboot and then press the sync button on the docking cradle.

It also has some tips on how to get a grip on Graffiti, the input language of the Palm OS, which can be a bit confusing to start with since it is a simplified alphabet. In general, what it means is that some characters have been simplified or have to be written in a specific way. But don't despair, help is not far away as Palm has supplied a pocket guide as well as a couple of stickers that you can attach to the lid of the IIIc to give you an overview of the Graffiti alphabet. The only letter that is a bit of a nuisance is h, since it's the only one that is written in lower case.

The software bundle is hardly overwhelming, as it is exactly the same package that comes with the rest of Palm's PDA range. The only difference is the OS, 3.5, which is the only version to support colour, and also makes an appearance on both the Vx and m100. The applications that come as standard on the IIIc are an address book utility, calculator, organiser, expense book, memo pad and a to do list utility.

If you want more software for your IIIc there's plenty out there. A variety of software titles are available for the Palm OS, either as shareware or freeware, or to buy or download from the Internet. Websites such as www.tucows.com, have thousands of titles to choose from, while Palm's own site has a comprehensive list of related websites and links to software developers. The majority of software has been developed for older versions of the Palm OS and do not come in colour. However, Palm has addressed this issue by including colour support in version 3.5 of the Palm OS, which in turn has led to an increase in available colour programs.

The colour screen comes into its own for games. There are some excellent choices available and not even the Pocket PCs have anything as good. One game we have to mention is Ancient Red. This is like a pocket version of Diablo and has excellent graphics. It's available for download at www.palmblvd.com.

Overall, the IIIc is an excellent PDA, even though it can't compare in terms of speed to something like the Compaq iPAQ, which is 10 times faster at 206MHz. Here, you're running a 20MHz Motorola Dragonball CPU, which might lead you to assume that the IIIc is a poor performer, but it's quite the contrary – most applications start as soon as you tap the icon with the stylus and we haven't experienced any slowdown whatsoever, even when running multiple applications.

At the end of the day, if you want a colour PDA the IIIc is a very good choice, except that it is a bit on the pricey side.

**LARS-GORAN NILSSON**

## DETAILS

**PRICE** £320 (£272.34 ex VAT)
**CONTACT** Palm 020 7365 9820
www.palm.com
**PROS** Colour display; long battery life; robust OS
**CONS** Price
**OVERALL** Palm's range of PDAs is easy to use and the IIIc gives you a few added bonuses, but it doesn't really add much to an already good platform except for the colour display

| | |
|---|---|
| FEATURES | ★★★★ |
| EASE OF USE | ★★★★★ |
| VALUE FOR MONEY | ★★★ |
| OVERALL RATING | ★★★★ |

# *Palm* IIIe

*PALMTOP*



**WEIGHING IN AT** a mere 170g and sporting a see-through body, the IIIe is Palm's second cheapest entrant in this group test at £149.99 inc VAT. The unusual look of the unit will appeal to some and be loathed by others – the influence of the iMac seems to pervade everything these days.

Under the clear plastic flap that protects the screen, you have something akin to a communicator from the original *Star Trek* series. Unfortunately the angle the cover opens up to is a little bit irritating, making the unit feel bulkier to handle and a little flimsy. The flap can be forced with an alarming click to a less precarious and more open position, although the flimsiness is still evident. Thankfully the whole flap can be easily unclipped to give a more compact overall device – albeit with no screen protection.

One of the more useful features of the casing is a spring-back cover to protect the connections for the HotSync cradle from damage from the elements, ensuring dust build-up does not occur on the terminals. This is a good feature, and one that would have benefited the screen contrast wheel, which is sited on the side of the unit. This wheel seems to constantly need re-adjustment because its position means it is frequently being knocked, despite being slightly recessed. The wheel was extremely sensitive – we assume this to be an idiosyncracy of the test unit, rather than a reflection of the IIIe series as a whole.

Two AAA batteries power the IIIe, fitting into the back. At the top of the back is the infra-red port for 'beaming'

information to and from the unit. The stylus is little more than a miniature pen-shaped piece of plastic that slots into the top rear of the body.

The screen on the IIIe is split into a large viewing area and the bottom quarter is reserved as the Graffiti writing area – letters are written on the left and numbers on the right. Holding the on/off button after the unit is switched on activates the backlight to allow use in poorer lighting conditions. Quick Launch buttons for the organiser, address list, to do and memo lists are situated at the bottom, with the on/off switch to the left and a scroll button sitting in the middle.

There is no getting away from the fact that the screen is small, and along with the difficulties of keeping the contrast set, was not the easiest display to view. The resolution is 160 x 160, and the overall effect is a pretty grainy picture. The program menu is made up of icons that allow access to the various applications with a press of the stylus (or through the quick-launch buttons). With the IIIe, as with all Palms, learning the Graffiti writing style is a necessity. A tutorial program allows you to practise writing, and stickers are supplied to place on the screen cover to remind you of the specialist shapes of each letter. Learning Graffiti is a fairly quick process – at least learning the basics is – and it allows the unit to be used efficiently. The more complex characters will take a while to learn, though.

Getting started with the IIIe is a simple process. A quick-start reference card gets you up and running in next

to no time, while for the hardcore enthusiast a thick manual covering every aspect of the Palm operating system is included. The IIIe runs version 3.1.1 of the Palm OS.

To make sure your IIIe's details are up-to-date with your PC, a HotSync cradle is included with the unit. This plugs into a serial port in your PC (both nine-pin and 25-pin serial sockets are catered for). After simple installation of the supplied software, you just slot the IIIe into the cradle and press the button. An electronic melody tells you when it is connecting and when it has updated. The PC software can also be used to install further applications onto the unit. Simply download the required program to your PC from the Internet, then click the install button in the PC software and it will transfer to the cradled IIIe, adding the relevant icons to the program menu.

With 2MB of onboard RAM and ROM also amounting to 2MB, the IIIe sometimes got bogged down, with the stylus having no effect when we wanted to select or move from a given program, which is unfortunate as there is no possibility of a memory upgrade. After a brief spell, the system seems to get over the backlog and normal service resumes.

With most of the installed programs fulfilling the role of a small organiser, the IIIe will appeal to the gadget lover who doesn't want to break the bank and wants an electronic Filofax. With dimensions of 119.8 x 81 x 17.7mm (h x w x d) it will easily fit into a pocket and it has all the functions you'd expect from a small organiser. With a question mark over the build quality, it does seem expensive for what it is. However, the ability to download and install mind-numbingly addictive games like HardBall (the one where you bounce a ball and destroy bricks on a wall) will certainly give a disgruntled executive on the train something to occupy their mind. Overall, though, there are far preferable, albeit more expensive PDAs that are much better to use and which have displays that are easier to view.

**SCOTT MONTGOMERY**

## DETAILS

**PRICE** £149.99 (£127.65 ex VAT)
**CONTACT** Palm 020 7365 9820
**www.palm.com**
**PROS** Compact design
**CONS** Screen protection flap is flimsy and sits at an awkward angle
**OVERALL** May be worth the money, although the build quality isn't wonderful. If you require a PDA there are better ones, although they cost more

| | |
|---|---|
| FEATURES | ★★★★ |
| EASE OF USE | ★★★★ |
| VALUE FOR MONEY | ★★★★ |
| OVERALL RATING | ★★★★ |

## Palm Vx

**WHEN US ROBOTICS** first made the Palm, the industry was half expecting a failure the size of the Apple Newton. Fortunately, the Palm arrived with a simple interface and data entry that was similar to handwriting. Since then Palm's been bought by 3Com, and then spun off into its own company to face the assault of Microsoft and Psion. So, can the latest release, the Vx, still cut it?

