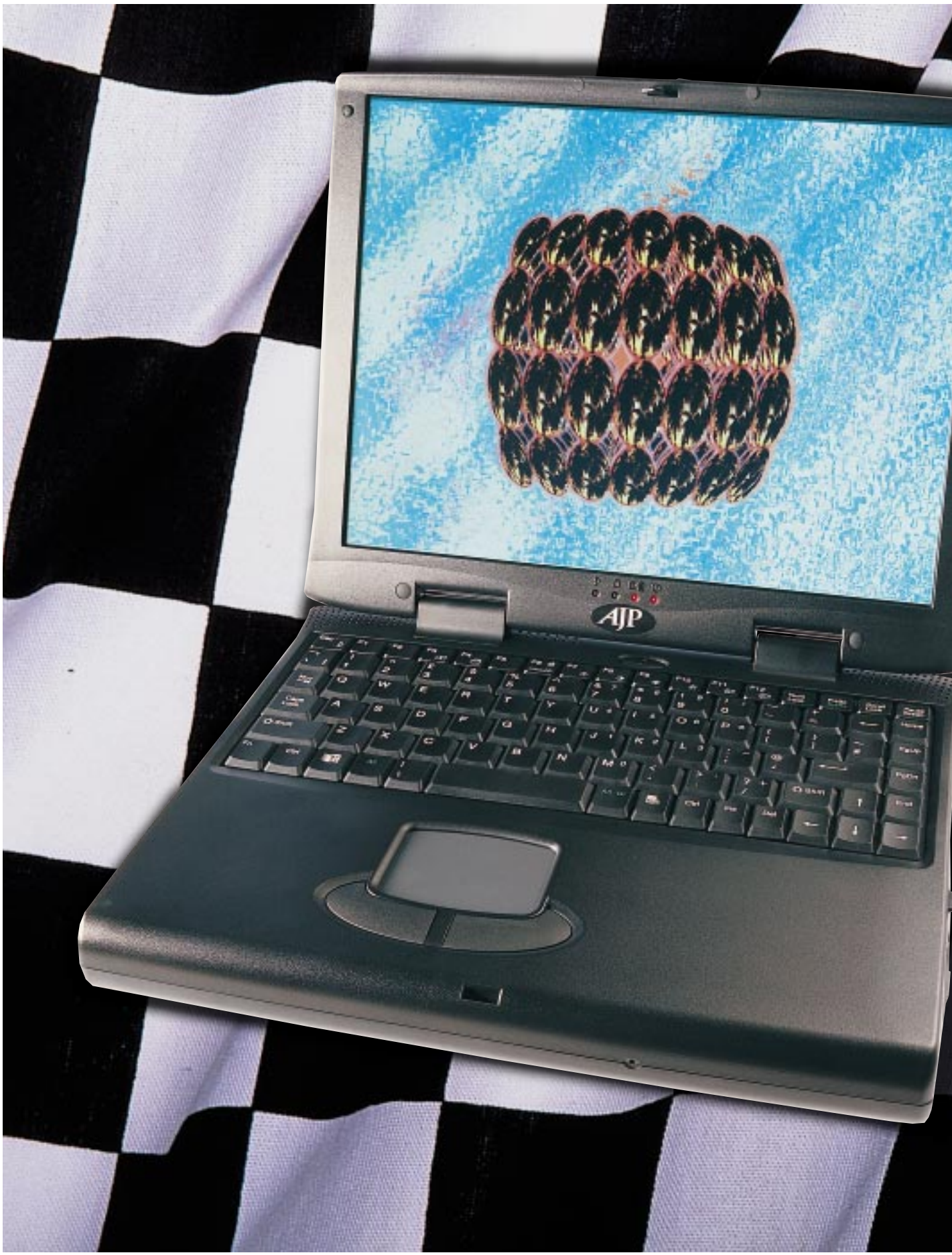

AJP

Winning formula

Choosing the ideal notebook is no easy task. Should it be entry-level, ultra-portable or a desktop replacement? To make it easier for you to make the decision, we've summarised the main points of each type and tested four in each category.

Mobile computing, like mobile communications, has gone through a process of incredible miniaturisation, while at the same time functionality has massively expanded. What used to seem like great big heavy bricks can now be as thin and light as an actual paper notebook — well, maybe a hardbacked book. Nor are notebooks very far behind desktop PCs in terms of power and speed, although the notebook and the PC are still very different beasts.

What notebooks gain in portability, they loose in upgradeability and they are, relatively speaking, much more expensive than desktops. If you are going to be spending your hard-earned cash on a non-upgradeable notebook, you have to be sure you are buying not just the best but the right notebook for your needs.

Most notebook manufacturers now seem to assume there are three distinct types of notebook: desktop replacement, ultra-portable and entry-level. We have divided our reviews into these same three categories, looking at four notebooks in each category.

To help you make an informed decision we also have the full low-down on the best technology on offer and what to look for in the perfect notebook.

Contents

Tested and reviewed by Adele Dyer and Paul Trueman.

Ratings

★★★★★ **Buy while stocks last**
★★★★ **Great buy**
★★★ **Good buy**
★★ **Shop around**
★ **Not recommended**

Notebook notes

Choices, choices, choices... If you want to work while on the move, you have some interesting decisions to make. You can take everything with you, from a credit card-sized REX card, through PDAs and on to notebooks with PII300 processors and 15in screens.

