Technofile: personal digital assitants

Handhelds used to be little more than electronic diaries, but the new breed of personal digital assistant is more like a mini computer than a high-tech calendar. Alex Katz looks at what the latest models have to offer

Once upon a time, a company called Palm revolutionised handheld computing with the launch of its PalmPilot devices. These small, portable, easy-to-use personal organisers won popularity thanks to the ease with which they could synchronise data with a PC, twinned with their ability to run a range of handy software applications. Because of this early success, Palm rapidly came to dominate the PDA (personal digital assistant) market, with an enviable market share of around 80 percent in its heyday during the late 1990s.

Never one to miss a trick, Microsoft soon cottoned on to the potential of the handheld market and launched its own operating system for PDAs, Windows CE. As with the desktop version of Windows, it's taken a few revisions for the product to really catch on. But with the latest generation, Pocket PC 2002, Microsoft and its hardware partners have finally started to threaten Palm's dominance.

One of the measures Palm has taken to counter the growing popularity of Pocket PC is to license out its operating system to a number of manufacturers, including Sony and Handspring. It has even spun off the OS development arm of the company under the brand PalmSource, in order to push the software to as wide a range of device manufacturers as possible.

Palm and Pocket PC aren't the only contenders, though, as new devices such as Sharp's Zaurus come on to the market running flavours of the Linux operating system. There are also a growing number of so-called convergence devices that roll the features of a PDA, mobile phone and even other devices into one unit.

All of this adds up to a wide and confusing range of devices to choose from, but over the next few pages we hope to help making your choice of handheld easier. We'll explain the pros and cons of the different types of PDAs and look at some of the emerging technologies to show what the market may bring in the future.

Palm vs Pocket PC: price wars

The first question when looking to buy a PDA is whether to go for a device based on the Palm OS or Pocket PC operating system. The answer is less than clear cut – hence the happy co-existence of both types of product on the market.

So what are the differences? Well, a principal one is price. Palm-based devices tend to be cheaper than Pocket PCs. Ignoring Handspring's Treos, which have built-in phones, the most expensive Palm-based device on the market at the moment is the £355 Sony Clie PEG-NR70V, while you can pick up a Palm m105 for as little as £64. The least pricey Pocket PC-based device, by contrast, is Toshiba's e310 at £245, while if you want all the bells and whistles you could pay over £500 for a Compaq iPaq H3970.

The reasons behind this price discrepancy are manifold. Palm-based devices tend to be based on cheaper components, such as less powerful processors and lower-resolution screens. But the operating system itself helps to keep costs low. Palm OS is relatively simple and highly optimised and doesn't need powerful hardware to run. Pocket PC is based on Windows, so places higher demands on processor and memory.

Devices based on the new version 5.0 of Palm OS are due for release soon and will support the same fast ARM-based processors as Pocket PC, including Intel's 400MHz XScale found in the iPaq 3970 and Toshiba e740.

↖ NEC is one of several companies currently making their first forays into the PDA market

This may well push up the prices of higher-end Palms. However, Dell is reported to be entering the Pocket PC market in the coming months, and the manufacturer's usual strategy is to undercut the competition and spark off a price war. Asus is another new entry into the PDA market with its mid-priced £360 MyPal A600 (for a full review see page 56).

Apps-a-plenty

If you're after a device that will integrate well with Office applications on your desktop, then Pocket PC is the way forward. The operating system comes with Pocket Word and Excel, which not only synchronise documents from your desktop but offer advanced document creation and editing features. Similar functionality is also available for Palm-based devices, but only in the form of third-party software such as DataViz's Documents To Go, which is bundled with many of the latest high-end Palm-based devices.

← Palm-based devices are often cheap and easy to use, so are good entry-level models

For traditional organiser functionality, such as contacts, calendars and to-do lists, both systems are excellent. However, most users will find the Palm OS simpler for basic tasks than Pocket PC. Coupled with the low prices of entry-level devices, such as Palm's m100 series or Sony's SL10, it would be hard not to recommend a Palm.

Palm devices tend to be smaller and lighter than the competition, although some Pocket PC manufacturers are starting to compete. As a result of Palm OS' lower specifications, these devices also tend to have better battery life, often lasting up to two weeks on a single charge, whereas Pocket PC battery life is usually quoted in hours rather than weeks.