Fortunately for Palm, the answer seems to be 'yes'. Externally the Vx is the identical twin of the much-loved V. It's the size of an average pocket diary, in height, width and, more impressively, depth. Weighing just 120g, its monochrome screen affords a normal-use battery life of one month. This kind of practicality gives the Palm a clear advantage over Pocket PCs. But it's not just this that wins you over, as the Palm Vx is designed to look attractive. A sleek brushed metal case makes sure that the unit is tough enough to be carried around all day and a leather flap folds over the screen to protect it.

The flap is designed to slide into a groove on either side of the Palm, which makes it suitable for left- or right-handed people. Whichever slot remains free then houses the stylus. Even this has intelligence built into it, as the end unscrews to reveal a pin that can be used to reset the Palm in the unlikely event of a crash. While this design remains the same as the Palm V, there's a lot more going on under the cover.

The first major change is an upgraded 20MHz Motorola EZ Dragonball processor. It may sound a little weedy compared to the quoted specs of other products, but for the Palm platform it's actually very nippy. Installing anything more than this would just be a waste. A more significant upgrade comes from the 8MB of memory – up 6MB from the V. This is a godsend when the Palm is being used to store email, as 2MB is easily eaten up.

Beyond the design and specs, usability can make or break a PDA. Fortunately, Palm has worked hard on this, and the simplistic interface has endeared it to users who would usually run screaming from a computer. The Palm Vx comes installed with Palm OS 3.5. New features include a smoother-looking interface, a more intuitive menu system and an optimised synchronisation system. Other than this, the basic system remains the same, with navigation performed through a combination of a stylus and a touch-sensitive screen.

Applications are launched from icons in the workspace, or for easy access the most common ones – calendar, address book – have shortcut buttons built into the Palm's case.

Once inside an application any data entry is performed using the Graffiti system. This is similar to handwriting, but it does require characters to be formed in a specific way, and in a specific area of the screen. A box located at the bottom is divided into two entry areas: one for text and one for numbers. In this way, the Palm knows exactly what kind of data is being entered. Granted, this all takes a little while to get used to, but it does soon become second nature.

Alternatively, you can buy a standard keyboard that plugs into the data connector at the bottom of the unit. Keyboards aren't the only devices capable of using this interface. Other peripherals, from a modem to a Compact Flash reader, are also available. More usually, this interface is used for the cradle that charges the battery and sychronises data on the Palm with a PC. Through the HotSync software, applications and information can be exchanged with a desktop computer.

Out of the box, Palm offers two choices for storing data: Microsoft Outlook or the Palm Desktop. We prefer Outlook, as the Desktop is a bit basic and can't be used as an email client.

The only complaint we have is that it's difficult to switch from using the Palm Desktop to Outlook, or vice versa should the need arise. The Pocket Mirror software allows greater control over the synchronisation process, but it's still a pain to perform the actual switchover. If you're a Lotus Notes user, though, don't feel left out as Lotus sells a piece of software called EasySync to allow the Palm to talk with Notes instead.

Synchronisation isn't the only method of communication. The Palm has an infra-red port at the top of the device, which can be used for transmitting data such as electronic business cards. This is even compatible with the system used by Nokia mobile phones. Not surprisingly, the infra-red connector can also be used to make dial-up connections through mobile phones. Palm has worked hard to provide a larger range of connection software, and a full web browser is now available.

Maybe the Vx doesn't have a colour screen, or the capability to play MP3 files, but then it doesn't really need it. The Palm does one job, and it does it very well. With support from thousands of developers, and a superb interface, you can't go wrong with one of these devices in your hand.

**DAVID LUDLOW**

## DETAILS

**PRICE** £299.99 (£255.31 ex VAT)
**CONTACT** 020 7365 9820
**www.palm.com**
**PROS** Easy to use; long battery life; good software support
**CONS** Synchronisation software can be tricky to configure; email can quickly fill the device
**OVERALL** Palm makes some of the best PDAs on the market, and the Vx is the top of the range. It performs a specific job, and consequently is very good at what it does. With a long battery life, this is everything that you need to organise yourself

| | |
|---|---|
| **FEATURES** | ★★★★★ |
| **EASE OF USE** | ★★★★★ |
| **VALUE FOR MONEY** | ★★★★ |
| **OVERALL RATING** | ★★★★★ |

# *Ericsson* MC218

*HANDHELD*
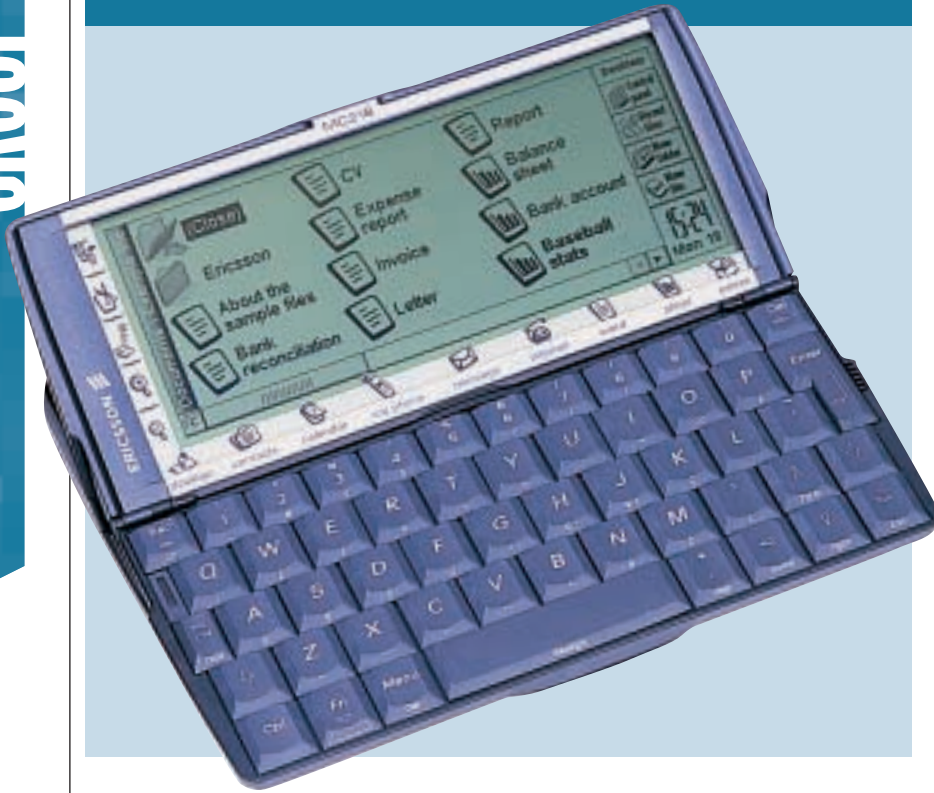


**IF YOU THINK YOU'RE** seeing double, don't panic – yes, this does look very much like the Psion Series 5mx, and the reason is that the two are actually very close relations.

Psion has had a good run for its money with the Series 5 range, benefiting from a first-class keyboard and a wide, clear screen, but in our last PDA group test it was this Ericsson that denied it first place. This was largely due to the fact that it includes an infra-red modem for use with Ericsson phones and shaves a little off the price.

