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# Motherboard mania

**At the heart of every good system is a good motherboard, but how do you know the good from the bad and the ugly? We test 30 boards aimed at both Intel and AMD processors to find out which comes out on top**

**O**ur annual motherboard group test involves a pile of processors, stacks of memory, a heap of hard drives and a load of graphics cards. This year we had a total of 30 motherboards in three clusters: Socket A Athlon/Duron, Socket 370 Celeron/PiII and Socket 478 Pentium 4. In each section we looked at the quality, performance, features and pricing to come to our overall conclusions.

The team at *PCW* has built hundreds of PCs over the years and we do appreciate how much difference a good motherboard can make when you're up to your elbows in wires and ribbon cables.

A decent layout and a minimal number of jumpers and dip switches make life so much easier, and should get you up and running much faster.

On the other hand, we've suffered the pain of a defective BIOS late on a Friday night, and know how much hassle a poor manual can cause.

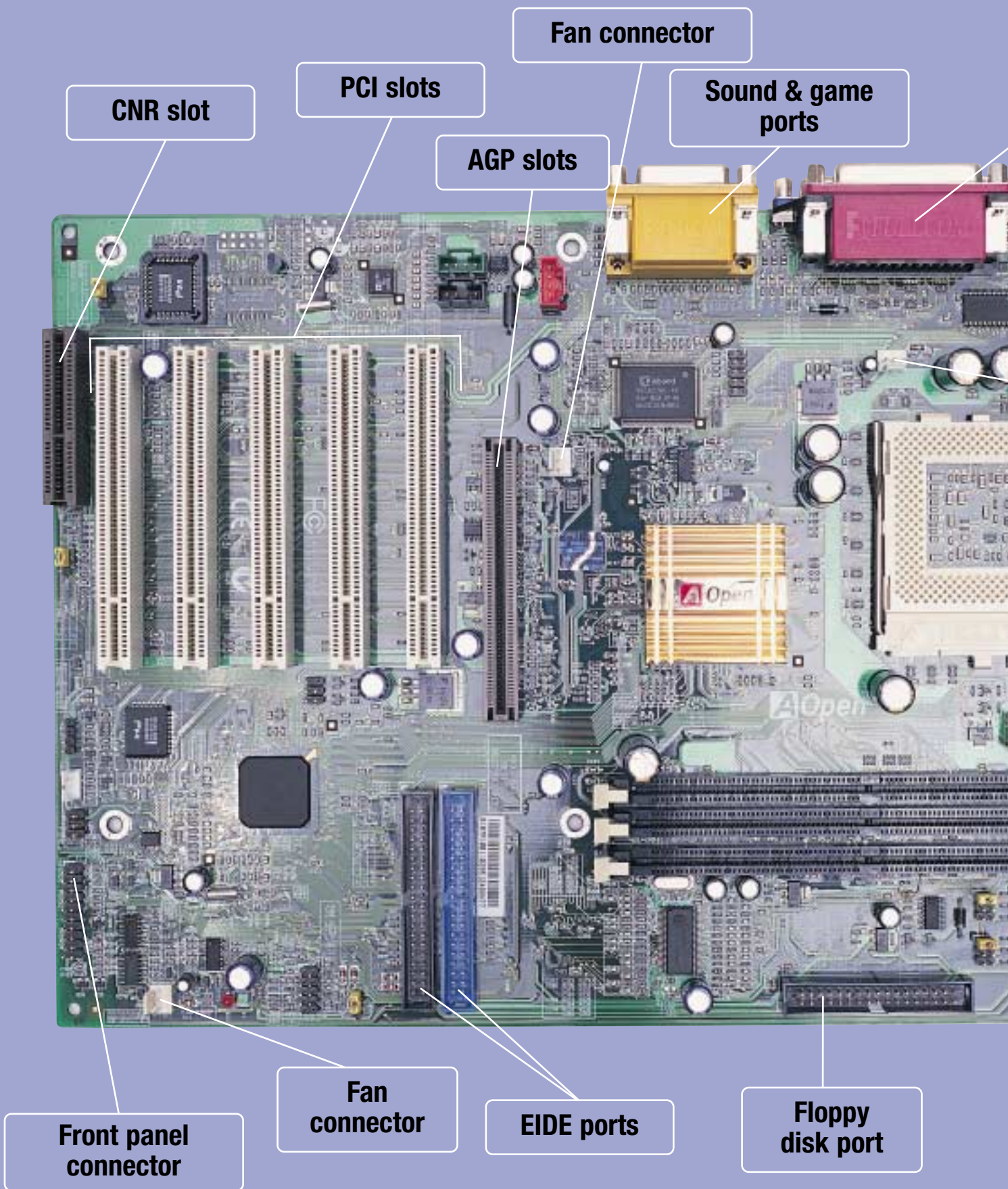
Some of you will install a motherboard, set up the BIOS and give it little more thought. The more hardcore readers will upgrade the memory, change the processor, update the BIOS and change settings quite regularly to get the last few ounces of performance out of a PC.