But power features which make Windows' Pocket PC more attractive include the built-in MP3 player (although Sony does offer this on some of the Clie

Look to the future

If you're looking to invest in a PDA (personal digital assistant), Palm OS- and Pocket PC-based devices aren't the only options. Take, for example, the Sharp Zaurus SL-5500. In terms of specifications, it is almost identical to most Pocket PC devices. But there's one crucial difference – it runs the Linux operating system. The SL-5500 is aimed at corporates who can write their own applications for it, but there is little to recommend it to consumers given its high price and unfamiliar operating system.

A more realistic set of challengers comes in the form of the growing number of convergence devices available. With varying degrees of success, these combine PDA and mobile phone features in a single device. One approach to the convergence device has been to bolt a mobile phone on to a handheld, a route taken by Handspring with its Palm OS-based Treo range.

The Treo is available with either a monochrome or colour screen (the 180 and 270 respectively), but the features are somewhat limited. The screen on both models is only 160x160 pixels and they run Palm OS 3.5.2H, rather than the latest 4.1 version. As yet, data transfer is by standard GSM (global system for mobiles) dialup access, although a GPRS (general packet radio service) upgrade is due by the end of the year.

If you want the full PDA/phone experience, you should consider 02's Xda – the first device in Europe to combine Microsoft's Pocket PC 2002 Phone Edition with GPRS data.

HP's Jornada 928 also uses Pocket PC Phone Edition but this is the last product in the Jornada range, following HP's merger with Compaq. The company has promised to roll the best Jornada technology into the newly branded iPaq range, but it hasn't yet made any details public on how exactly it intends to do this.

Coming at the convergence device problem from the other side are the mobile phone manufacturers, such as Nokia with its 7650 and Sony Ericsson with its P800. Both these products use the Symbian operating system, based on the old Psion OS. This means there's less additional software available than for Palm and Pocket PC, but it's a more robust operating system.

Yet another approach is the dedicated connectivity device, such as RIM's BlackBerry, which gives you constant access to your corporate email wherever you are. It connects to your company email system over GPRS and also has an optional built-in phone. But this really is only for corporates as it requires the installation of server software, which could set you back in the region of £2,500.

A more consumer-oriented option is the Pogo which, for £255 plus a £7.99 per month access charge, offers web, email, phone, text messages and an MP3 player.

Despite this proliferation of different solutions, the convergence device era has literally only just begun, and this is where the future of PDA technology lies.

models), handwriting recognition software, voice recorder function and generally a better selection of expansion slots. Palm devices have a single MMC/SD slot; Handspring Visors use the proprietary Springboard slot, while Sony's Clie devices use the company's Memory Stick technology. Pocket PCs, by contrast, often have a CompactFlash slot, some of which can take high-capacity Microdrive media, as well as an SD card slot – both of which can be used for connectivity modules as well as additional storage.

Business studies

With such a wide range of devices and options, how do you make a choice? It all depends on what you'll be using it for.

The biggest growth in PDAs is in the business sector. As devices become better equipped to handle corporate demands, so companies are seeing them as cheaper, smaller and less power-hungry alternatives to notebooks. And it's in this sector where Pocket PC wins hands down thanks to its seamless integration with Microsoft Office and the number of advanced features built into every device.

Obviously the more high-end the PDA, the more business-specific features it has. One excellent example is Toshiba's e740, which is available in three models: one with built-in Wi-Fi, one with built-in Bluetooth and one plain vanilla version without any wireless features. Integrated wireless frees up the expansion slots, of which there are two (CompactFlash and SD) for additional storage and functionality.

The e740 is also one of the first devices to feature the 400MHz Intel XScale processor, but don't be fooled by the figures. This processor won't run twice as fast as a PDA based on a 206MHz StrongARM chip because of the different architectures within the two processors. There is also the fact that applications have to be rewritten to take advantage of XScale, so until there is some compliant software you won't get the full benefit.

Another Pocket PC that uses the XScale chip is Compaq's latest iPaq range, the H3900 series. The 3950 is similar to the e740, although it doesn't have a built-in CompactFlash slot; you have to use Compaq's expansion jacket. The 3970 has Bluetooth, but there is no Wi-Fi version.