The basic specs sound fairly mundane when compared to some of the other contenders on test here, but remember that this device is running EPOC, which is far less power-hungry. The MC218 fairly speeds along, then, with a 36MHz ARM 710T processor and 16MB of RAM. Standard built-in applications are burnt into 12MB of ROM, but you'll find a wide range of software available for download or off-the-shelf purchase to supplement these.

If you find yourself approaching the boundaries of the 16MB of RAM or you want a more permanent form of storage, there's a Type I Compact Flash slot to the right, hidden behind a swivel-out flap. The MC218 runs on two AA batteries and is fairly light, although not quite light enough to carry around in a jacket pocket without showing. Although there is a socket for an external power supply, you don't get one in the box.

The monochrome screen is excellent in most lighting conditions, but bear in mind that it only opens to a fixed angle and, like it or lump it, that's how it has to

be used – you can't change it like you can with many of the CE-based devices. A backlight can be switched on and off at will and the screen contrast can be adjusted through 32 levels using the keyboard. Without title bars or permanently displayed menus, the OS and applications work well on the 134 x 50mm half-VGA panel at a resolution of 640 x 240 in 16 levels of grey. Pointer manipulation is by means of a comfortable stylus that slides into a holder in front of the battery compartment, and can directly address any on-screen point on a grid of 695 x 280 locations, which means the pointer is even more accurate than the display.

Ericsson is pretty much a global brand so it's hardly a surprise to see that every key on the keyboard has a second function, allowing you to call up all manner of accented characters and the euro symbol, although strangely this has been located on the 's' key. We were actually a little disappointed by the keyboard on our review device. It was stiff and felt rather cheap, unlike the excellent keyboards found on the Psion equivalents. This feeling of cheapness was carried through in the casing, which is a grainy plastic, and there was a definite scraping as we opened and closed the clamshell body. Hopefully all of these points will sort themselves out as the device loosens up naturally through everyday use. The MC218 also does not look as smart as the Series 5mx, due in large part to the bold keyboard characters and childish on-screen icons. Perhaps to reinforce the importance of mobile communications

to Ericsson's strategy, the icons have also been slightly rearranged so that 'contacts' and 'my telephone' come before the word processor and spreadsheet. The Ericsson does have the upper hand when it comes to storage. While the Psion arrives naked the MC218 wears a smart black case with velcro to hold the device in place.

Three buttons on the front of the casing take care of recording and playing back audio, letting you treat the device much like a dictation machine without having to open it up. Recorded clips can even be saved and used as alarms so you can in effect set yourself up a talking diary.

Bundled with a modem, this is one of the only PDAs on test here that truly meets the needs of the mobile user. It has a problem, though, in that by using its own proprietary file format (translated to PC-understandable data upon synchronisation with a desktop machine) you'll have difficulty getting emailed files understood by their recipients unless they, too, have an Ericsson machine. The ability to save emails as rtf or at least as plain text would have overcome this problem, but that's not an option.

Ericsson is playing up the fact that the MC218 is WAP enabled. This kind of misses the point of WAP, which is really designed for single-box solutions. Using both a phone and a PDA seems a little heavy handed. Unfortunately for Psion there's not yet a plug-in to enable its Series 5mx to do similar.

PC synchronisation is still by means of a standard serial cable. It's a shame this remains the case with so many PDAs when USB is now the ideal interface.

This is the second time we've looked at the MC218 and, this time around we're not as enamoured as we were with the original incarnation. It feels cheaper and less sturdy than the Psion Series 5mx and is not as nice to use. That said, we cannot overlook the fact that Ericsson has bundled an infra-red modem and a case which, while not hard-sided, will protect the device from knocks in a briefcase or travel bag.

**NIK RAWLINSON**

## DETAILS

**PRICE** £379.99 (£323.40 ex VAT)
**CONTACT** Ericsson 0990 237 237
**www.ericsson.co.uk**
**PROS** A good imitation 5mx; bundled modem and carry case
**CONS** Build quality of the device is not up to the same standards as Psion
**OVERALL** Approaching the Psion 5mx, but not quite up there

| | |
|---|---|
| **FEATURES** | ★★★★★ |
| **EASE OF USE** | ★★★★★ |
| **VALUE FOR MONEY** | ★★★★ |
| **OVERALL RATING** | ★★★★★ |

# *HP* **Jornada 720**   *HANDHELD*



**HEWLETT-PACKARD'S** Jornada 720 is the first PDA to feature Microsoft's Windows for Handheld PC 2000 software. In other words, it's the first clamshell-keyboarded PDA to run the latest version 3.0 of Windows CE. Before you get too excited though, Windows CE 3.0 for Handheld PCs is a very different kettle of fish to the completely revamped version for the latest palm form factor Pocket PCs.

At first glance, the Jornada 720's software appears to be pretty much the same as the earlier 680/690. The Start button's still present and everything needs to be double-clicked. The core pocket application suite of Outlook, Word, Excel, PowerPoint and Access has been updated from 3.0 (on the old 680/690) to 3.01, which as far as we could see, simply involves sporting new-style desktop icons – shame when you consider the significantly redesigned portions of the new Pocket PCs. Microsoft says the new Handheld PC OS is appropriate for the size of the screen on this form factor, and that it's still based on the new Windows CE 3.0 kernel, but 'specialised' for this device.

So what has changed on the software front? Most obviously is the new Pocket Internet Explorer, significantly upgraded and improved from version 3.0 to 4.1. It may not play, say, Flash animations, but it handles web content much better than before (supporting HTML 4.0, JScript, animated gifs, and Java applets using HP ChaiVM). Also new and welcome is the Media Player, which, along with a stereo headphone jack on the side of the 720,

allows you to use the unit as a solid-state personal stereo.

Rather infuriatingly, there's no Pocket ebook reader, as Microsoft has targeted the new HPC OS at 'enterprise rather than consumer' – we'd like to have seen it included anyway. Remaining on the enterprise front, the new OS also includes a Windows Terminal Server client, Microsoft Messaging Queue (MSMQ) and the Crypto API to improve security. HP has also thrown in its own backup and dialup utilities along with a copy of Yahoo! Messenger.

Physically speaking, the 720 looks almost identical to the 680/690. It still measures 189 x 95 x 34mm (w x d x h) and weighs 510g with standard battery. This makes it considerably chunkier than a Psion 5mx, but not so much so that you can't squeeze it into a big pocket. Despite its larger dimensions, the keyboard on the 680/690/720 is not a patch on the Psion 5mx either, but still sufficiently good for banging out plenty of words so long as your fingers aren't too large.

Where the 720 really scores over products like the 5mx, however, is with its 640 x 240 pixel 6.5in colour LCD screen. While HP could have been lazy and kept the same screen as the 680/690, it has increased the colours to proper 16bit, improved the touch-sensitive layer and even fitted a 2D graphics accelerator. The result is a noticeably brighter, clearer screen with faster updates. In addition, with full 640pixel width and 16bit colour, most basic websites are rendered perfectly.

The insides are quicker too: the 133MHz Hitachi SH3 of the 680/690 has

been replaced by a 206MHz StrongARM SA1110 processor, which, coupled with the 720's standard 32MB of memory and improved data bus, increases speed. Applications launch almost instantly, and the websites we visited also opened about 50 per cent faster.

HP has improved the port layout on the 720. There's still separate Type I Compact Flash and Type II PC Card slots, but rather than piggy-backing them as on the 680/690 (which made the bottom bulge), the 720 can swallow them whole while keeping the bottom surface flush. There's no access to cables on the CF slot and it still can't take the IBM Microdrive, but it's a superior arrangement. The backup battery is stored under the CF panel.