As attractive as some of the smaller devices are, if you need all the applications you use on your desktop, or are going to be making presentations, a notebook is your only option. While it may be tempting to replace your desktop with an all-singing, all-dancing notebook, do you really need to carry a big 'brick' around with you, or would you rather go for a tiny, slim, lightweight model? And can you really afford £3,000, or would you rather save your cash and go for a slightly slower machine that will not break the bank? Even though your new notebook may be a replacement for your desktop PC, you cannot expect it to behave in the same way. The first and most basic difference is in the processors. Intel has for many years produced mobile processors which have a different architecture from its desktop processors. These consume less power and typically run less hot than the desktop processors. They are also much smaller — a vital consideration when you think about the problems of stuffing a Pentium II into a notebook.

Innovations in the mobile processor market are sometimes remarkable...

However, until recently, the various means of attaching the processor to the motherboard usually involved soldering the chip onto the board using TCP (tape carrier package). For smaller vendors this meant buying chassis in bulk with motherboards and their chips already included, which carried a risk of remaining unsold if not enough customers wanted that speed of processor. So, many notebook manufacturers opted to use Socket 7 desktop processors. Desktop processors generate high heat levels, which shortens the life of the processor, and other components can be damaged if there is insufficient heat dissipation. Their high power consumption means shortened battery life, which is not good news if you are going to be using the notebook away from power sources — on the train, for example.

▲INTEL'S MOBILE PENTIUM II PROCESSOR, CURRENTLY AVAILABLE AT A MAXIMUM SPEED OF 366MHZ

Choosing an entry-level notebook

While you can now get an entry-level PC with a reasonable specification for around £500, the same cannot be said of notebooks.

Entry-level notebooks fall into two broad categories: those aimed at corporate organisations which need to kit out large numbers of people with notebooks, and the first-time notebook buyer who does not necessarily know a great deal about PCs and needs a cheap deal. In either case, ultra-portability is not a huge issue, nor is a great deal of power. Provided it can run basic applications, make presentations and be lugged around, a notebook with a significantly lower-powered processor is not such a bad idea, since it is less draining on the battery.

If you are buying notebooks for your workforce, some manageability features will make it easy to keep track of the notebook, its components and the software installation.

When connected to your business network, you'll be able to run a variety of checks on the notebook. These would immediately reveal whether, say, any RAM had been removed. Or, if the notebook itself is stolen, you can add features which will prevent it from being used by anyone who does not have the correct password. These go far beyond the normal Windows and BIOS passwords although not all are as thief-proof as they could be. However, by far the most popular manageability features combat problems such as, if your employee decides to delete a few system files, the fault can be picked up and rectified over the network.

If you can bear the additional network traffic, you can run all these checks over the network whenever the notebook logs on, whether it is over the LAN (local area network) or from a remote location.

With the demise of Socket 7, new processors and new ways of attaching processors to motherboards have been developed. The first of these came with the Mobile 233MMX, which not only used a smaller die size and smaller micron process but was also the first processor to come on a mobile module — a card containing the processor, the chipset and the L2 cache. The idea is that it can be slotted in and out, although to do so still takes a lot more engineering than when jamming in a desktop processor.

The new breed

While mobile modules are still around, the new breed of processors — notably the PII, and the Celerons just announced by Intel — also come in two new packages. The first is the Mobile Mini Cartridge, a tiny package containing just the processor. However, for even smaller machines such as the new generation of thin and light notebooks, there is the BGA (ball grid array) package.

As the name suggests, this uses ball bearings to connect it to the motherboard and can be slipped in easily; at the same time, the connectivity with the motherboard is excellent. The BGA processors are 98 percent smaller than the PII desktop in its SECC (single edge contact cartridge), but anyone who has ever prised the plastic coating off the SECC will see that the processor itself is like most consumer goods: very small compared to the size of the packaging.

Innovations in the mobile-processor market are sometimes remarkable, but they do take quite a while to come around. This is not so surprising when you consider the number of desktop systems compared to the number of notebooks sold each year. Current Mobile PII processors run at a top speed of 366MHz, and Intel has just announced Mobile Celerons running at 266 and 300MHz.

The PIIs are the most different from their desktop equivalents. Rather than having the L2 cache in the SECC, Intel has put the 256Kb of L2 cache on-die and it runs at the same core speed of the processor. Since the Pentium Pro, Intel has not put L2 cache on-die as it is an expensive operation. Intel admits the on-die cache will run faster than the 512Kb on the PII SECC, which runs at half the core speed of the processor. The shrunken Celeron also has 128Kb of L2 cache on-die, running, as it does in the desktop version, at the core speed of the processor.

More notebooks are physically damaged than develop hardware faults

However, shrinking the size of the processors is as nothing compared to the difficult task of lowering the power consumption while increasing the clock speed. Desktop PII processors have a core voltage of 2.2v, while the Mobile PII has a core voltage of 1.6v.

You will have noticed, though, a decided lag between the announcements of higher-speed desktop processors and their mobile equivalents. While Katmai is due to hit a machine near you next month [*look out for a round-up in the next issue of PCW*] the mobile version, codenamed Coppermine, with its new instructions and 100MHz front-side bus, will not be available until the second half of this year.