We've done a lot of work to help you make buying your decision; enjoy. ➤

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# Anatomy of a motherboard



## Glossary

**AGP** Accelerated Graphics Port. An expansion slot specifically for graphics cards, offering high bandwidth.

**AMR** Audio Modem Riser. An expansion slot for audio/modem riser or modem riser cards.

**ACR** Advanced Communications Riser. This is a new slot for audio/modem riser developed by VIA and AMD, similar to Intel's CNR (see below).

**BIOS** Basic Input Output System. Communicates between the hardware and OS. This is where all the system settings are configured and stored. A BIOS can be upgraded if new features arrive.

**CNR** Communication Network Riser. An expansion slot for communications/network riser similar to AMR (see above) but also supporting LAN connectivity.

**DDR SDRAM** The latest generation of SDRAM (see below), which reads and writes data at both the rising and the falling edge of the system clock and thus doubles the data throughput, hence the name DDR (Double Data Rate).

**DIMM** Dual Inline Memory Module. A 168pin memory stick, usually SDRAM although EDO DIMMs are still available.

**EIDE** Enhanced Integrated Device Electronics. The standard used for most hard disks and other storage devices. Most boards can support four EIDE devices, although some can handle eight.

**EIDE-RAID** Many new motherboards feature an additional EIDE controller which has built-in functionality for RAID (Redundant Array of Inexpensive Disks) – this allows several EIDE drives to be connected together for faster performance or data security.

**FSB** Front-Side Bus. The speed at which the CPU communicates with the system memory.

**ISA** Industry Standard Architecture. A 16bit expansion slot that's now almost extinct. Very few new cards are available in this format.

**Parallel port** Similar to the serial port (see below) but with faster bi-directional transfer. Usually used for printers and scanners.

**PCI** Peripheral Component Interconnect. A 32bit expansion slot used for the majority of expansion cards other than graphics adaptors.

**POST** Power On Self Test. The first operation that is executed when the system is switched on. Checks the status of the memory, processor and other components.

**SCSI** Small Computer System Interface. Similar to EIDE (see above) but catering to a more corporate market. Up to 15 devices can be connected and transfer rates are far superior to EIDE.

**SDRAM** Synchronous Dynamic Random Access Memory. Fast system memory that superseded EDO RAM.

**RDRAM** RAMBUS Dynamic Random Access Memory has been around for a while now and is so far only used by Intel and only in its high-end performance products. This is a very fast memory in theory with data speeds of up to 1.6 billion bytes per second, but sadly it's proven to be too expensive for the average user so far.

**Serial port** Also known as COM ports, serial ports are used to connect peripherals to your PC such as modems, PDAs and digital cameras.

**Slot 1** The CPU connector for early Intel Pentium III processors.

**Socket A** The CPU connector for AMD Athlon and Duron processors.

**Socket 370** The CPU connector for Intel Celeron and PIII processors.

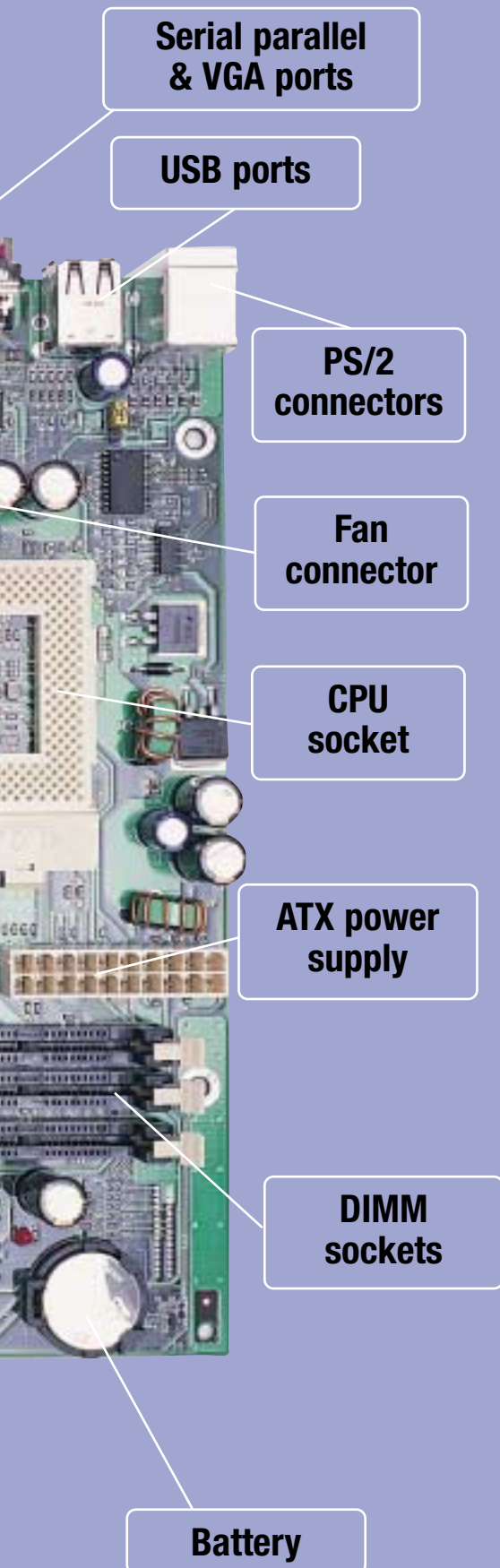
**Socket 478** The CPU connector for Intel Pentium 4 processors.