Joining the stereo headphone jack is a new Smart Card reader for those corporate customers, and the built-in 56K V.90 modem is still present and correct. We even got online using a Nokia 7110 mobile phone and the IR port without any additional drivers.

Supplied with ActiveSync 3.1 and Outlook 2000, the 720 synchronises beautifully with Windows. Transferring big media files from your PC would take ages over the old serial interface, so HP now includes a USB connection – note that USB is only available from the supplied docking cradle and you have to provide your own cable.

Comparisons are bound to be drawn with the Psion Series 5mx, which is smaller and lighter, features a longer life and boasts the best keyboard of all clamshells. However, the older 680/690 was immediately preferable in many cases with a colour screen and built-in 56K modem as standard.

While the 720 doesn't share the OS quantum leap of its Pocket PC conterparts, HP and Microsoft have made several significant enhancements over the 680/690. It's quicker, the battery lasts up to nine hours, there's a Smart Card reader, Media Player and the best web browser in this form factor.
**GORDON LAING**

## DETAILS

**PRICE** £665 (£565.96 ex VAT)
**CONTACT** 0990 47 47 47
**www.hp.com/jornada**
**PROS** Colour screen; built-in modem; media player; loads of ports
**CONS** Software not massively different from the old 680/690
**OVERALL** With seriously improved performance, all the ports you can handle, the best PDA web browser and personal stereo capability, the Jornada 720 will be the perfect handheld for many users

| | |
|---|---|
| FEATURES | ★★★★★ |
| EASE OF USE | ★★★★★ |
| VALUE FOR MONEY | ★★★ |
| OVERALL RATING | ★★★★ |

## *Psion* **Revo Plus**

*HANDHELD*



**PSION HAS LONG BEEN** the innovator in the handheld PC market, with both its hardware and software garnering praise for being well-designed and easy to use. When the Revo was launched 12 months ago though, eyebrows were raised. Given Psion's dwindling share of the handheld market, a slimmed-down Series 5mx (both in form and function) hardly seemed a wise idea. Despite being truly pocket-sized, the lack of a backlit screen, modem and expansion slot made the Revo look decidedly lacklustre.

It's been a busy year since then – Palm came up with the colour IIIc and Microsoft finally figured out palmtops with the Pocket PC. Psion hasn't been idle either and in September, the Revo Plus arrived.

If you were expecting the Revo Plus to be the next generation of Psion handheld, reaping the rewards of its Symbian partnership, you're in for a big disappointment. The Revo Plus is merely an upgraded Revo and that upgrade goes no further than doubling the RAM to 16MB. There are other new features but these lie solely in the new bundled software. Before we get to that, let's recap on the Revo's main points.

Despite its shortcomings, the Revo Plus (and the more able Series 5mx) is still one of the most capable keyboard-based pocket computers. The main reason for this is its elegant EPOC32 operating system and a suite of well-crafted applications. EPOC32 runs well on relatively low-specification hardware, which is why while Pocket PCs have 200MHz RISC processors, the Revo Plus

manages with a 36MHz ARM 710T and feels none the slower for it.

Given its handheld heritage, it's no surprise that Psion knows what it's doing when it comes to writing usable applications and those on the Revo Plus are largely the same as those found on the Psion Series 5mx and Series 7. The word processor, spreadsheet, contacts database and agenda make good use of the small screen and if you have a suitable infra-red mobile phone, the email and SMS client let you communicate on the move. Another point in the Revo Plus' favour is the well-established EPOC32 developer base.

Although the Revo included a web browser as part of its application suite, it wasn't great. It occupied a big chunk of the Revo's RAM and had no support for secure sites. Installing Java support ate up yet more memory but the browser still fell over accessing sites that a Windows CE device would eat for breakfast. This time round, Psion has opted for Opera 3.62 as the browser and it occupies just 2MB of RAM.

Opera supports 128bit SSL (secure socket layer) 2 and 3 encryption, TLS (transport layer security) 1.0 for secure online transactions and embedded Java applets. So in theory at least, you can use your Revo Plus for safe ecommerce, providing you have access to a telephone connection. In practice, Opera works well but it's sufficiently different from Internet Explorer and Netscape to confuse users the first time they use it. Despite being superior to the EPOC browser, Opera still lags well behind Pocket Internet Explorer and the Revo

Plus' small, murky screen, limited multimedia support and ponderous displaying of complex web pages make for a frustrating Internet experience.

The Revo Plus also includes a WAP (wireless application protocol) browser, the idea being that it makes more sense to update your handheld software rather than your phone to keep up with mobile browsing. Given the limitations of the Revo Plus and WAP itself, this works well enough but using two devices to perform a task designed for one seems to miss the point a little. After all, the beauty (if that's the right word) of WAP is that you can discretely use your phone while walking along to find out what's on at the cinema. With the Revo Plus, you have to find somewhere to put both it and your phone while you tap at a keyboard.

While Palm, Handspring and Windows CE devices are able to communicate smoothly and quickly with PCs via USB connections, the Revo Plus is still lumbered with PsiWin and a comparatively slow serial connection. When it works, PsiWin does well enough and will synchronise data between the major Windows office applications with relative ease. The problem is getting PsiWin to work at all and it seems unable to detect a connected Revo Plus more than 25 per cent of the time.

Even with a connection established, PsiWin is often unable to show the contents of 'My Psion'. If you remove your Revo Plus from the docking cradle and then replace it, a reboot of the PC is usually needed before a connection can be re-established. It's baffling that Psion hasn't been able to fix this problem with version 2.3 of PsiWin and why it's still relying on a serial connection is anyone's guess. Version 2.4 of PsiWin and USB support is due soon but whether it improves the Revo Plus' poor PC connectivity remains to be seen.

**JULIAN PROKAZA**

## DETAILS

**PRICE** £299.95 (£255.28 ex VAT)
**CONTACT** Psion 0990 143 050
**www.psion.co.uk**
**PROS** Compact design with usable keyboard; powerful; easy-to-use application suite; long battery life
**CONS** Small, non-backlit monochrome screen; requires extra hardware for Internet access; hit-and-miss PC connectivity
**OVERALL** The Revo Plus is a versatile performer and a good choice for anyone looking for a compact keyboard-based handheld, but despite the added RAM and extra software it's starting to look like yesterday's technology

| | |
|---|---|
| **FEATURES** | ★★★★ |
| **EASE OF USE** | ★★★★ |
| **VALUE FOR MONEY** | ★★★★★ |
| **OVERALL RATING** | ★★★★ |

# *Psion* Series 5mx

THE PSION SERIES 5MX is a quality piece of kit. From the moment you open the box and find the unit nestled neatly in the packaging, it exudes quality. Getting going is a simple process of putting in the supplied batteries and powering up the unit. Then you're off to new heights of handheld computing.

The unit itself is bigger than Palm's PDAs, but then you get a keyboard and a bigger screen for this trade-off. The dimensions allow it to fit into a jacket pocket, although its weight (354g) will mean your suits just won't sit right. Despite this, it is a convenient size for easy transportation and feels robust and well constructed.

Opening up the screen highlights the unit's design quality. The keyboard slides out as the clamshell is opened. The stylus is located on the side and is accessed by pressing it in and allowing it to spring out. As the unit is longer than the Palm units, the stylus is a good size and feels more comfortable to use as a result.

The screen has a resolution of 640 x 240 and the characters can be increased in size if you are struggling to see them. As the panel has a backlight, viewing is not a problem – even at the smallest character size. Below the screen are small pictures that give access to the main programs directly through a touch of the stylus. To the left are buttons to activate dropdown menus, a cut command button, infra-red activation, and the character size zoom control.