Power play

Today, Intel does not have the market to itself. AMD has a mobile version of the K6 processor. Essentially, this is exactly the same as the desktop chip, although each processor goes through more stringent power testing when it comes off the conveyor belt. Because the processor takes so much power, it makes sense to have some kind of power management, so as to preserve battery life.

As a response to the problem, Toshiba created ACPI (advanced component and power interface) which specifies how the OS, motherboard hardware and peripherals talk to each other about power usage.

Choosing an ultra-portable notebook

It is a fine line between choosing an ultra-portable notebook and a CE machine. Both are relatively small and light and have basic applications like Word and Excel. The evangelists would have you think that CE is going to change the future of computing, getting rid of bloatware once and for all.

But if you believe the sceptics, CE is a spent force before it gets going, with numerous inherent problems including the fact that because it uses solid state memory, any updates or applications you load necessitate you having to flash the ROM.

If you want a small, light, device but cannot live without a full version of Windows and all the applications that run on it, then there are some wonderful options out there. You only have to look at the machines we have reviewed in our 'ultra-portable' section [*p183*] to quickly realise they are very, very sexy.

You should remember that certain sacrifices will have to be made. For example, the chances are you are not going to get a floppy drive in a notebook this small, but when you are out on the road, do you really need this? And the same goes for a CD-ROM drive. If you can trade-off these drives against the extra weight they require, you are doing well. Console yourself with the thought that devices like CD-ROM drives are real power-gobblers without ACPI.

You will also probably have to live with a smaller screen than on a desktop replacement notebook, but this is only really a problem if you are going to be doing presentations and need several people to be able to see the screen. In general, though, thin notebooks can suffer from poor connectivity. Make sure you will only need one Type II PC Card slot, for instance; if you use a large Type III network PC Card, think again. You should also make sure a port replicator is available if you want to use the notebook at your desk.

You can expect to see many more small and light notebooks in the future, especially utilising such things as the new IBM SmartDisk, a tiny hard disk about the size of a CompactFlash card with a capacity of 340Mb at present, although this could grow to around 1Gb.

Using ACPI, the operating system should control the power supplied to peripherals, rather than depending on the BIOS to detect when peripherals have not been used for a while and so shut them down, although the BIOS is still needed to do the actual switching on and off.

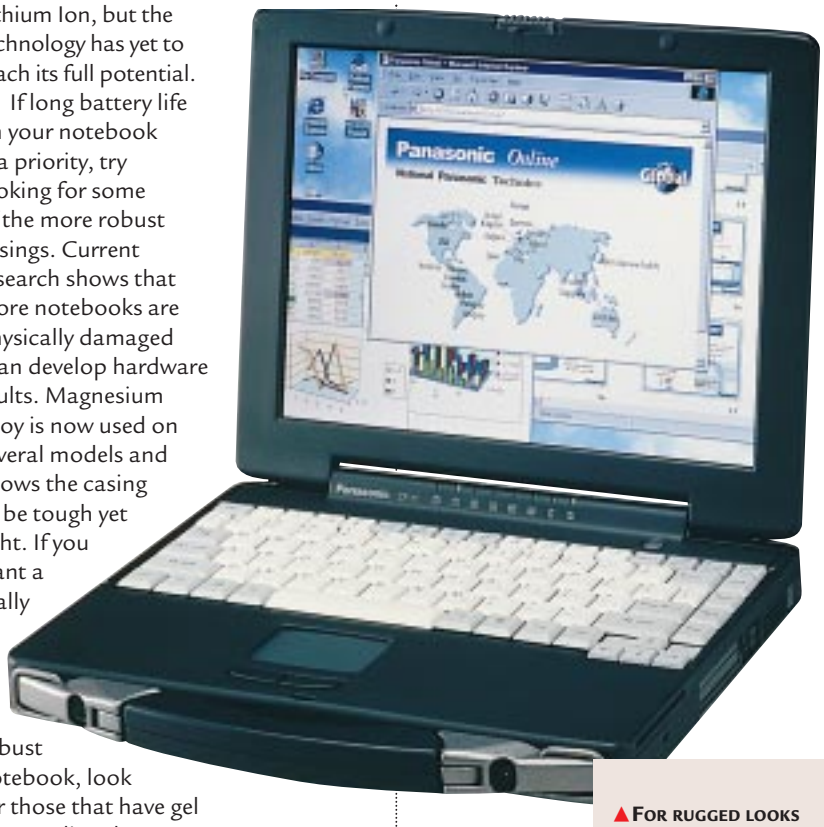
ACPI is implemented in Windows 98, although only in a limited way. Compare the Windows power management utility in Control Panel to that on a Toshiba or IBM notebook, for instance, and the difference is staggering. It is worth checking out the power management on the notebook you intend to buy before you part with your cash.

Smart batteries

ACPI also utilises the Smart Battery System developed jointly between Intel and Duracell, which gives more accurate battery readings and allows the battery to take control of charging, so prolonging the life of the battery. Yet any power management is only a good idea so long as you have a good battery to start with. While mobile devices have got smaller and lighter, batteries have not exactly come on in leaps and bounds.

There is a new technology, known as Lithium Polymer, which in due time is intended as a replacement for Lithium Ion. At the moment, the general consensus is that it does not give much longer life and is more expensive than Lithium Ion, but the technology has yet to reach its full potential.