**SMP** Symmetric MultiProcessing. A multiprocessor configuration where two or more processors share the same memory and system bus.

**UltraDMA66** An EIDE bus mastering standard that allows a burst transfer rate of up to 66Mbytes/sec.

**UltraDMA100** The latest EIDE bus mastering standard that allows burst transfer rates of up to 100Mbytes/sec.

**USB** Universal Serial Bus. The successor to serial and parallel ports. USB offers 12Mbits/sec transfer and the ability to hotswap.



# GROUP TEST MOTHERBOARDS

## Abit BL7

SOCKET 478

**PRICE** £121.96 (£103.80 ex VAT) **CONTACT** Komplett.co.uk [www.komplett.co.uk](http://www.komplett.co.uk)

**PROS** Excellent overclocking features **CONS** Crowded layout

**OVERALL** Enthusiasts should form an orderly queue for this flexible board

**LAYOUT** **DOCUMENTATION**

**VALUE FOR MONEY** **OVERALL**

The BL7's layout is a little confused as there are so many components and space has been set aside for the RAID EIDE connectors on the more expensive model.

You get three USB ports, rather than the usual two. There is no room for the legacy gameport connector, which is supplied on a separate bracket. The main ATX power connector is sandwiched between the memory slots and EIDE connectors, so joining all the cables together is a bit fiddly.

At one end of the board is a block of dip switches that allow the use of Abit's excellent Soft Menu. This enables you to alter

BIOS settings without having to open the case. However, it is unclear who would want not want the Soft Menu enabled as the Abit BIOS setup is so comprehensive and easy to use.

On the board are two miniature buttons for power and reset, as well as an alphanumeric LCD diagnostic display. If overclocking gets you into trouble, these are tools to help you dig your way out.

The BL7 is similar in performance to the rest of the motherboards based on the 845 chipset, but there is more performance waiting to be released.



## Abit TH7II-RAID

SOCKET 478

**PRICE** £169.53 (£144.28 ex VAT) **CONTACT** Dabs.com 0870 429 3120 [www.dabs.com](http://www.dabs.com)

**PROS** Very fast; loads of features **CONS** You'll need to buy RDRAM

**OVERALL** Expensive, but effectively proving that RDRAM still has the edge

**LAYOUT** **DOCUMENTATION**

**VALUE FOR MONEY** **OVERALL**

The TH7II-RAID stands out in this group, as it is the only board using the Intel 850 chipset. This means it is the only board using RDRAM rather than SDRAM.

If you add in the Highpoint RAID controller, with its inevitable cost, you get the most expensive motherboard in the group. Happily it is also the fastest motherboard we tested, and by a significant margin too.

There are micro-LEDs, the onboard alphanumeric LCD display for diagnostics, and micro-buttons for power and reset. These make life much easier when your head is stuck inside your PC's case.

The hardware takes up one corner of the motherboard, so Abit has rotated the floppy connector 90 degrees so that it is in line with the first PCI slot.

A long PCI card in that slot would likely foul the floppy connector, but that isn't a problem as it is best to leave space next to the AGP slot to allow air to circulate when you use a high-end graphics card.

If you intend to build a full-on performance P4 system and you're prepared to use RDRAM, this is a superb board. You can run EIDE RAID and up to eight drives, and the BIOS is crying out to be tweaked.