To get to the main system screen, a clearly marked orange button is situated on the bottom left corner. Here, the usual options are available: control panel, recently used files, new file, etc. It is similar enough to standard Windows operating systems for you to manage to navigate your way around easily. From the control panel various things can be set up, such as screen contrast, time, and there is an add/remove programs button to allow you to keep track of the installed programs. Use of the dropdown menu also allows memory usage and battery life to be monitored.

Applications for the 5mx include the usual organisers, jotters and calculator one would expect from a handheld device. Where the Psion comes into its own, though, is in the inclusion of Word and a spreadsheet package. These are fully working applications, albeit not quite as versatile as their PC-based counterparts. Inclusion of Word allows proper documents to be drafted up for printing or emailing when connected to the PC. The 5mx even has a spell checker as standard to ensure what you are producing is of good quality.

The keyboard is about two-thirds the size of a conventional computer keyboard and typing is no problem at all. The keys have a satisfying feel when pressed, although if you are not pressing the button down directly it tends to not register the keystroke. Overall, though, the keyboard makes this an ideal mobile word processor, and with printing through your PC an automatic operation, you don't even need to upload your documents for output.

Connection of the Psion to your PC is a simple operation. The supplied serial cable plugs into an available nine-pin serial port (no 25pin adaptor is supplied) and the other end connects into the Psion beneath a protective cover on the rear. The software disc has various applications and programs that you can install (and Psion has left precisely which ones up to you, so you don't clog up the available resources). With the link and software installed, you can transfer data between your PC and the Psion, as well as print and email. If you have a laptop there is an infra-red port in the back of 5mx, so transfer of information this way is an option.

As with most other PDAs, upgrade options are available and with the 5mx's screen being larger than most (and with a higher resolution) you can even get hold of some passable games. For those who travel frequently, there is a Berlitz interpreter and a phrase book, turning the 5mx into a useful travel tool.

As for hardware, a cable is available to connect directly to a printer, allowing you to print off documents. There is also a PC Card modem adaptor for the Psion Gold Card range of modems. Solid-state Flash memory cards for storage can be purchased from Psion and any other Compact Flash memory manufacturer.

Psion has supplied an extremely comprehensive manual with the 5mx. So if you are a first-time user of any kind of computer at all, you can quickly get up to speed – although it is unlikely that anyone with PC experience will do more than give it a cursory glance.

Overall, the Psion Series 5mx is an excellent handheld that is easy to both use and transport. With 16MB of RAM and 15MB of Flash disk space it has room for all that most users can throw at it – and it has a Flash slot for the addition of another Flash disk or any other upgrades. It even has OPL (Organiser Programming Language) for those who want to try their hand at a bit of programming. It isn't cheap at £399.95 inc VAT, but if it's a computer you need rather than a computerised notepad, this is an ideal solution.

**SCOTT MONTGOMERY**

## DETELS

**PRICE** £399.95 (£340.38 ex VAT)
**CONTACT** Psion 0990 143 050
**www.psion.co.uk**
**PROS** Efficient word processor and usable-sized keyboard
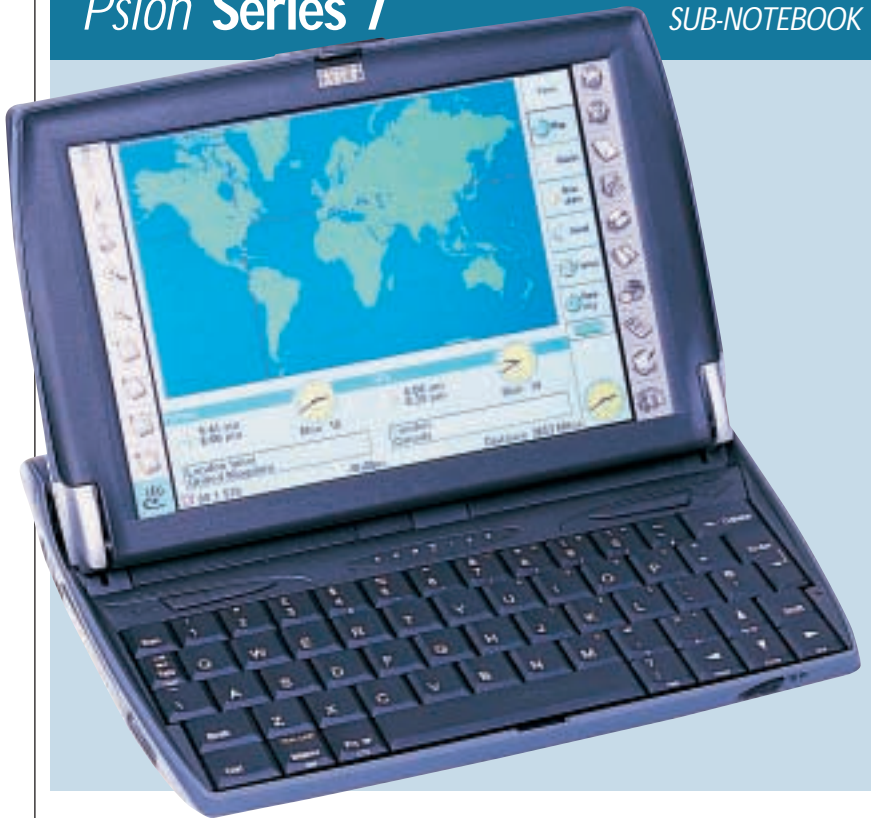**CONS** A bit heavy for putting into a pocket
**OVERALL** It may be a little expensive, but if it's a small computer you're after rather than just an electronic organiser, this is a good-quality, functional solution

| | |
|---|---|
| FEATURES | ★★★★★ |
| EASE OF USE | ★★★★★ |
| VALUE FOR MONEY | ★★★★ |
| OVERALL RATING | ★★★★★ |

## *Psion* Series 7

**THERE CAN BE FEW** people in the PDA-using world who aren't aware of Psion's reputation for excellence in design. The Series 7 takes that reputation and boosts it beyond the clouds and far out into the stratosphere.

Such is the unusual nature of this PDA/notebook hybrid that it genuinely does turn heads. This is mainly thanks to its unique navy-blue leather casing. In a nutshell, the Series 7 is a grown-up Series 5 equipped with a colour screen, bigger keyboard and a long-life rechargeable battery.

Although it's little more than a year since the Series 7 hit the streets, it has quite a history. It really began life as the netBook – a slightly beefier version of what we now know, but aimed at the corporate user and bought in bulk. Naturally, when word got out, Joe Public was keen to get his hands on the mythical colour Psion and ultimately the company performed a *volte face*, trimming a few of the specifications and launching it as the Series 7.

Enough of the history lesson – just how good are the goods? There's no denying that it's a desirable piece of kit, particularly to anyone who needs to word process or perform other basic office tasks on the move. The sheer joy of getting away with carrying something barely the size of a hardback novel in place of a notebook PC and getting over eight hours of battery life is truly liberating. Even the lightest notebooks are still just too big for comfort.

The software you'll find in place is, of course, the usual spread of EPOC goodies from Word through Sheet, Agenda, Contacts and Spell to the newer email application and web browser. The addition of colour is certainly helpful when using the spreadsheet for graphing, doodling a sketch or browsing the Internet, although it doesn't add much to the word-processing experience. Speaking of appearances, the touch-sensitive 7.7in screen can manage a resolution of 640 x 480 pixels and is clear in all but the very brightest of conditions.