If long battery life on your notebook is a priority, try looking for some of the more robust casings. Current research shows that more notebooks are physically damaged than develop hardware faults. Magnesium alloy is now used on several models and allows the casing to be tough yet light. If you want a really robust notebook, look for those that have gel surrounding the components most likely to be damaged, such as the hard disk. Gel at the corners of the notebook is also a good idea, although rubber coating is definitely not. Rubber jackets simply make the notebook bounce more, meaning it hits the ground hard more times, thus increasing the risk of damage.



▲ FOR RUGGED LOOKS AND DURABILITY, THE PANASONIC TOUGHBOOK TAKES SOME BEATING [SEE REVIEW, P184]

Choosing a notebook as a desktop replacement

For the power user, a notebook must have all the functionality of a desktop but in a portable form. So, you can have the brute force power of a good processor and lots of RAM, a huge hard disk, floppy drive, CD-ROM, a large screen and good sound. But there are pay-offs. Weight is the most obvious: do you really want to carry a 9lb brick around with you? Battery life is another.

If you are the type of user who needs to replace a desktop but for whom portability is not a great issue, then this kind of notebook is for you. But if you are only likely to move the notebook from your office to a meeting room and back again, or at worst, from the office into the car and then into your study at home, then weight will not be a consideration. Nor will battery life, as you are unlikely to ever be very far from an electric socket. Alternatively, if presentations are your game, you may have to end up with a desktop replacement just to get the larger screen and better sound quality these notebooks typically offer. If your company works exclusively on NT, you may be forced, at least until the launch of Windows 2000 later this year, to use a desktop replacement notebook. Many notebooks will have the 'Designed for Windows 98 and Windows NT' stickers on them but few have the staying power to run NT effectively, apart from at the very high end.

If your company demands that you get on the network quickly, then these notebooks are the best equipped for the job. Typically, desktop replacements come with better docking solutions, often with room for a network interface card.

In our reviews of desktop-replacement notebooks [*p184*] we were looking for the best all-round solution. Portability was not as big an issue as was the need for every part of a desktop to be present in the notebook. We were also looking for good-quality components. But most of all we were looking for durability. After all, if you are going to spend around £3,000 on a notebook, it has to be likely to last the course.

Entry Level

AJP 1100M

EDITOR'S CHOICE PERSONAL COMPUTER WORLD

AJP, in common with other manufacturers, buys stock from Asian manufacturers and reconfigures and re-brands it, and the 1100M bears the tell-tale signs. For instance, we couldn't work out why the slots for the two Type II PC Cards (or one Type III) are buried almost one inch inside the case. It was difficult to slot some cards in and we needed tweezers to subsequently remove them. We were also puzzled by the TFT panel hinges. One was moulded into the body of the notebook, the other wasn't. The overall appearance wasn't pretty. Not that aesthetic appearance is everything, but if you're spending this kind of money, at least you want it to look worth the expense. What you lose in build quality, though, is made up for in the spec. The 1100M uses Intel's PII266 in combination with a generous 64Mb of SDRAM, and this was one of the few entry-level notebooks to carry 4Mb of graphics VRAM. But the chip in question was the 2D S3 Virge, so while it handles office apps well, don't necessarily expect rich multimedia at your fingertips.

PCW DETAILS

Price *£1,350.08 (£1,149 ex VAT)*
Contact *AJP 0181 208 9744*
www.ajp.co.uk
Good Points *Pretty good specifications for an entry-level unit.*
Bad Points *Attention to appearance.*
Conclusion *Makes up in power what it lacks in appearance*

Build Quality	★★★★
Value for Money	★★★★

COMPAQ Armada 1700

Armada is an apt name for this battleship of a machine with matt black styling. There are three models within the 1700 range, from the PII233 to the PII300 in the model we looked at, and the 6300T. It was felt that for the price, users deserved more video memory than the 2Mb of VRAM with the Chips & Technologies 65555 graphics chip. Compaq has a bewildering range of notebooks on offer, and while the 1700 is better kitted-out than the 1500, it is still entry-level. With slots for two Type II cards though, once you have shelled out for a PC Card modem, the 1700 represents a pretty complete package. We were particularly impressed by the excellent speakers on this notebook, giving a clear, sharp sound through the Premiersound system. Weighing in at 3.78kg, this is a thick notebook that you'd be conscious of lugging around. But once you sit down to type, you'll soon be won over. The 1700 has an excellent keyboard with nice touches like the four hot-keys that can be programmed to launch oft-used applications.

PCW DETAILS

Price *£2,462.63 (£2,095 ex VAT)*
Contact *Compaq 0845 2704040*
www.compaq.com
Good Points *Very speedy processor.*
Bad Points *One of the heavier models.*
Conclusion *A sturdy, well-equipped notebook.*

Build Quality	★★★★
Value for Money	★★★★

GATEWAY Solo 2500 S5-233

Gateway has been selling notebooks in the past few years only, realising it was missing out by not providing a full product range. However, Gateway is selling its notebooks in the same way as Dell and Compaq, which buy-in machines from Taiwanese manufacturers. And, it is able to specify these machines with options not available to smaller resellers. However, the fact remains that unlike companies such as Toshiba, Sony and Sharp, Gateway does *not* make its own notebooks. In this entry-level machine, this buy-in approach shows through.
The Solo 2500 may hit all the right notes from the spec-sheet point of view – having two USB ports, floppy, CD, TV-out, sound and most of the other sockets you might expect in addition to the basic spec of 12.1in screen, P233 MMX, 64Mb RAM – but its build quality lets it down. There is a large bezel around the screen yet it still flexes easily; the display is also a little uneven in its luminosity. The glidepad had a nasty habit of drifting when we tried to click on an object, and the hard drive on our model clattered alarmingly.