## AOpen AX4BS

SOCKET 478

**PRICE** £115.14 (£98 ex VAT) **CONTACT** Dabs.com 0870 429 3120 [www.dabs.com](http://www.dabs.com)

**PROS** Good performance and quality **CONS** A rather basic specification

**OVERALL** Very good value – recommended

**LAYOUT** **DOCUMENTATION**

**VALUE FOR MONEY** **OVERALL**

AOpen has used a black PCB for the AX4BS. This adds no practical benefit but it looks neat and tidy.

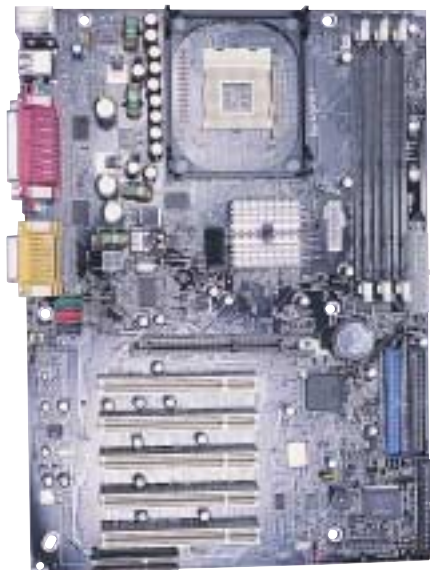
Inside the box is a driver CD that includes Adobe Acrobat Reader and a good manual with photos and screenshots, instead of the usual line drawings. AOpen is well aware that a CD is no use while you are assembling a PC, so it has also provided a comprehensive paper installation guide.

This board is easy to set up, and almost every connector is clearly labelled, the only exception being the anonymous header pins for the front-panel buttons and lights.

It is noteworthy that the floppy and EIDE connectors are spaced well away from other components and the cables caused no problems at all.

The spec is a little basic and misses out Wake on LAN and Wake on Modem. There is a connection point for extra USB ports, but no bracket is included. On the positive side, a copy of Norton AntiVirus is included.

In our SYSmark tests the AX4BS performed as well as the majority of the 845 chipset motherboards in this group, yet it is far cheaper than most of the competition. This is a good-value piece of hardware.



## Asus P4B

SOCKET 478

**PRICE** £142.35 (£121.15 ex VAT) **CONTACT** Dabs.com 0870 429 3120 [www.dabs.com](http://www.dabs.com)

**PROS** Good quality and connectivity **CONS** Limited BIOS adjustment

**OVERALL** Slightly expensive, but you get a decent product for your money

**LAYOUT**  **DOCUMENTATION**

**VALUE FOR MONEY**  **OVERALL**

This 845 chipset motherboard is chock-full of connectors, and is cluttered as a result. The EIDE, floppy and ATX power connectors are all jammed next to the memory slots, and the retention latch for the AGP graphics card overlaps that on the third SDRAM slot.

An AUX+12V connector, a Molex device of the type found on hard drives or CD-ROMs, allows you to use a regular ATX power supply, rather than a dedicated ATX12V unit. The motherboard also has the 'correct' square ATX12V socket so you can use either type of power supply.

Asus has crammed in six PCI slots, as

well as a CNR plus the AGP. You also get two separate brackets: one carries two more USB ports and the other has S/PDIF-Out, which could save you buying a sound card.

There are further options to add a Smart Card reader or the Asus iPanel, although these are not included with the P4B.

The BIOS setup is disappointing as front-side bus (FSB) adjustment is in rather large steps, and is unlikely to be very useful.

The P4B performs similarly to the other 845 boards but is one of the more expensive here. This is the price you pay for a solid brand name and all that connectivity.



## EPoX 4B2A

SOCKET 478

**PRICE** £118.67 (£101 ex VAT) **CONTACT** SCL 020 8547 1620 [www.scl-ltd.co.uk](http://www.scl-ltd.co.uk)

**PROS** Decent performance at a fair price **CONS** No interesting features

**OVERALL** There's nothing wrong with the EPoX but it's eclipsed by the competition

**LAYOUT**  **DOCUMENTATION**

**VALUE FOR MONEY**  **OVERALL**

In this group, the EPoX 4B2A is very average. That may sound cruel, but it's accurate. Performance and price put this board almost exactly in the middle of the 845 pack, so EPoX is competing on features.

Glance at the specs and you'll be hard pressed to find an interesting or unusual feature. There are six PCI slots and one CNR, and you get a bracket with two extra USB ports, but that's as good as it gets.

The layout is fine, but EPoX has put some capacitors very close to the ATX12V connector. There are also lots of tall capacitors around the heatsink mount with strategic

gaps for the heatsink clamps. This is not a fault as such, but a few millimetres of extra room would make a world of difference.

EPoX supplies the motherboard in a box made of orange corrugated cardboard, with a translucent plastic sleeve and an orange carrying handle. The manual provided in the box is on a par with Abit and Asus, which is a positive point.