The larger form factor naturally accommodates a bigger keyboard – in this case, it's not too far off full size. Typing is actually almost as comfortable as on a regular keyboard, although Psion has switched the location of the 'Menu' and 'Fn' keys, which can be annoying at first, particularly if you're accustomed to a Series 5. The hinge is a variation on Psion's usual clamshell design, with the base of the screen sliding forward the further you open the case. This increases stability and prevents the whole shebang from falling over when you tap on the screen. Needless to say, it all slides in and out as smooth as silk. The stylus is also one of the better examples we have seen in this group test. It's well balanced and in the hand it actually feels like a pen.

The beating heart of the Series 7 is a 133MHz StrongARM processor operating in tandem with 16MB of DRAM. The EPOC OS resides in ROM, which is where it has one over on its big brother, the netBook. Memory expansion is possible through the addition of a proprietary plug-in 16MB DIMM should you need it.

As for ports, there are two that should be scrutinised closely before making your mind up. The first is a Compact Flash II tray, into which you can pop any suitable card you fancy, as long as it doesn't have any protruding parts, such as the cable from a modem. This, for once, is a piece of rank bad design – all Psion had to do was leave it as a regular slot, rather than making it into a tray. In addition, the Type II PC Card slot is something of a letdown. It's a great idea in theory, but since it can handle only a Psion Dacom modem card, it's of little more use to you than a chocolate teapot.

While we're looking at the failings of the unit, one of the biggest areas of concern is that of email and online functionality in general. In hardware terms, it's massively disappointing not to see a built-in modem. These days Psion is up against some stiff competition in the form of a slew of fully featured Pocket PCs and really needs to pull its finger out on the connectivity front. The latest product launch – the Revo Plus – is a perfect example of this blinkered thinking. Unless you have a phone with an infra-red modem, you'll need to buy either a Psion infra-red travel modem or the aforementioned PC Card modem.

As far as the Internet software goes, it's all as you'd expect, apart from a few small problems with the browser not supporting JavaScript. This should be rectified with the release of a new JS-enabled Opera browser. The major problem is compatibility – if you write an EPOC Word document on the Series 7 and email it to someone else, all you'll get back from them are complaints that they can't open it, which is little short of pointless. It's possible to read Microsoft Word documents received by email, but that's only half a solution.

The bottom line remains that the Series 7 is a great laptop replacement and well worth checking out, provided you can live with its limitations.

**J MARK LYTLE**

# *Samsung* IZZI-Pro Swivel *SUB-NOTEBOOK*
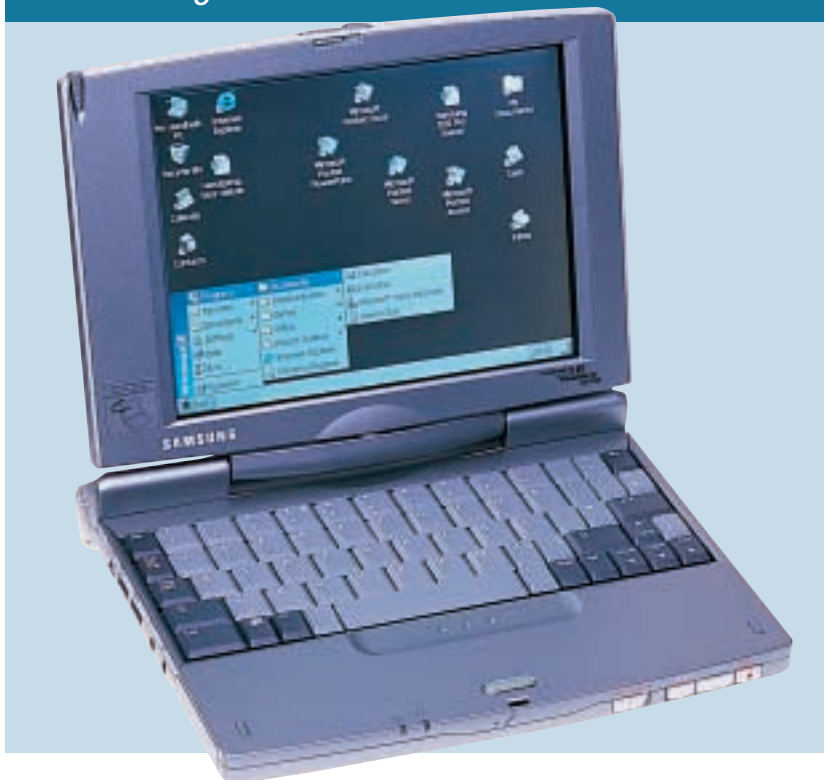


**SAMSUNG SEEMS TO BE** going IZZI crazy, using the name to brand many of its forthcoming products. The Pro Swivel flavour, though, relates to its sub-notebook sized Windows CE device, which has one unique selling point – a rotating screen, hence the 'Swivel'. More about that in a moment.

Stripped to the basics, the core of this machine is a 129MHz Toshiba processor. This 32bit RISC chip is supplemented by 32MB of EDO DRAM, which puts it up there with the big players, and on par with some of the less powerful desktop PCs. This gives it plenty of space to put the internal microphone to good use, and it'll store up to 60 minutes of voice recordings when set to capture 8bit mono. This generous 32MB is backed up by a further 16MB of ROM for application storage, so this really is one of the most capacious PDAs on offer.

Unfortunately, the Swivel arrived on the scene just a little too early to take advantage of the version of Pocket PC released for use on keyboarded devices, and so retains Windows CE 2.11, which feels very natural on a device of this size and works far better than those CE implementations running on smaller devices.

Samsung has added its own IZZI Pro applet to the Control Panel. This sets the modem country code, letting you choose from a range of nine territories, of which five, namely France, Germany, Norway, the Netherlands and the UK, will be of use to European travellers. It also toggles CRT use on and off and graphically displays the remaining level of battery power, which is far more informative than the standard Good/Low status facilities of standard Windows CE distributions. Finally, it lets you set your own brightness and contrast and specify how many steps the backlight should fade through when the device is not used for a specified length of time.

It tips the scales at 1Kg and is around the size of a small hardback book at 228 x 196 x 25mm (w x d x h), so it'll easily fit into a briefcase or onto the seat-back tray of a plane or train. Unfortunately, though, the keyboard inhabits a strange nether-world somewhere between a full-sized notebook and a traditional PDA and we often found ourselves mis-keying when typing at speed. No doubt this problem would be overcome in time but it was an irritating introduction. There is one plus point to this keyboard, in that it incorporates a euro symbol, accessible using Ctrl-Shift-5, which sets it apart from many of its competitors.

The screen is an 8.2in DTSN VGA touch-sensitive panel capable of displaying 256 colours at a top resolution of 640 x 480. As mentioned, this swivels and if you fold it flat a magnet on the back will hold it in place, so you can use it in either tablet or traditional notebook modes. As there is no glidepad or trackpoint for moving the pointer you're committed to using the supplied stylus, so we were pleased to see that the panel's hinge was sufficient to prevent our prodding from jogging the screen when in use. Unfortunately, though, whatever Samsung has used to cover it is prone to reflecting every light in the room, which is a major distraction if you intend to use the device for extended periods.

We were disappointed that the Swivel doesn't seem to switch itself off when you close the lid. As this is pretty standard fare for other CE devices we often found ourselves leaving it on when we weren't using it. Fortunately, it benefits from a battery life of eight hours (according to Samsung) and has an average recharge time of three and a half hours.

