



Pentium 4 DDR motherboards

Six of the latest DDR Pentium 4 motherboards receive the PC Pro treatment

It was only four months ago that we rounded up 18 Pentium 4 motherboards (*see Labs, issue 88, p96*), but the release of new chipsets has meant that a follow-up was in order. Of primary concern is Intel's own DDR chipset, the 845D, of which we saw just one sample in our last round-up. Also new is VIA's revision of the P4X266 – the cunningly named P4X266A – which brings support for UltraDMA/133 and, more importantly, enhanced performance.

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CONTRIBUTOR Jim Martin
PHOTOGRAPHY Hugh Threlfall,
Julian Hawkins

We tested the six boards using exactly the same components and benchmarks as for the last Labs. The only addition was 256Mb of PC2700 DDR SDRAM from Samsung, which we used to test the MSI 645 Ultra – the SiS645 chipset is still the sole supporter of 333MHz memory. But, it's soon to be joined by the VIA P4X333, which will render the new P4X266A out of date while it's still relatively new. Such is the pace of change in the motherboard market.

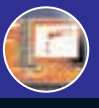
The chipsets aren't the only things that change quickly. The Pentium 4 itself has already moved from 423 pins to 478 in its short life, and the manufacturing process from 0.18 micron to 0.13 micron, with the introduction of Northwood. There's speculation of another development as well – an increase of the FSB (front side bus) frequency from 400MHz to 533MHz. Unfortunately, even though all six motherboards here support a 133MHz FSB, this is only achievable through overclocking, which means they're unlikely to be compatible with the new CPUs. Several manufacturers have hinted that a new chipset will be required to support such a CPU.

Of course, it's impossible to speculate on the performance increase that a 533MHz FSB will bring, which in turn means that we can't say whether it's worth waiting for them. But, if you're looking to build a Pentium 4-based PC now, we've covered as many bases as possible, so whether you're after a basic budget board or a fully loaded monster you'll find your ideal match here.