There is nothing wrong with the EPoX, but there is nothing outstanding either. We would be happy to buy a PC and find it was built around this product, but we wouldn't rush out to buy it.

## FIC VC11

SOCKET 478

**PRICE** £119.85 (£102 ex VAT) **CONTACT** FIC 01895 810 812 [www.fic.com.tw](http://www.fic.com.tw)

**PROS** You get 10/100 LAN **CONS** It's a slow performer

**OVERALL** Onboard LAN is a neat feature but there's not much else to set this board apart

**LAYOUT**  **DOCUMENTATION**

**VALUE FOR MONEY**  **OVERALL**

FIC's manual is rather a slender tome, but it covers all the essentials. It does rather assume you have a built a PC before and that you understand the components.

This is one of the tidier boards in the group, but then it has fewer connections than most. There are five PCI slots where some others have six, and only two EIDE connectors, as there is no RAID controller.

The power connectors include an AT type supplementary connector in addition to the ATX12V socket, so the board is a little tight for space near the memory slots. If you are likely to use long or bulky PCI cards

this could be the motherboard for you, as there is plenty of room for expansion cards.

FIC has included a 10/100 LAN socket above the two USB ports, which hints at this board being aimed at the corporate market.

We liked the software bundle of Norton Ghost, Virtual Drive and Norton AntiVirus.

The VC11 is one of the slowest 845 boards here, however, the difference is only some three per cent in SYSmark 2001.

It is priced in the middle of the group, but unless the front panel sound connectors or onboard 10/100 LAN are paramount, Abit's BL7 or MSI's Pro2-R would be preferable.



# GROUP TEST MOTHERBOARDS

## Gigabyte GA-81DX

SOCKET 478

**PRICE** £123.38 (£105 ex VAT) **CONTACT** Dabs.com 0870 429 3120 [www.dabs.com](http://www.dabs.com)

**PROS** The fastest 845 board in the group **CONS** Poor layout

**OVERALL** A very good-value package

**LAYOUT** **DOCUMENTATION**

**VALUE FOR MONEY** **OVERALL**

This is the fastest 845 board here. It's only one point ahead in SYSmark, so it's a marginal victory, but it's fastest nonetheless.

In addition to the performance, Gigabyte has crammed in a load of features and kept the price down to a competitive level.

The layout suffers a bit, with the floppy and EIDE connectors hard up against the third DIMM slot. Once the board is installed, and all the cables are connected, it will be a pain to get memory modules in and out. Similarly the ATX12V connector is jammed in a corner surrounded by components.

Other than that, it's good news. There's a

bracket with two USB ports, onboard 10/100 LAN and the option to connect up infra-red.

You also get Gigabyte's Dual BIOS. This is an incredibly sensible idea that we'd like to see more frequently. If your BIOS fails the backup BIOS will not only kick in, but will also flash the original BIOS and fix it ready for the next startup.

In the same vein you also get Norton AntiVirus and Norton Personal Firewall. Clearly Gigabyte feels that prevention is better than cure, and we strongly agree.

The manual is competent but not up to the standard of Asus and Abit.



## MSI 845 Pro2-R

SOCKET 478

**PRICE** £128.76 (£109.58 ex VAT) **CONTACT** Komplet.co.uk [www.komplet.co.uk](http://www.komplet.co.uk)

**PROS** Loads of extras, including USB networking **CONS** Layout could be improved

**OVERALL** Good value and a strong feature set make the MSI a solid choice

**LAYOUT** **DOCUMENTATION**

**VALUE FOR MONEY** **OVERALL**

The 845 Pro2-R gives the game away in its model code. It uses the 845 chipset and that 'R' stands for RAID. Although it looks slightly more expensive than the majority of the 845 boards, you get so many features and extras that it is impressively cheap.

There's EIDE RAID, SmartKey and a choice of two extra USB ports or the D-bracket.

D-bracket extends the onboard diagnostic LEDs to the outside of the PC case to assist problem solving. It also has one up and one down USB port for networking. This lets you network two PCs together using the supplied GeneLink software. One

PC has the D-bracket, while the other uses a conventional USB port, so connection speed is 12Mbits/sec.

SmartKey, a security dongle that attaches to a USB extension cable to lock out your PC unless the SmartKey is plugged in, is clearly aimed at the more paranoid user. We do wonder, however, what you do if you lose the single key that MSI provides.

The board is well laid out and has one of the most impressive feature sets we've seen. It's a little disappointing that the 845 Pro2-R doesn't perform better, though, but you do get a lot of hardware for your cash.