A quick tour around the edges reveals enough ports and sockets to put even a fully featured notebook to shame. To the right there's a PC Card slot, reset point, power socket and internal modem, while to the left a proprietary VGA port for an external monitor, the PC connection interface, headphone and microphone sockets and a Type II Compact Flash slot. It's a shame Samsung opted for a non-standard VGA interface when some other manufacturers managed to squeeze in a widely accepted D-SUB as it means you can only use the Samsung-supplied cable if you want to connect to a monitor. Finally, at the back of the device sit the USB and IrDA 2.0 ports. It's a widely recognised fact that there is little in the way of CE-compliant USB devices but it's nice to have the port there just in case any should come along in the future.

In all, the IZZI-Pro Swivel is a nice attempt at a sub-notebook sized device but it's let down by its screen. The ability to turn it into a tablet is really little more than a gimmick, but if Samsung could come up with genuinely useful tablet-oriented software it might be able to corner a unique market. As it stands, there is little to make the tablet form factor a must-buy feature, apart from the fact you'll probably be the only person you know who has one. That said, in this larger form factor arena there's little to choose from, so if you need one it's still worthy of consideration.

**NIK RAWLINSON**

## DETAILS

**PRICE** £938.83 (£799 ex VAT)
**CONTACT** Samsung 0800 521 652
**www.samsungelectronics.co.uk**
**PROS** Euro symbol; plenty of memory; lots of ports; long battery life
**CONS** Non-standard VGA port and disappointing screen are both drawbacks; doesn't switch itself off automatically when the lid is closed; fairly pricey
**OVERALL** Difficult to recommend with this screen, especially when you consider the cost of the machine

| FEATURES | ★★★★ |
| EASE OF USE | ★★★ |
| VALUE FOR MONEY | ★★★ |
| OVERALL RATING | ★★★ |

## Table of features: palmtops

| Manufacturer | Casio | Compaq | Compaq | Handspring |
|---|---|---|---|---|
| **Model** | **Cassiopeia E-115** | **Aero 1550** | **iPAQ H3630** | **Visor Deluxe** |
| Price inc VAT (ex VAT) | £499 (£424.68) | £269.08 (£229) | £448.85 (£382) | £199 (£169.36) |
| Telephone | 020 8450 9131 | 0845 270 4000 | 0845 270 4000 | 020 7309 0134 |
| **Features** | | | | |
| CPU (speed) | MIPS VR-4121 (131MHz) | MIPS R-4111 (70MHz) | Intel StrongARM RISC (206MHz) | Motorola Dragonball (16.6MHz) |
| RAM/ROM | 32MB/16MB | 16MB/16MB | 32MB/16MB | 8MB/2MB |
| Size (h x w x d in mm) | 131.2 x 82.5 x 20 | 130 x 79 x 12.7 | 130 x 83.5 x 15.9 | 121.9 x 76.2 x 17.8 |
| Weight | 255g | 150g | 190g | 180g |
| Operating system | Pocket PC | Pocket PC | Pocket PC | Palm OS 3.1 |
| Input method | Stylus | Stylus | Stylus | Stylus |
| Voice recorder/modem | ✔/✗ | ✔/✗ | ✔/✗ | ✗/✗ |
| Display type | TFT | STN | TFT | Backlit LCD |
| Display resolution | 240 x 320 | 240 x 320 | 240 x 320 | 160 x 160 |
| Colour/monochrome | Colour | Monochrome | Colour | Monochrome |
| Infra-red | IrDA | IrDA | IrDA | ✔proprietary |
| Compact Flash slot | ✔ | ✔ | ✗ (optional) | ✗ |
| PC Card slot | ✗ | ✗ | ✗ (optional) | ✗ |
| Serial | ✔ | ✔ | ✗ (serial version available) | ✗ |
| USB | ✗ | ✗ | ✔ | ✔ |
| Other | Serial cradle, AC adaptor, soft case | Serial cradle, AC adaptor, leather case | USB cradle, ambient light sensor, alarm LED | USB cradle, leather case, plastic cover |
| **Battery** | | | | |
| Quoted battery life | 6hrs | 14hrs | 10hrs | Up to 1 month |
| Battery type | Li-ion | Li-ion | Lithium-polymer | 2 x AAA alkaline |

## Table of features: handhelds & laptop replacements

| Manufacturer | Ericsson | HP | Psion | Psion | Psion | Samsung |
|---|---|---|---|---|---|---|
| **Model** | **MC218** | **Jornada 720** | **Revo Plus** | **Series 5mx** | **Series 7** | **Izzi-Pro Swivel** |
| Price inc VAT (ex VAT) | £379.99 (£323.40) | £665 (£565.96) | £299.95 (£255.28) | £399.95 (£340.38) | £699.95 (£595.70) | £938.83 (£799) |
| Telephone | 0990 237 237 | 0870 547 47 47 | 0990 143 050 | 0990 143 050 | 0990 143 050 | 0800 521 652 |
| **Features** | | | | | | |
| CPU (speed) | ARM 710T Risc (36MHz) | Intel StrongARM SA1110 (206MHz) | ARM 710T Risc (36MHz) | ARM 710T Risc (36MHz) | StrongARM SA1100 (133MHz) | Toshiba MIPS TX3922 (129MHz) |
| RAM/ROM | 16MB/12MB | 32MB/16MB | 16MB/8MB | 16MB/10MB | 16MB/12MB | 32MB/16MB |
| Size (h x w x d in mm) | 24 x 172 x 90 | 34 x 189 x 95 | 18 x 157 x 79 | 23 x 170 x 90 | 37 x 235 x 182 | 25 x 228 x 196 |
| Weight inc batteries | 350g | 510g | 200g | 354g | 1.15Kg | 1.15Kg |
| Operating system | EPOC | Win HPC 2000 (WinCE 3.0 core) | EPOC | EPOC | EPOC | Win CE 2.11 |
| Input method | Keyboard and stylus | Keyboard and stylus | Keyboard and stylus | Keyboard and stylus | Keyboard and stylus | Keyboard and stylus |
| Voice recorder/modem | ✔/* | ✔/V.90 (RJ11port) | ✗/✗ | ✔/✗ | ✔/✗ | ✔/V.90 (RJ11 port) |
| Display type | Backlit LCD | LCD | LCD | Backlit LCD | Backlit STN LCD | 8.2in VGA DSTN LCD |
| Display resolution | 640 x 240 | 640 x 240 | 480 x 160 | 640 x 240 | 640 x 480 | 640 x 480 |
| Colour/monochrome | Monochrome | Colour | Monochrome | Monochrome | Colour | Colour |
| Infra-red | IrDA | IrDA | IrDA | IrDA | IrDA | IrDA |
| Compact Flash slot/PC Card slot | ✔/✗ | ✔/✔ | ✗/✗ | ✔/✗ | ✔/✔ | ✔/✔ |
| Serial/USB | ✔/✗ | ✗/✔ | ✔/✗ | ✔/✗ | ✔/✗ | ✔/✔ |
| Other | WAP enabled, soft case | USB cradle, Smart Card reader slot | AC adaptor, serial cradle | Serial lead | Docking station interface | VGA port, RJ11 to BT cable, serial & VGA cables |
| **Battery** | | | | | | |
| Quoted battery life | 1 month | Up to 9hrs | 14hrs | 1 month | 8.5hrs | 8-10hrs for AA pack |
| Battery type | 2 x AA alkaline | Li-ion | NiMH | 2 x AA alkaline | Li-ion | Li-ion/6 x AA alkaline |