PCW DETAILS

Price *£1,267.83 (£1,079 ex VAT)*
Contact *Gateway 0800 172000*
www.gateway.com/uk
Good Points *TV-out port.*
Bad Points *Screen. Casing. Glidepad. Hard drive.*
Conclusion *Looks good on paper, but disappoints in the flesh.*

Build Quality	★★
Value for Money	★★★

PICO Consul

Don't be fooled – this notebook does not have a magnesium chassis, it is just silver-coloured plastic. The colour is almost the most remarkable thing about this machine. Its glidepad is a little 'sticky' but not impossible to use. The mouse buttons have an annoying click and the keys on the keyboard tend to allow too much sideways movement, but neither of these are uncommon complaints in a notebook. And, its performance scores were just as one would expect from the specification. Nevertheless, many things about this machine put it slightly ahead of the crowd. The floppy and CD-ROM drives both fit into the notebook at once, so you don't have to swap drives, and the 13.3in screen running at a resolution of 1024 x 768 in 16-bit colour is good, with even luminosity. All the ports are shielded by lids to stop them getting clogged with dirt and the hard disk is an impressive 6Gb. The Consul is bundled with a 56K PC Card modem, GSM-ready, although be aware that not all PC Card modems work with all phones and compatibility with your mobile is not assured.

PCW DETAILS

Price *£1,526.33 (£1,299 ex VAT)*
Contact *Pico Direct 01483 402111*
www.picodirect.co.uk
Good Points *Bundled PC Card modem.*
Bad Points *Runs quite hot.*
Conclusion *Very average rebadged notebook.*

Build Quality	★★★
Value for Money	★★★

Ultra Portable

ACER TravelMate 312T

With the arrival of sub-notebooks running the latest generation of Windows CE, it is unusual to find one which uses Windows 95. The Acer looks as if it should be powered by a StrongArm processor, not a Pentium running at 233MHz with a 3Gb hard drive. We were impressed with the TravelMate's functionality in view of its size. At 36mm deep, the TravelMate is the same depth as a conventional notebook which means there is a lot more room inside than you might think. There is a 56K internal modem, room for two Type II PC Cards and no need for a port replicator. Ultra-portables such as the Vaio (*below*) need a plug-in replicator so you can attach to parallel, serial and other ports, whereas the TravelMate is thick enough for all those connections at the rear. Its keyboard does suffer from the cut-down size though, with the keys slightly too small and bunched together to enable easy typing. This review was typed on the keyboard, mainly using this reviewer's fingernail tips, and while it works quite well to make short notes, it could grow tiring to hunch over the keyboard for long stints.

PCW DETAILS

Price *£1,408.83 (£1,199 ex VAT)*
Contact *Acer 01753 487000*
www.acer.co.uk
Good Points *CD-ROM. Floppy. Internal modem.*
Bad Points *Size restrictions can make typing tiresome.*
Conclusion *An excellent miniature package.*

Build Quality	★★★★★
Value for Money	★★★★

SHARP PC-A150 UltraLite

EDITOR'S CHOICE PERSONAL COMPUTER WORLD

Sharp is good at producing highly desirable, well thought out and well built sub-notebooks. The UltraLite *is* small and light and seems remarkably robust. Its tough magnesium casing, which covers the entire notebook, not just the screen, looks as if it is going to protect it from some serious knocks. Other aspects show attention to detail. The VGA and USB ports have little rubber covers to keep the dirt out and the external floppy drive has one serial, one parallel and one VGA port on the back, so acting as a sort of mini docking station all of its own. Everything about the UltraLite screams good quality. Sharp is the world's largest manufacturer of LCD screens, so it isn't surprising that this notebook's screen is the best we saw in this group test: sharp, bright and with even luminosity. It even has effective brightness controls, unlike most other notebooks. Equally, the keyboard is one of the best in this test. It has little travel, as you would expect from a notebook this thin, but it does have a good, firm touch without the tilting you get on some notebook keyboards.

PCW DETAILS

Price *£2,109.13 (£1,795 ex VAT)*
Contact *Sharp 0800 262958*
www.sharp.co.jp
Good Points *Good results for the specification.*
Bad Points *Low spec compared to other notebooks in this category.*
Conclusion *Well thought out. Very desirable.*

Build Quality	★★★★
Value for Money	★★★★

SONY Vaio 505G

If you are solely after portability in your notebook, you should consider the Vaio 505. Impossibly slender, and gorgeous to look at with its lilac magnesium finish, the 505 will definitely win admiration from your workmates. With its skinny form factor and excellent 10.1in TFT screen, weighing only 1.35kg, Sony claims the 505 will give you 2.5 hours of battery life. The 505 has a depth of only 208mm but there isn't room for serial, parallel or PS/2 connections. Designers have cleverly protected the ports for floppy and port replicator with rubber covers but this is another notebook that assumes most software still loads from floppy disks — a CD-ROM drive is not standard. The Vaio takes a Type II PC Card in its single slot to connect to the external CD drive but the basic package does include a ComOne 56K PC Card modem for internet connectivity. You will end up with a rather more space-consuming machine when you do need to load software and surf the net, but for working solely on a notebook while on the move, an ultra-portable doesn't get much better than this.