## QDI Platinix 2

SOCKET 478

**PRICE** £107.22 (£91.25 ex VAT) **CONTACT** Misco 0870 720 8600 [www.misco.co.uk](http://www.misco.co.uk)

**PROS** It's very cheap **CONS** Very poor performance

**OVERALL** Your Pentium 4 processor deserves better

**LAYOUT** **DOCUMENTATION**

**VALUE FOR MONEY** **OVERALL**

This is the cheapest 845 chipset board in the group, and it's the slowest in SYSmark by a substantial margin.

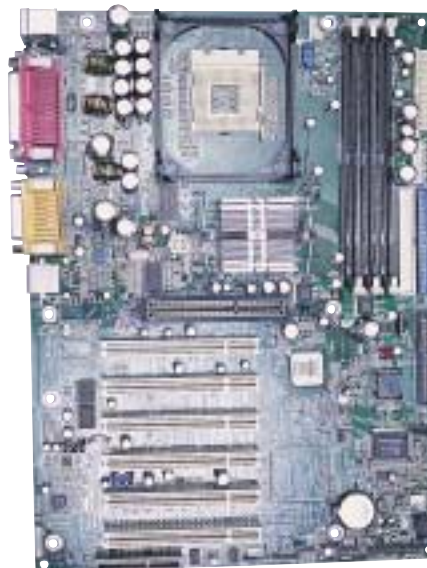
QDI is an enormous Chinese manufacturer that makes millions of boards each year, but clearly something has gone wrong with this one.

If you had to buy the cheapest P4 motherboard and performance was not an issue, QDI offers all the features you are likely to need. AGP, six PCI slots and CNR are par for the course. The Platinix 2 also has infra-red, Wake on LAN and Wake on Modem. If QDI had included 10/100 LAN

this would have been an almost unbeatable feature set.

The board appears to be made with cheaper components than some of the competition. A number of the capacitors, for example, are simply huge. There are a surprising number of jumpers, including those used to set processor voltage. QDI has clearly chosen this path deliberately as it has a history of jumperless designs.

It is a shame the Platinix 2 performed so poorly in the SYSmark tests as these results makes it almost impossible to recommend this product.



## SuperMicro P4SBA

SOCKET 478

**PRICE** £139.83 (£119 ex VAT) **CONTACT** Dabs.com 0870 429 3120 [www.dabs.com](http://www.dabs.com)

**PROS** Excellent quality **CONS** Not enough features

**OVERALL** Too expensive

**LAYOUT**  **DOCUMENTATION**

**VALUE FOR MONEY**  **OVERALL**

The P4SBA is a very dull motherboard. Worse, it is dull and overpriced. It performs similarly to the other 845 boards, yet it has precious few features to justify its price.

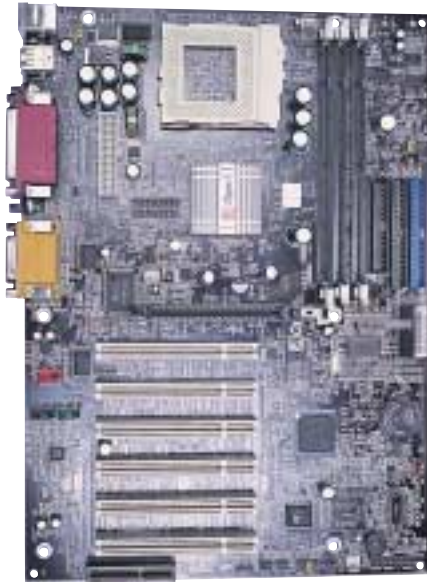
This is the only board in the group that doesn't include integrated sound, but it does have both Wake on LAN and Wake on Modem. These features indicate that it's aimed at the corporate workstation market, so the inclusion of an AGP Pro slot is unexpected. However, this will be welcome if you're assembling a video-editing or CAD workstation with a high-end graphics card.

The quality and layout of the board is

excellent. One minor, yet annoying, point is that the floppy and EIDE connectors are arranged in a block. However, the components are neat and tidy, and every one has a clear label printed next to it.

On the negative side, SuperMicro has included a bracket with a single USB port. Most manufacturers supply two ports, and Abit gets three ports on the board itself.

SuperMicro's range is full of solid professional products. By comparison this is almost a toy, although the price doesn't reflect this. It is well made, but you can get more for your money from the opposition.



## AOpen AX3S-U

SOCKET 370

**PRICE** £95.17 (£81 ex VAT) **CONTACT** Dabs.com 0870 429 3120 [www.dabs.com](http://www.dabs.com)

**PROS** Onboard video if you need it **CONS** Poor layout; no paper manual

**OVERALL** Average performance and features, but poor component layout

**LAYOUT**  **DOCUMENTATION**

**VALUE FOR MONEY**  **OVERALL**

AOpen used to produce the best documentation of any motherboard manufacturer, but the usual thick tome is missing here. Instead there is an in-depth manual on the CD and a colourful fold-out poster telling you all you need to know about installation and setup – a fair compromise we think.