KEY:  * = IrDA modem for compatible Ericsson phones included

| | HP | Palm | Palm | Palm | Palm |
|---|---|---|---|---|---|
| | Jornada 548 | Palm m100 | Palm IIIc | Palm IIIe | Palm Vx |
| | £439 (£373.62) | £130 (£110.64) | £320 (£272.34) | £149.99 (£127.65) | £299.99 (£255.31) |
| | 0870 547 47 47 | 020 7365 9820 | 020 7365 9820 | 020 7365 9820 | 020 7365 9820 |
| | | | | | |
| | Hitachi SH3 (133MHz) | Motorola Dragonball (16.6MHz) | Motorola Dragonball (20MHz) | Motorola Dragonball (16.6MHz) | Motorola Dragonball (20MHz) |
| | 32MB/16MB | 2MB/2MB | 8MB/2MB | 2MB/2MB | 8MB/2MB |
| | 130 x 78 x 16 | 118 x 79 x 18 | 127 x 79 x 17 | 119.8 x 81 x 17.7 | 115 x 80 x 10 |
| | 260g | 140g | 192g | 170g | 120g |
| | Pocket PC | Palm OS 3.5 | Palm OS 3.5 | Palm OS 3.1 | Palm OS 3.5 |
| | Stylus | Stylus | Stylus | Stylus | Stylus |
| | ✔/✘ | ✘/✘ | ✘/✘ | ✘/✘ | ✘/✘ |
| | Backlit CSTN | Backlit LCD | Backlit TFT | Backlit LCD | Backlit LCD |
| | 240 x 320 | 160 x 160 | 160 x 160 | 160 x 160 | 160 x 160 |
| | Colour | Monochrome | Colour | Monochrome | Monochrome |
| | IrDA | ✔ prioprietary | ✔ proprietary | ✔ proprietary | ✔ proprietary |
| | ✔ | ✘ | ✘ | ✘ | ✘ |
| | ✘ | ✘ | ✘ | ✘ | ✘ |
| | ✔ | ✔ | ✔ | ✔ | ✔ |
| | ✔ | ✘ | ✘ | ✘ | ✘ |
| | USB cradle, AC adaptor | Flip cover | Serial cradle, flip cover AC adaptor and plugs | Serial cradle, flip cover, serial converter | Serial cradle, leather cover, serial converter, AC adaptor |
| | | | | | |
| | 8hrs | Up to 2 months | Up to 2 weeks | Up to 2 months | Up to 1 month |
| | Li-ion | 2 x AAA alkaline | Li-ion | 2 x AAA alkaline | Li-ion |

# Thanks for the memory...

**W**here memory is concerned, handheld devices are somewhat limited in comparison to full-size laptops. The biggest issue is power consumption, since battery life is everything on a handheld. There are a few different storage media that have become the de facto standard by now. Perhaps the best known is Compact Flash or CF cards, closely resembling a half-sized version of the PC Card that you find in a laptop. The main difference is that CF cards drain less power than PC Cards and, of course, they use less space.

There are two flavours of CF card, Type I and Type II. Type II cards are thicker and so are incompatible with Type I slots. The cards come in a variety of capacities from about 8MB to 192MB and we should soon see even bigger cards than this.

IBM also has its now famous Microdrive in Type II format, which is available in sizes up to 1GB. Other popular Compact Flash cards are network cards and modems.

A less popular storage media for handhelds is Smart Media. These are smaller and thinner than Compact Flash.

They are limited to memory use only, and range from 4MB to 64MB in size. Smart Media is more commonly found in digital cameras than PDAs.

A third media type quickly gaining acceptance among MP3 players is MMC or Multimedia Cards. MMCs are smaller than Compact Flash and like

Smartmedia are also only available for memory storage. A few up-and-coming Springboard modules that will soon be available for the HandspringVisor will also support the MMC cards.

And finally there is the Sony Memory Stick, which seems to be increasing in popularity even though it has so far only been available in devices from Sony. Also a storage-only technology, it is similar to Smart Media and MMC but again comes in a different size. The only PDA that is compatible to date is Sony's Clié range, currently only available in Japan and the US.

With the growing number of devices that use or require some form of compact removable storage, the market for these modules seems to be healthy. It is, however, fragmented between the competing formats mentioned above, which raises the question of standardisation. Will one technology become as universal as the humble floppy disk? None of manufacturers want to give up any ground to the competition so this will take a long time – especially when the big players have to be serious about standardising.

**LARS-GORAN NILSSON**

# Editor's **Choice**

**T**he term Personal Digital Assistant generally defines a gadget serving as a personal organiser for contacts, notes and to do lists, but that term has lately broadened to encompass devices for movie watching, audio playback and Internet browsing. Add to this the fact that we all have different usage requirements and it becomes clear that selecting the best is a tricky decision.

With such a diverse range of options and form factors we split the various contenders into three: palmtops, handhelds and laptop replacements. In each of the categories we weighed up the pros and cons for each device and then assessed their features, ease of use and value for money.

## The winners

The Palmtop category saw a closely fought battle between two devices, one running Pocket PC and the other Palm OS. We debated the virtues of each operating system but could not judge one device to be better than the other on the basis of OS alone. We therefore gave two Highly Commended awards, one to the Palm OS-driven Handspring Visor Deluxe and the other to the HP Jornada 548 running Microsoft's Pocket PC.

If you want an all-round multimedia device with a colour screen, stereo sound and movie playback the Jornada 548 has the capability. In addition, it has a built-in Type I Compact Flash slot, giving expansion potential. You can argue that the Casio has built-in expansion potential too and that the Compaq iPAQ runs faster, but the Jornada 548 is £60 cheaper than the Casio, and the iPAQ only offers expansion through its optional jacket system. As for the Handspring Visor Deluxe, the Springboard slot has a lot going for it, promising to expand the functionality of the device. At £199 the 8MB Visor is keenly priced, and comes with a multi-functional stylus and USB cradle.

Moving to the handhelds, we again find two award winners with differing operating systems. The Psion Series 5mx runs EPOC, while HP's Jornada 720 is driven by Microsoft's handheld version of WinCE 3.0.

Again, each OS had its fair share of fans, so ultimately it came down to other features. First up, the Psion Series 5mx. This lovely unit looks the part and has a keyboard that's a pleasure to use. While the 5mx and the Ericsson MC218 are almost identical, Psion gets the Editor's Choice for its superior overall build quality. Nevertheless, Ericsson came close by bundling an infra-red modem.

If EPOC just isn't your thing you could opt for the Highly Commended HP Jornada 720. At £665, it is not the cheapest but you get a range of features. With Microsoft's HPC OS, the new Pocket Internet Explorer allows you to view content through the 720's internal modem. In addition Compact Flash Type I and Type II slots are included and performance is boosted by a 206MHz processor. We were also impressed by the 720's clear colour screen and the inclusion of a Smart Card reader.

Finally, the Psion Series 7 earned itself a Highly Commended accolade, winning the duel between laptop replacements. The Samsung is an interesting device, but it wasn't on a par with the well-built Series 7. It does have a notebook-like array of ports, but for just a little more money you could buy a real laptop. The Series 7, on the other hand, is a genuine lightweight alternative to a notebook with a colour screen and keyboard that are a joy to use. The lack of a modem is disappointing and the problem of file compatibility may put some users off, but this aside the Series 7 is a good choice for users on the go.


*The Visor promises expandable functionality*


*HP's Jornada 548 is ideal for multimedia*


*The Psion 5mx is stylish and versatile*


*HP's Jornada 720 has a host of features*


*Psion's Series 7 takes the place of a laptop*