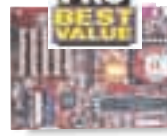


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See p47



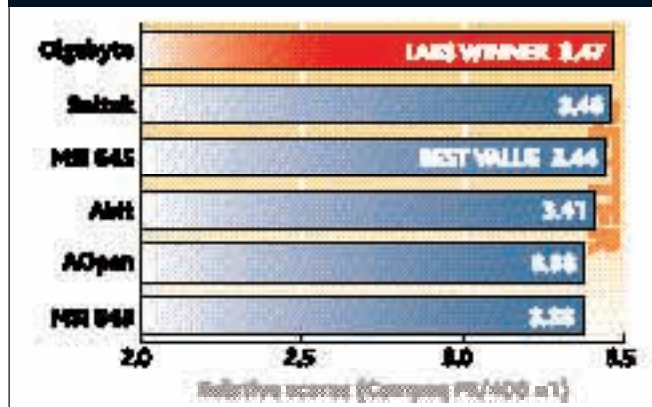
● SPECIFICATIONS AND FEATURES



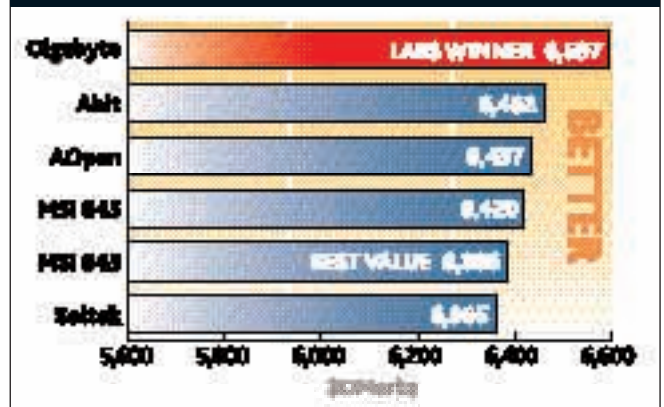
	Abit BD7-RAID	AOpen AX4B	Gigabyte 8IRXP	MSI 645 Ultra	MSI 845 Ultra-ARU	Soltek 85DRV3
Overall score	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Price* (inc VAT)	£127 (£149)	£102 (£120)	£126 (£148)	£70 (£82)	£117 (£137)	£77 (£90)
Supplier	dabs.com 0800 138 5182	dabs.com 0800 138 5182	dabs.com 0800 138 5182	Insight 0870 700 7350	dabs.com 0800 138 5182	dabs.com 0800 138 5182
Supplier's Web site	www.dabs.com	www.dabs.com	www.dabs.com	www.insight.com/uk	www.dabs.com	www.dabs.com
Manufacturer's Web site	www.abit.com.tw	www.aopen.nl	www.gigabyte.com.tw	www.msi.com.tw	www.msi.com.tw	www.soltek.com.tw
Basic warranty	1yr RTB	1yr RTB	3yrs RTB	1yr RTB	1yr RTB	1yr RTB
DETAILS						
Chipset	Intel 845D	Intel 845D	Intel 845D	SiS645	Intel 845D	VIA P4X266A
Type of memory supported	PC1600, PC2100	PC1600, PC2100	PC1600, PC2100	PC1600, PC2100, PC2700	PC1600, PC2100	PC1600, PC2100
Form factor	ATX	ATX	ATX	ATX	ATX	ATX
Dimensions: length x width (mm)	305 x 240	305 x 244	305 x 244	305 x 220	305 x 230	305 x 246
Highest UltraDMA mode	133	100	133	100	133	133
AGP support	4x	4x	4x	4x	4x	4x
BIOS type	Award	Award	Phoenix (Dual BIOS)	AMI	AMI	Award
Number of fan sockets	3	3	3	2	3 (1 used)	4
CPU COMPATIBILITY						
CPU connector type	Socket 478	Socket 478	Socket 478	Socket 478	Socket 478	Socket 478
Quoted speed	All	1.3-2.4GHz+	All	1.5-2.2GHz+	1.5-2.2GHz+	All
CPU multiplier	8-24+	8-24+	8-24+	8-24+	8-24+	8-24+
FSB frequency (MHz)	100-250 (1MHz increments)	100-200 (1MHz increments)	100-200 (1MHz increments)	100-200 (1MHz increments)	100-200 (1MHz increments)	100-255 (1MHz increments)
Frequency setting method	BIOS (SoftMenu II)	BIOS	BIOS, software (EasyTunell)	BIOS, software (Fuzzy Logic III)	BIOS, software (Fuzzy Logic III)	BIOS, jumper
OVERCLOCKING SUPPORT						
CPU voltage adjust	1.1-2.2V (in 0.025V increments)	1.1-1.85V (in 0.025V increments)	1.1-1.85V (in 0.025V increments)	1.725-1.85V (in 0.025V increments)	1.75-1.85V (in 0.025V increments)	1.1-1.85V (in 0.025V increments)
DIMM voltage adjust	2.5V-2.7V (in 0.1V increments)	✗	2.6V-2.8V (in 0.1V increments)	✗	2.5V-2.6V (in 0.1V increments)	2.5V-2.6V (in 0.1V increments)
AGP voltage adjust	✗	✗	1.6V-1.8V (in 0.1V increments)	✗	1.5V-1.6V (in 0.1V increments)	1.5V-1.8V (in 0.1V increments)
FSB/PCI divider	✓	✗	✓	CPU/DRAM ratio adjust	✗	✗
EXPANSION						
DIMM sockets	2	3	3	3	3	3
RIMM sockets	✗	✗	✗	✗	✗	✗
Maximum memory	2Gb	2Gb	2Gb	3Gb	2Gb	1.5Gb unbuffered, 3Gb registered
AGP	✓	✓	✓	✓	✓	✓
AGP Pro	✗	✗	✗	✗	✗	✗
PCI	6	5	6	5	5	6
CNR	1	1	1	1	1	1
PORTS						
On main backplane**	2S, 1P, 3U	2S, 1P, 2U, 1G	2S, 1P, 2U, 1G, 1R-45	2S, 1P, 2U, 1G	2S, 1P, 2U, 1G	2S, 1P, 2U, 1G
Additional USB supplied	✗	✗	2 x USB 1.1, 4 x USB 2	2 x USB 1.1	2 x USB 1.1, 4 x USB 2	✗
Additional serial supplied	✗	✗	✗	✗	✗	✗
Optional IrDA	✓	✓	✓	✓	✓	✓
Additional USB headers on motherboard	1	1	3	2	3	1
Other headers	Game port (included), thermal sensor	Front panel audio	Memory Stick, SmartMedia	Front panel audio	Front panel audio	Thermal sensor (sensor included)
HARDWARE MONITORING						
Wake-on-Modem (WoM)	✗	✓	✗	✓	✓	✗
Wake-on-LAN (WoL)	✓	✓	✓	✗	✓	✓
CPU fan speed	✓	✓	✓	✓	✓	✓
Temperature monitoring	✓	✓	✓	✓	✓	✓
Voltage monitoring	✓	✓	✓	✓	✓	✓
INTEGRATED COMPONENTS						
Audio	Avance Logic ALC200 (AC97)	Analog Devices AD1885 (AC97)	Creative CT5880 (four-channel) + Sigmatal 9708T	Avance Logic ALC201/A (AC97)	C-Media CMI8738/PCI-6ch-LX (six-channel)	VIA VT1611A (AC97)
Network interface adaptor	✗	✗	Intel 82562ET (10/100)	✗	✗	✗
RAID controller	HighPoint HPT372 (RAID-0, -1, -0+1, JBOD)	✗	Promise PDC20276 (RAID-0, -1)	✗	Promise PDC20276 (RAID-0, -1)	✗
Other	✗	✗	NEC USB 2 controller	✗	NEC USB 2 controller	✗
MANUAL						
Error/beep codes guide	✓	✗	✗	✓	✗	✗
BIOS guide	✓	✗	✗	✓	✓	✓
ITEMS SUPPLIED						
34-pin floppy cable	✓	✓	✓	✓	✓	✓
IDE 80-conductor ribbon cable	2	✓	3	✓	2	✓
Motherboard driver CD	✓	✓	✓	✓	✓	✓
Software	Norton AntiVirus 2002 (lite version), Hardware Monitor	Norton AntiVirus 2002	Norton AntiVirus 2002, Personal Firewall 2002, Intel LANdesk Client Manager	Fuzzy Logic III, Live BIOS, PC Alert III, Trend PC-cillin 2000	Fuzzy Logic III, Live BIOS, PC Alert III, Trend PC-cillin 2000	Trend PC-cillin 2000, Virtual Drive, Drive Image 4, PowerQuest PartitionMagic 6 SE