This board isn't short on features. Running the Intel 815E chipset it has onboard sound and video, with the VGA connector taking the place of the second serial port. A second serial connector is bundled on a cable.

Since most people won't want onboard graphics there's an AGP slot complete with

a clamp to keep the card in place. There are also six PCI slots and a single CNR.

Layout is a mixed bag. Floppy and EIDE connectors are on the right-hand edge next to the DIMM sockets. But the ATX power socket is behind the I/O ports and flanked by a bank of six large capacitors. Also, all the internal audio connectors are next to the PCI slots, making cable routing difficult.

Performance was pretty good, with the board coming fourth overall in the SYSmark tests, but only five points behind the leading Transcend board. The AOpen is not bad, but the layout could have been tidier.

## Chaintech 60JA3T

SOCKET 370

**PRICE** £84.01 (£71.50 ex VAT) **CONTACT** Scan [www.scan.co.uk](http://www.scan.co.uk) 0870 755 4747

**PROS** Six-channel sound **CONS** Very poor layout with too many obstructions

**OVERALL** The layout is bad, making installation more tricky

**LAYOUT**  **DOCUMENTATION**

**VALUE FOR MONEY**  **OVERALL**

Chaintech boards used to be regularly installed in evesham.com systems, but this has changed recently and we rarely see boards from this company.

The 60JA3T is based on the Intel 815EP chipset so there's no support for DDR SDRAM, leaving you with three DIMM slots to fill with PC133 SDRAM or slower.

There is a massive number of capacitors, especially around the ATX power socket, which is behind the audio ports. Not only does this position mean the power loom has to drape over the CPU and heatsink assembly, but also that the sur-

rounding capacitors make it hard to plug and unplug the power supply.

The EIDE ports are on the right of the PCB next to the DIMM slots, but bizarrely the floppy connector is parallel to the AGP slot. The ZIF socket is free from obstructions, so installing a CPU will be hassle free. Expansion-wise there are six PCI slots and a CNR slot.

Sound is well catered for with support for six-channel output. A backing plate with the extra outputs has been bundled.

The 60JA3T offers middle of the road performance with a below average price.





# GROUP TEST MOTHERBOARDS

## ECS P6S5AT

SOCKET 370

**PRICE** £54.03 (£45.98 ex VAT) **CONTACT** Ebuyer [www.ebuyer.com](http://www.ebuyer.com) 08707 542 100

**PROS** The cheapest motherboard on test **CONS** Poor layout; fairly slow

**OVERALL** If money is really tight the P6S5AT is worth a look

**LAYOUT**  **DOCUMENTATION**

**VALUE FOR MONEY**  **OVERALL**

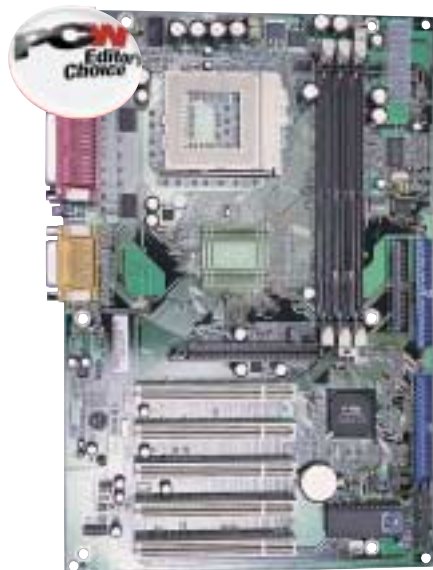
This board is based on the SIS 635/T chipset that supports both SDR and DDR SDRAM with two DIMM slots for each flavour. You can't run both SDR and DDR memory at the same time and, since 256MB of DDR SDRAM will cost you less than £30, you'd be better off buying new memory. The extra DIMM slots also force the EIDE ports to the bottom of the board behind the five PCI slots. This means the EIDE cables have to drape across the board and the memory sockets to get to the drives.

The ZIF socket is surrounded by a few capacitors but isn't overly obstructed.

Unfortunately, the same can't be said for the ATX power socket which is wedged between a group of capacitors behind the I/O ports. As well as difficult insertion, this results in the power loom being draped over the CPU and heatsink assembly.

The AGP slot supports AGP4x but isn't AGP Pro compatible. Above this slot there's a single AMR slot. Onboard sound comes courtesy of an AC97 chip and the usual array of audio ports are present.