PCW DETAILS

Price *£2,301.83 (£1959 ex VAT)*
Contact *Sony 0870 2402408*
www.sony.com
Good Points *Excellent form factor. Internet connectivity offered as standard.*
Bad Points *Plugging in all the necessary drives can prove tiresome — it's the price you pay for portability*
Conclusion *It's lilac, light and lovely.*

Build Quality	★★★★
Value for Money	★★★★

TOSHIBA Portege 7010CT

Toshiba prides itself on innovation through its large manufacturing base. Toshiba is keen to stress the business angle of its Portege range, particularly the larger 7010 we looked at. Its build quality is excellent, with easy access to sometimes fiddly components like the PC Card slots. As you would expect from a Toshiba PC, given that it helped design the open standard, the 7010 offers ACPI power management through the Windows 98 OS. The battery pack is fixed at the rear of the notebook, with the port replicator — with parallel, serial and PS2 ports — and floppy-drive connections at the left-hand side of the notebook, with the cooling vents for the PII300 processor on the other side. Only the floppy drive and the replicator are standard, which essentially means that any remotely serious user will need to invest in the DVD-ROM docking station or save pennies by opting for a CD-ROM extension PC Card. Rather than a touchpad, the designers have used the Mousepoint in the middle of the keyboard, which uses pressure to direct the cursor.

PCW DETAILS

Price *£2,931.63 (£2,495 ex VAT)*
Contact *Toshiba 01932 841600*
www.toshiba.com
Good Points *Well built. Gorgeous to look at.*
Bad Points *A CD-ROM as standard would suit the serious user.*
Conclusion *A slim, functional notebook ideal for the image-conscious businessperson.*

Build Quality	★★★★
Value for Money	★★★★

Desktop Replacement

ACi Olympian II

The Olympian II purports to offer a bewildering range of functionality but a closer look proved disappointing. One of the heaviest notebooks we reviewed here, it comes with a second battery which attaches beneath the notebook, acting as a stand to angle the keyboard. The keyboard was impressive but there were other parts of the casing that seemed less well designed. The parallel, serial and other ports are at the rear, protected by a flimsy plastic cover, with another, separate, inset plastic cover over the replicator port. We were in for a surprise with the DVD-ROM drive built in to the Olympian, over the floppy drive. It recognised the DVD films we ran yet there seemed to be a conflict with the Mediamatics software showing the films: we could hear them but we could see only a scrambled image. The TFT screen on our test model proved unstable. Whenever the notebook was moved, there was flickering all over the screen. We assumed this was due to faulty transistors that were unable to sustain the signals to the liquid crystal on the model we tested.

PCW DETAILS

Price *£2,583.83 (£2,199 ex VAT)*
Contact *ACi 0181 3571116*
www.aciweb.co.uk
Good Points *Extra battery as standard. Large hard drive.*
Bad Points *Faulty DVD and suspect TFT screen on our test model.*
Conclusion *Disappointing, despite the hardware on offer.*

Build Quality	★★
Value for Money	★★

DELL Inspiron 7000

The first thing that strikes you about the Inspiron 7000 is the lid. It is larger than the notebook beneath so it juts out over the machine's base. The reason is immediately apparent when you lift the lid — the screen is a whopping 15 inches. While this does not seem enormous compared to a 14.1in screen, it is the equivalent to moving from a 15in to a 17in CRT monitor. The Dell ran at only 1024 x 768 but this is acceptable at this screen size especially on a good, even display like this one. The display was driven by an ATi 3D Rage LT Pro graphics chipset. While this notebook is a 'brick' like the IBM (*below*) it does score some brownie points. The floppy drive and CD-ROM drive, one on top of the other, are in a single bay so you don't need to swap drives. And, while it doesn't have an internal modem, it does have a Psion Dacom Gold Card incorporating a 56K modem, GSM and ISDN. The Inspiron does not have power management software beyond the limited power management offered in Windows 98.

PCW DETAILS

Price *£2,348.83 (£1,999 ex VAT)*
Contact *Dell 0870 907 5664*
www.dell.com/uk
Good Points *Huge screen.*
Bad Points *Glidepad is over-sensitive.*
Conclusion *A solid all-rounder boasting the best performance in this group test.*

Build Quality	★★★
Value for Money	★★★

IBM ThinkPad 770

On first look it is easy to dismiss this notebook. It is a huge brick of a machine: thick, chunky and almost the size of the desktop it will be replacing; yet it still cannot accommodate a floppy and a CD/DVD drive together. An external floppy can either be attached to a port on the notebook or swapped with the DVD drive. Interestingly, IBM also has a second line of desktop-replacement ThinkPads which are a great deal thinner — is this the way IBM means to go in future? You might also be wary of the number of utilities which automatically start when you boot up the machine; — ten in all, not including IE4. Amongst these utilities are some rare gems. The power management utility, for instance, offers you a full implementation of ACPI, with settings for CD-ROM, CPU and PCI power. There is also call management software so the internal modem can be used as an answerphone, as well as a plethora of other useful utilities. The screen on this notebook has to be seen to be believed. It is only 13.7in diagonally yet runs at an incredible resolution of 1280 x 1024. Although this may seem like overkill, it is nevertheless a very good screen and is pin sharp.