*Prices were correct at time of going to press. **Key: S = serial, P = parallel, U = USB, G = game, RJ-45 = network socket

● 2D PERFORMANCE



● 3D PERFORMANCE





Abit BD7-RAID

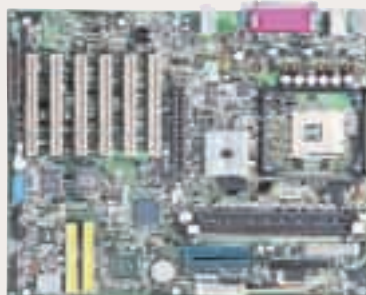
PRICE £127 (£149 inc VAT)

SUPPLIER dabs.com 0800 138 5182

VERDICT A well-featured motherboard, with the advanced RAID controller taking pride of place, but it costs too much.

Abit targets the BD7-RAID straight at the power user. All the company's usual trademarks are here – from the integrated power and reset buttons to the diagnostic LEDs, and from the six PCI slots to the HighPoint HPT372 RAID controller.

The RAID controller is particularly noteworthy. It supports mirroring, striping and a combination of both when using four EIDE hard disks; the Promise controller on the Gigabyte 81RXP and MSI 845 only provides mirror or striping options. Both



controllers support UltraDMA/133, but this doesn't offer any great benefits over UltraDMA/100 for current hard disks.

Oddly, there are three USB ports integrated on the backplane, and the audio ports are mounted vertically, leaving no room for a game port. This is supplied on a separate backplate, so if you want to make use of it then one of the six PCI slots will be rendered unusable. Also note that this board has just two DIMM sockets.

Overclockers will appreciate SoftMenu III's features, including voltage adjustment for the CPU and DIMM sockets, as well as the FSB/PCI divider that locks the AGP and PCI slot frequencies when overclocking.

The BD7's performance was average in our 2D suite, scoring 3.41 overall, but was more impressive in 3D with a total of 6,462 3DMarks earning it second place. Sadly for Abit, the Gigabyte 81RXP has integrated LAN, USB 2 and better audio for the same price. Unless you need the Abit's advanced RAID features, the choice isn't difficult.

PC PRO RESULTS

PERFORMANCE	★★★★★
FEATURES & EXPANSION	★★★★★
VALUE FOR MONEY	★★★☆☆
OVERALL	★★★★★

AOpen AX4B

PRICE £102 (£120 inc VAT)

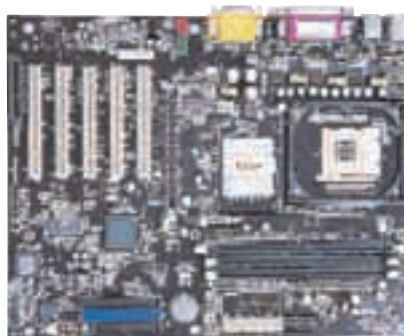
SUPPLIER dabs.com 0800 138 5182

VERDICT A comparative lack of features for the price does AOpen no favours in this competitive Labs.