All play and no work

PDAs aren't just for business, though – they can be personal too. Here the choice is harder. Pocket PC devices have plenty of built-in multimedia functions, but Sony has made great strides in thinking outside the PDA box recently. Its latest devices, such as the NR70V and the T675C, include a built-in MP3 player, programmable TV remote control and excellent colour screen with picture and movie playback software. The NR70V even has a built-in digital camera. And as they run the Palm OS, Sony's Clie PDAs have a vast amount of third-party software available in terms of games, reference material, ebooks and so on.

→ Compaq's latest iPaq model uses Intel's XScale processor

← Sony's consumer-oriented PDAs include features such as MP3 players, built-in cameras and stunning screens

For users interested in PDAs for their core function as a personal organiser, we'd recommend looking no further than the wide selection of Palm OS-based devices. Palm's own range starts with the absurdly cheap m105 that, for as little as £64, offers plenty of bang for your buck. It has 8MB of memory, enough to store up to 10,000 addresses, and it runs for two months from two AAA batteries.

The m105 is not the most up-to-date product, so you may want to consider the m125 which runs the latest version of the Palm OS and has an SD card slot. Then there's its colour counterpart, the m130, which at £193 is the lowest-cost colour PDA available.

Accessories

If you thought the choice of PDAs (personal digital assistants) was daunting, there's also a huge range of accessories to consider. Most manufacturers supply their own add-ons, but there are a number of third-party solutions as well, offering add-on keyboards, spare synchronisation cables, Bluetooth and Wi-Fi modules, plug-in digital cameras, cases and additional storage to name but a few.

The most important thing to consider is making sure the peripherals you want are compatible, something that is usually determined by the expansion capabilities of any given device. Palm devices use the MMC/SD card slot, while Sony uses its own Memory Stick technology. Most Pocket PCs use a choice of SD, CompactFlash and other connection technologies. Some manufacturers provide additional software and reference material on read-only cards – for example, Palm's PalmPak language translator card.

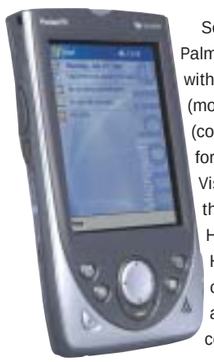
Some more imaginative PDA add-ons include Sony's forthcoming gamepad, the PEGA-GC10, which turns your Clie into a mini console. It even comes with two games to get you up and playing. Brother has also turned its hand to expanding PDA possibilities with its mono-thermal PDA printer, the m-PRNT.

A perennial favourite is the Palm portable keyboard, which offers a full-size laptop keyboard that folds away to barely larger than the size of a PDA itself. Logitech's KeyCase is also an ingenious solution, constructed out of fabric that wraps around the device to act as a case when not in use.

Excellent resources for a wide variety of handheld accessories are at www.pdabuyersguide.com (which only trades in the USA but provides a comprehensive resource of what's available) and www.widget.co.uk. For more information on Clie accessories visit www.clieplaza.com and for details about the m-PRNT visit www.brother.co.uk.