PCW DETAILS

Price *£3,795.25 (£3,230 ex VAT)*
Contact *IBM 0870 601 0136*
www.uk.ibm.com
Good Points *High-res screen. High spec. DVD.*
Bad Points *Swappable floppy.*
Conclusion *A well-built brick.*

Build Quality	★★★★
Value for Money	★★★

PANASONIC Toughbook CF-71

EDITOR'S CHOICE Personal Computer World

Gone are the days of nasty-looking black chunks of plastic as the only option for the potential notebook buyer. The handle attached to this case could have looked rather clunky but instead it is an aesthetic winner. We were impressed by the high quality of the Toughbook's design. We dropped it from the regulation 30cm, causing no apparent damage — the hard drive is encased in protective gel. Of course, a 30cm drop zone isn't really going to be applicable in a practical environment: it needs to be at least twice that in case you drop it while walking. The swappable drive lock was impressively robust, quick and easy to use, and the multimedia pocket can take CD-ROM, floppy and Superdisk drives. The PII266 mobile processor gets fairly hot after a few hours' use, dissipated through the underside of the case. The keyboard was one of the best we saw in this test although the same could not be said of the touchpad. It required a heavy touch before it responded, and the double tap that replaces a double click needed to be more of a thump.

PCW DETAILS

Price *£2,701.32 (£2,299 ex VAT)*
Contact *Panasonic 0800 444220*
www.panasonic.co.uk
Good Points *Durability. Ease of use.*
Bad Points *The touchpad proved too 'tough'.*
Conclusion *A eye-catching package.*

Build Quality	★★★★
Value for Money	★★★★

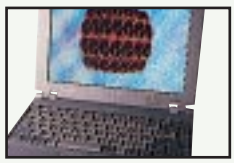
Table of features



Entry Level

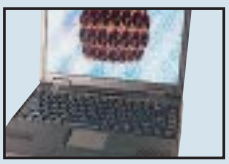
Manufacturer - Model	AJP 1100M	Compaq Armada 1700	Gateway Solo 2500 S5-233	Pico Consul
Price ex. VAT	£1,149	£2,095	£1,079	£1,299
Tel	0181 208 9744	0845 270 4040	0800 172000	01483 402111
URL	ww.ajp.co.uk	www.compaq.com	www.gateway.com/uk	www.picodirect.co.uk
Processor and RAM	PII266 / 64Mb SDRAM	PII300 / 32Mb SDRAM	P233MMX / 32Mb SDRAM	P233MMX / 64Mb SDRAM
Graphics manufacturer	S3 Virge	Chips & Technologies	NeoMagic	S3
Graphics chip	MX	P6555 PCI	128-bit	Virge
Graphics RAM	4Mb VRAM	2Mb VRAM	2Mb VRAM	4Mb VRAM
Screen size / type	13.3in / TFT	14.1in / TFT	12.1in / TFT	13.3in / TFT
Max screen resolution	1024 x 768	1024 x 768	800 x 600	1024 x 768
Hard disk size	3Gb	5Gb	2Gb	6.4Gb
Battery type / claimed life	Lithium Ion / 2-3.5hrs	Lithium Ion / 2.5hrs	Lithium Ion / 2.5hrs	NiMH / 2hrs
Weight inc. battery	3kg	3.78kg	3.1kg	3.3kg

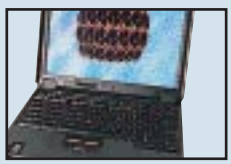




Ultra Portables

Manufacturer - Model	Acer Travelmate 312T	Sharp PC-A150	Sony Vaio 505G	Toshiba Portege 7010CT
Price ex. VAT	£1,199	£1,795	£1,959	£2,495
Tel	01753 487000	0800 262958	0870 240 2408	01932 841600
URL	www.acer.co.uk	www.sharp.co.jp	www.sony.com	www.toshiba.co.uk
Processor and RAM	P233MMX / 32Mb SDRAM	P233MMX / 64Mb SDRAM	PII266 / 32Mb SDRAM	PII300 / 32Mb SDRAM
Graphics manufacturer	NeoMagic	NeoMagic	NeoMagic	NeoMagic
Graphics chip	MagicGraph 128ZV+	128-bit	Magicgraph 128DX	MagicMedia
Graphics RAM	1Mb SGRAM	2Mb VRAM	2.5Mb SGRAM	2.5Mb SVRAM
Screen size / type	8.4in / TFT	11.3in / TFT	10.4in / TFT	12.1in / TFT
Max screen resolution	800 x 600	800 x 600	800 x 600	800 x 600
Hard disk size	3.2Gb	4.3Gb	4.3Gb	4.3Gb
Battery type / claimed life	Lithium Ion / 2.5hrs	Lithium Ion / 2.5hrs	Lithium Ion / 2.5hrs	Lithium Ion / 2.5hrs
Weight inc. battery	1.2kg	1.4kg	1.35kg	1.9kg