The AX4B is the most basic board on test: it has integrated AC97 audio, but that's about it. There are no RAID, USB 2 or NIC controllers integrated, and while this would be fine at £70 the AX4B costs £102. And where other boards have useful extras such as LEDs for diagnosing problems or additional USB ports, AOpen is minimalist, not even providing a paper manual.

Expansion is par for the course; the five PCI slots, three DIMM sockets and obligatory CNR slot should suffice for most users. It's good to see that the extra space gained by omitting a sixth PCI slot has been used at the top of the bank of slots, which means memory can be removed or installed without removing the AGP card. The rest of the layout is reasonable, although the EIDE connectors may be mounted too low down for shorter cables to reach.

There are three fan connectors for cooling the components, which could come in handy if you take advantage of the overclocking features in the BIOS. The FSB can be increased in 1MHz increments, while the CPU voltage can be increased to 1.85V. Another neat feature is the Watchdog Timer, which resets the FSB to default if it has been overclocked too much. This saves resetting the CMOS and losing other settings.



AOpen has been beaten by the strong competition in this Labs, as the AX4B offers little to recommend it. Even the full version of Norton AntiVirus 2002 gains it little ground. Performance is nothing exceptional, and the price is too high for the features on offer.

PC PRO RESULTS

PERFORMANCE	★★★★★
FEATURES & EXPANSION	★★★★★
VALUE FOR MONEY	★★★☆☆
OVERALL	★★★★★

Gigabyte 81RXP

PRICE £126 (£148 inc VAT)

SUPPLIER dabs.com 0800 138 5182

VERDICT Loaded with features, including RAID, USB 2 and four-channel audio, the 81RXP is the clear winner this month.

The 81RXP isn't just another 845D-based board. Gigabyte has added a plethora of features to enhance the board's appeal. First, and most obvious thanks to their lurid green colour, are the two extra EIDE channels driven by a Promise PDC20276 RAID controller. True, it doesn't support RAID-0+1 as the Abit does, but it does support UltraDMA/133.

Next on the list is the NEC USB 2 controller. This is a later revision of the chip we saw on MSI's K7T266 Pro2-RU (see *Labs*, issue 89, p80) and solves some of the older



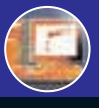
chip's IRQ-sharing problems. Then there's the 10/100 Intel Ethernet adaptor and Creative's CT5880 chip, which delivers four-channel audio.

Add to this a full complement of six PCI slots and three DIMM sockets and you've got a serious Pentium 4 motherboard. The familiar Dual BIOS is also in place for guaranteed booting. Look more carefully and you'll find headers for Memory Stick and SmartMedia readers – another unique feature. Six additional USB ports are included, as are three EIDE cables and an I/O shield to accommodate the RJ-45 connector on the backplane.

Finally, performance was top notch in both 2D and 3D – 3.47 and 6,597 3DMarks respectively were enough to give the 81RXP first place overall. Add to this a reasonable price and Gigabyte has a winner on its hands. If you don't need support for the next generation of Pentium 4 chips, the 81RXP is an excellent choice.

PC PRO RESULTS

PERFORMANCE	★★★★★
FEATURES & EXPANSION	★★★★★
VALUE FOR MONEY	★★★★★
OVERALL	★★★★★



MSI 645 Ultra

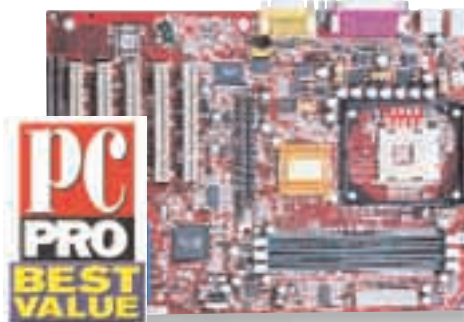
PRICE £70 (£82 inc VAT)

SUPPLIER Insight 0870 700 7350

VERDICT This previous Labs Winner is now an even bigger bargain and remains the best choice for less demanding users.

The 645 Ultra won our recent Pentium 4 motherboards group test (see *Labs*, issue 88, p96) and returns this month to defend its crown. It didn't quite succeed, but it remains a solid choice because it's such fantastic value. Based on the SiS645 chipset – still the only Pentium 4 chipset to support PC2700 DDR RAM – the MSI supports up to 3Gb of memory, 1Gb more than the Intel 845D boards.