Features comparison

Model	Telephone	Website	Price (ex VAT)	Operating system	Processor/ speed	Memory (ROM)	Memory (RAM)	Screen size (pixels)		Screen colour depth	Battery life	Communications	Expansion	Dimensions (width x depth x height)	Weight
Palm devices															
Handspring Treo 180	020 7309 0134	www.handspring.co.uk	£340	Palm OS 3.5.2H	Dragonball VZ/33MHz	n/a	16MB	160x160		monochrome	100 hours standby, 2.5 hours talktime	GSM, IR	none	108x71x21mm	147g
Handspring Treo 270	020 7309 0134	www.handspring.co.uk	£425	Palm OS 3.5.2H	Dragonball VZ/33MHz	n/a	16MB	160x160		4,096 colours	150 hours standby, 3 hours talktime	GSM, IR	none	108x71x21mm	153g
Handspring Visor Neo	020 7309 0134	www.handspring.co.uk	£144	Palm OS 3.5.2H	Dragonball VZ/33MHz	n/a	8MB	160x160		monochrome	2 months	IR	Springboard slot	122x76x18mm	153g
Handspring Visor Pro	020 7309 0134	www.handspring.co.uk	£229	Palm OS 3.5.2H	Dragonball VZ/33MHz	n/a	16MB	160x160		monochrome	2 months	IR	Springboard slot	122x76x18mm	161g
Handspring Visor Prism	020 7309 0134	www.handspring.co.uk	£297	Palm OS 3.5.2H	Dragonball VZ/33MHz	n/a	8MB	160x160		65,536 colours	2 weeks	IR	Springboard slot	120x75x21mm	194g
Palm m105	020 7365 9820	www.palm.com/uk	£67	Palm OS 3.5	Dragonball EZ/16MHz	2MB	8MB	160x160		monochrome	2 months	IR	none	118x79x18mm	125g
Palm m500	020 7365 9820	www.palm.com/uk	£165	Palm OS 4.0	Dragonball VZ/33MHz	4MB	8MB	160x160		monochrome (16 levels)	2 weeks	IR	SD/MMC	114x79x10mm	113g
Palm m515	020 7365 9820	www.palm.com/uk	£315	Palm OS 4.1	Dragonball VZ/33MHz	4MB	16MB	160x160		65,536 colours	1 week	IR	SD/MMC	114x79x13mm	139g
Sony Clie PEG-SL10	08705 424 424	www.sony.co.uk	£118	Palm OS 4.1	Dragonball VZ/33MHz	8MB	8MB	320x320		monochrome (16 levels)	20 days	IR	Memory Stick	104x72x17mm	103g
Sony Clie PEG-T675C	08705 424 424	www.sony.co.uk	£297	Palm OS 4.1	Dragonball Super VZ/66MHz	8MB	16MB	320x320		65,536 colours	10 days	IR	Memory Stick	118x72x13mm	140g
Sony Clie PEG-NR70V	08705 424 424	www.sony.co.uk	£382	Palm OS 4.1	Dragonball Super VZ/66MHz	8MB	16MB	320x480		65,536 colours	10 days	IR	Memory Stick	137x73x17mm	200g
Pocket PC devices															
Compaq iPaq H3970	0845 270 4222	www.compaq.co.uk	£529	Pocket PC 2002	XScale/400MHz	32MB	64MB	240x320		65,536 colours	14 hours	Bluetooth, IR	SD/MMC	133x84x16mm	190g
Fujitsu-Siemens Pocket Loox 600	01344 475 555	www.fujitsu-siemens.co.uk	£375	Pocket PC 2002	XScale/400MHz	32MB	64MB	240x320		65,536 colours	10 hours	Bluetooth, IR	CF II, SD/MMC	132x82x17mm	175g
HP Jornada 568	0870 241 3625	www.hp.com/uk	£340	Pocket PC 2002	StrongARM/206MHz	32MB	64MB	240x320		65,536 colours	14 hours	IR	CF I	132x77x17mm	173g
HP Jornada 928	0870 241 3625	www.hp.com/uk	£332	Pocket PC 2002 PE	StrongARM/206MHz	32MB	64MB	240x320		65,536 colours	120 standby, 3 hours talktime,	GPRS, GSM, IR	CF I	137x78x17mm	194g
NEC Mobile Pro 300E	0870 010 6328	www.nec-online.co.uk	£328	Pocket PC 2002	StrongARM/206MHz	32MB	64MB	240x320		65,536 colours	8 hours	IR	SD/MMC	125x77x15mm	146g
O2 Xda	0870 850 0202	www.o2.co.uk	£340	Pocket PC 2002 PE	StrongARM/206MHz	32MB	32MB	240x320		4,096 colours	180 hours standby, 5 hours talktime	GPRS, GSM	SD/MMC	129x73x18mm	201g
Packard Bell PocketGear 2060	01628 512 400	www.packardbell.co.uk	£323	Pocket PC 2002	StrongARM/206MHz	32MB	64MB	240x320		65,536 colours	8 hours	IR	SD/MMC	125x77x15mm	146g
Toshiba e310	0870 444 8944	www.toshiba.co.uk	£245	Pocket PC 2002	StrongARM/206MHz	32MB	32MB	240x320		65,536 colours	10 hours	IR	SD/MMC	125x80x12mm	140g
Toshiba e570	0870 444 8944	www.toshiba.co.uk	£379	Pocket PC 2002	StrongARM/206MHz	32MB	64MB	240x320		65,536 colours	8 hours	IR	CF II, SD/MMC	125x76x18mm	180g
Toshiba e740	0870 444 8944	www.toshiba.co.uk	£425	Pocket PC 2002	XScale/400MHz	32MB	64MB	240x320		65,536 colours	8 hours	Bluetooth, IR	CF II, SD/MMC	125x80x16mm	185g
Others															
Nokia 7650	08700 555 777	www.nokia.co.uk	£128	Symbian OS 7.0	n/a	n/a	6MB	176x208		4,096 colours	150 standby, 2-4 hours talktime	GPRS, GSM, IR Bluetooth	none	114x56x26mm	154g
Pogo	020 7961 4100	www.pogo.co.uk	£255	n/a	ARM7/75MHz	4MB	16MB	240x320		256 colours	3 days standby, up to 5 hours talktime	GPRS, GSM	MMC	120x90x20mm	243g
Sharp Zaurus SL-5500	0800 262 958	www.sharp.co.uk	£340	Linux 2.4	StrongARM/206MHz	16MB	64MB	240x320		65,536 colours	10 hours	none	CF II, SD/MMC	138x74x18mm	208g
Sony Ericsson P800	0870 523 7237	www.sonyericsson.com	tbc	Symbian OS 7.0	n/a	16MB	12MB	208x320		4,096 colours	400 hours standby, 13 hours talktime	GPRS, GSM, Bluetooth	MemoryStick Duo	117x59x27mm	158g