Desktop replacement

Manufacturer - Model	ACi Olympian II	Dell Inspiron 7000	IBM ThinkPad 770	Panasonic Toughbook CF71
Price ex. VAT	£2,199	£1,999	£3,230	£2,299
Tel	0181 357 1116	0870 907 5664	0870 601 0136	0800 444220
URL	www.aciweb.co.uk	www.dell.com/uk	www.uk.ibm.com	www.panasonic.co.uk
Processor and RAM	PII300 / 64Mb SDRAM	PII300 / 128Mb SDRAM	PII300 / 128Mb SDRAM	PII 266 / 32Mb SDRAM
Graphics manufacturer	ATi	ATi	Trident	NeoMagic
Graphics chip	3D Rage LT Pro	3D Rage LT Pro	CYBER9397	Magicgraph 128DX
Graphics RAM	4Mb SGRAM	4Mb VRAM	8Mb SGRAM	2Mb SGRAM
Screen size / type	13.8in / TFT	15in / TFT	13.7in / TFT	12.1in / TFT
Max screen resolution	1024 x 768	1024 x 768	1280 x 1024	800 x 600
Hard disk size	5.98Gb	6.4Gb	8.1Gb	4Gb
Battery type / claimed life	Lithium Ion / 3.5hrs	Lithium Ion / 3hrs	Lithium Ion / 3.5hrs	Lithium Ion / 2-3.5hrs
Weight inc. battery	3.7kg	4.04kg	3.53kg	2.9kg (not inc. handle)

Editor's Choice

There are two types of notebook vendor: those that design and build their own from scratch, and those that buy Taiwanese imports and rebadge them. The former are able to innovate and drive the market on to new areas. Not surprisingly, it was these manufacturers which produced the most impressive notebooks in this test. We have come up with a winner in each of our three notebook categories: entry level, desktop replacement and ultra-portable. Each winner earns itself an Editor's Choice award.

Choosing an entry-level notebook was the most difficult decision. All the contenders in this category were much of a muchness, with little on price or performance to put between them. In the end, the award went to the **AJP 1100M** for providing a great deal of power with a PII266, 64Mb of RAM and 4Mb of video RAM, and all for a very reasonable price.

In the desktop replacement category, the Editor's Choice is the **Panasonic ToughBook CF-71**. While it is not the fastest by a long chalk, having a slower processor and less RAM than the other contenders, its rugged design and practical styling applied to its carry-handle and magnesium-alloy casing made it both look the part and perform well.

The ultra-portables were all very good. Any of them would provide a wonderful option for anyone who needs a light machine for general tasks. In the end we plumped for the **Sharp PC-A150** as the best option. Even though the Sony Vaio 505G was a very near winner, the Sharp won through thanks to its great price and performance as well as for the little extras such as the external floppy with extra ports built in.

Overall, taking all 12 notebooks into consideration, the most impressive one we tested was the **Sharp PC-A150** — a machine which is light and portable but which boasts sufficient power and a big enough screen to be used in presentations. Providing you do not ask too much of your notebook, it could even be used as a desktop replacement.

▶ **Our Editor's Choices (from top): the AJP 1100M, the Panasonic Toughbook CF71, and most impressive of all, the Sharp PC-A150**

PCW Labs Report

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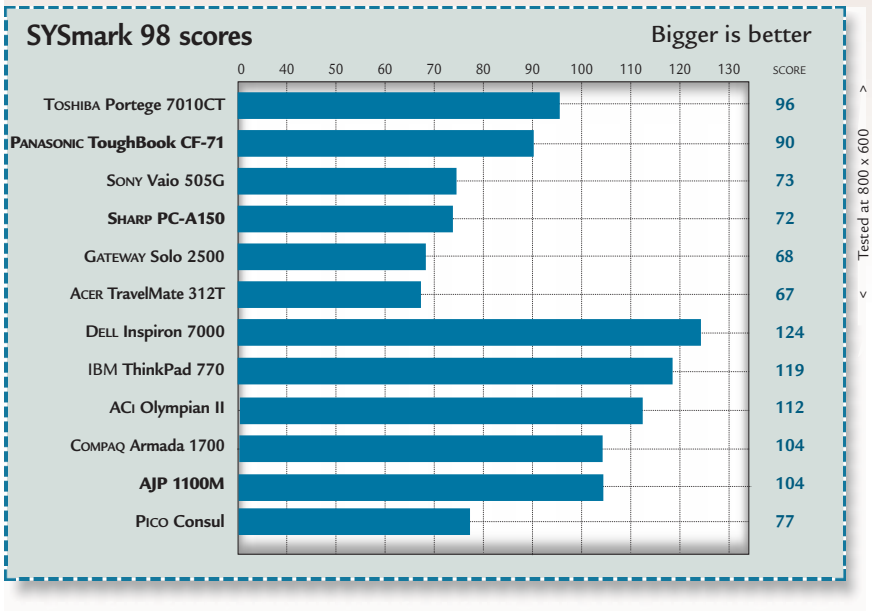

The fastest three notebooks used PII 300MHz mobile processors and hail from our desktop replacement category. Their performance is similar to PII 300MHz desktops. Despite being an entry-level machine, Compaq's Armada 1700 scored highly due to its PII 300 processor. The Toshiba ultra-portable may also have boasted a PII 300 chip but its performance fell short of the RAM-packed desktop replacements. The Toughbook also fell short compared to the other desktop replacement machines due to its PII 266 processor and only 32Mb RAM, but its rugged design impressed us. The slowest notebooks in the test also featured the least powerful processors — typically P233 MMX chips in the ultra-portables, which score similarly to 266 Celeron desktop systems.