We sourced a new 645 Ultra for this Labs, and retested it to ensure fairness. This sample could only manage a third-placed 3.44 in our 2D benchmarks, a drop of 0.1 from the last Labs test. However, all six boards perform



virtually identically, and you wouldn't be able to detect the difference without using benchmarks. Using PC2700 memory, the 645 accelerated to 3.55 in 2D and 6,607 in 3D – it scored only 6,386 with PC2100 memory.

In terms of expansion, the 645 is fairly average, with five PCI slots and one shared CNR slot. The basic integrated AC97 sound is adequate for general use and MSI's usual D-Bracket is bundled for diagnostics and also provides two extra USB ports. Overclocking features aren't as comprehensive as others on offer, but the CPU/DRAM ratio is adjustable, which could prove a useful feature, especially as you can't increase the DIMM voltage.

Although MSI loses its A List status, the 645 Ultra is a bargain at £70. If you don't need the Gigabyte's extra features, buy the 645.

PC PRORESULTS

PERFORMANCE	★★★★★
FEATURES & EXPANSION	★★★★★
VALUE FOR MONEY	★★★★★
OVERALL	★★★★★

MSI 845 Ultra-ARU

PRICE £117 (£137 inc VAT)

SUPPLIER dabs.com 0800 138 5182

VERDICT Almost as feature-packed as the Gigabyte, but it just loses out due to poorer expansion and performance.

In terms of features, this second MSI board rivals the Gigabyte 8IRXP. It possesses the same Promise RAID and NEC USB 2 controllers, allowing for excellent expansion potential. MSI kindly bundles four USB 2 ports and two extra



USB 1.1 ports, along with the same diagnostic LEDs as the 645 Ultra. However, there's no integrated LAN to be found.

MSI also slips behind on slot configuration. Five PCI slots are one down on the 8IRXP, and an AGP 4x slot and a CNR slot accompany these. But it's a shame that MSI has pushed the seven slots up towards the three DIMM sockets, necessitating removal of the graphics card to add memory.

The 845 Ultra-ARU lost out to the Gigabyte in our benchmarks as well. It only managed 3.38 in 2D – the joint-lowest score along with AOpen – and scored 6,420 3DMarks, 177 behind the 8IRXP.

Overclocking support is present in force, though. CPU, DIMM and AGP voltages can be increased, and the FSB settings range from 100-200MHz in 1MHz steps. You can also adjust the FSB frequency from within Windows using the Fuzzy Logic III applet, but there's no FSB/CPU divider as offered by Gigabyte.

Even though the 845 Ultra-ARU is almost £10 cheaper than the 8IRXP, the Gigabyte remains the better choice due to its extra features and performance.

PC PRORESULTS

PERFORMANCE	★★★★★
FEATURES & EXPANSION	★★★★★
VALUE FOR MONEY	★★★★★
OVERALL	★★★★★

Soltek 85DRV3

PRICE £77 (£90 inc VAT)

SUPPLIER dabs.com 0800 138 5182

VERDICT The only P4X266A chipset-based board on test is a good performer, but it can't quite match the 645 Ultra for value.

A casual glance cast over the 85DRV3 might give you a feeling of déjà vu, since it looks so similar to the MSI 845 Ultra-ARU. The red PCB is the only real similarity, though, as the Soltek is the sole board on test to use VIA's P4X266A chipset. This is an update to the original, and controversial, P4X266, and both the north bridge and south bridge are new.

There aren't any significant changes to the specification – the revision is mainly a performance enhancement, as we're used to seeing from VIA. It's worth bearing in mind that the P4X333 is being launched imminently and will support PC2700 DDR RAM.

Performance, then, was one of our key interests in the 85DRV3 and it managed second place overall with 3.46 in our 2D suite. Only Gigabyte, using an 845D chipset, bettered this score and the SiS645-based MSI 645 Ultra was a little further behind. However, in 3DMark2001, the Soltek didn't fare as well – it was the slowest on test with 6,365 3DMarks.

The six PCI slots are a welcome sight and the three DIMM sockets support up to 3Gb of



RAM, but only if you install Registered DIMMs. There aren't any integrated components other than the VIA AC97 audio, but this is reflected in the low price.

Good overclocking potential and a decent software bundle all help the Soltek's cause, but the MSI 645 Ultra is better value. We advise waiting for the P4X333 if you crave ultimate performance.

PC PRORESULTS

PERFORMANCE	★★★★★
FEATURES & EXPANSION	★★★★★
VALUE FOR MONEY	★★★★★
OVERALL	★★★★★