↑ Pocket PC-based devices offer PC-compatibility and high-power programs

Sony has recently joined Palm in the entry-level market with its stylish SL10 (monochrome) and SJ30 (colour) PDAs. Don't let's forget Handspring's rugged Visor products either – the Neo, Pro and Prism. However, all three of Handspring's products cost more and aren't as well specified as the competition, suggesting Handspring is placing its eggs firmly in the Treo communicator basket.

As you move further up the scale into mid-range PDA territory the waters become a little murky. High-end Palms and low- to mid-range Pocket PCs can do significantly more than just manage contacts and to-do lists, and here is where the prices begin to overlap. Users who don't need all the bells and whistles of high-end devices, such as built-in wireless and top-speed processors, might consider Palm's m500 (monochrome) or m515 (colour) devices, or Sony's T675C. Alternatively, Toshiba's e310 is the first Pocket PC device to challenge Palm and Sony in the style stakes. And at £245 it costs less than the m515.

The gap between these products and the XScale devices is filled by a bevy of Pocket PCs from a wide range of manufacturers, with very little to choose from between them. Products such as HP's soon-to-be-discontinued Jornada 568 and 728, Compaq's iPaq 3700 and 3800 series, Toshiba's e570, Packard Bell's PocketGear 2060, Fujitsu-Siemens' Pocket Loox and NEC's MobilePro 300E are all separated by just a few pounds and differ little in terms of functionality. They are worthy of consideration if you like the look of one and don't want anything special out of your device, but you won't find extras like built-in wireless, keyboards and so on.

Verdict

There are so many PDAs available today that it would be impossible to choose one for being the best overall – each range is different as they are aimed at various sets of customers. Instead we'll recommend our picks from each camp – Palm OS and Pocket PC.

When Sony first joined the ranks of Palm OS licensees, its devices were less than impressive. But now it's taking the handheld market very seriously and its products show this. Rather than going down the business and enterprise route, Sony is focusing on what it does best – consumer technology, with products such as the Clie PEG-NR70V. This combines the best of both worlds – with all that a Palm OS device has to offer in terms of PDA functionality, plus top-notch extras like the built-in camera, MP3 player and stunning screen, all with Sony's legendary style.

As far as Pocket PC goes, these products really come into their own when designed for the power user, as both the hardware and operating system included in Pocket PC devices often go underused. The product that we feel makes the most of this potential is Toshiba's e740. The fact that you can buy the e740 with either built-in Wi-Fi or Bluetooth means the devices' two storage card slots are left free for other peripherals, while the option to add VGA and USB ports brings this device close to what Pocket PCs should be: a PC that fits in your pocket. ■

→ Convergence devices like this Sony Ericsson are the future of the PDA