Documentation is fair with a 37-page manual covering board and BIOS setup, but performance was nothing spectacular.



## EPoX 3VSA

SOCKET 370

**PRICE** £69.95 (£59.28 ex VAT) **CONTACT** PC Ideals [www.pcideals.com](http://www.pcideals.com) 023 9286 3362

**PROS** Good layout and solid performance **CONS** No DDR

**OVERALL** A fast board with good layout at a great price

**LAYOUT**  **DOCUMENTATION**

**VALUE FOR MONEY**  **OVERALL**

This board from EPoX is the second fastest model on test, beaten only by the Transcend. That said, the EPoX is only one point slower and a lot cheaper. Based on the VIA Apollo Pro133T chipset, the board can only accept SDR SDRAM and not the faster DDR flavour, although this seems to have had little effect on system performance. You get three DIMM sockets allowing a maximum of 1.5GB of memory.

On the layout front, the ATX power socket is thoughtfully placed at the top right of the board, so the power loom is kept away from all the major component areas.

One of the EIDE ports and the floppy controller nestle to the right of the DIMM slots, where you'd want them, but the secondary EIDE port is towards the bottom of the board. This is because some jumpers and capacitors fill the space to the right of the DIMM slots where it should have gone, but it doesn't mean much cable stretching.

Expansion slots consist of five PCI and an AGP (not Pro) slot, while sound comes from an AC97 chip.

Paper documentation is good and performance is solid, but it's the price that clinches the Editor's Choice for EPoX.

## FIC FA15T

SOCKET 370

**PRICE** £58.75 (£50 ex VAT) **CONTACT** FIC [www.fic.com.tw](http://www.fic.com.tw) 01895 810 812

**PROS** Great layout **CONS** No DDR support; very slow

**OVERALL** Great layout and price but it's too slow

**LAYOUT**  **DOCUMENTATION**

**VALUE FOR MONEY**  **OVERALL**

Getting the bad news out of the way first, the FA15T is very slow. In fact, with a SYS-mark score of only 62, it's the second slowest board on test. Performance isn't everything and the FIC has some good points.

First is the layout of the board. The ATX power connector is positioned at the very top of the PCB, keeping the power wires away from all the major components. Also, the floppy and EIDE ports are on the right-hand side near where the drives are likely to be. There are some capacitors surrounding the ZIF socket, but none of them are close enough to hinder access.

The three DIMM sockets will accept PC133 SDRAM or slower. Since the FA15T is based on the VIA Apollo Pro 133T chipset there's no support for DDR SDRAM. The FSB and memory speed can be asynchronous, so you can use 100MHz memory and maintain an FSB speed of 133MHz.

You get five PCI slots plus single AGP and CNR connectors. Once more an AC97 solution takes care of sound, with game and audio ports next to the I/O connectors.

The paper manual looks good, but half of it is in foreign languages. That said it still tells you all you need to know.



## lwill BD133u

SOCKET 370

**PRICE** £89.99 (£76.58 ex VAT) **CONTACT** Computer Connections 01423 704 700  
**PROS** Six-channel onboard sound **CONS** Poor layout; wouldn't run memory at 133MHz  
**OVERALL** Disappointing layout with masses of capacitors make it hard to set up and maintain

**LAYOUT**  **DOCUMENTATION**   
**VALUE FOR MONEY**  **OVERALL**

The lwill name is well known in overclocking and system tweaking circles. Now it's boosting its retail presence.

The BD133u is based on the Intel 815EP chipset, so it doesn't have onboard graphics but, unlike Transcend, lwill has used the space where the VGA port would have been to hardwire the second serial port.

Layout is interesting to say the least. We've never seen a board with as many capacitors. To make matters worse, the ATX power socket is placed just above the AGP slot next to the northbridge and a load of capacitors. This means you've got no

choice but to drape the power loom across half of the board to get to the socket.

At least the floppy and EIDE connectors are on the right-hand edge, although there are capacitors close by here, too.

You get six PCI slots and the single AGP slot. You also get Wake on LAN and Wake on Modem connectors. The onboard sound is impressive, featuring six-channel output via the supplied backing plate with rear, centre and subwoofer channels.

Bizarrely the BD133u wouldn't run the system memory at 133MHz, leaving us to benchmark it at 100MHz.



## QDI Advance 12

SOCKET 370

**PRICE** £84.48 (£71.90 ex VAT) **CONTACT** Ebuyer [www.ebuyer.com](http://www.ebuyer.com) 08707 542 100  
**PROS** Good feature set; reasonable price **CONS** Very slow  
**OVERALL** Worth a look only if performance is of no consequence to you

**LAYOUT**  **DOCUMENTATION**   
**VALUE FOR MONEY**  **OVERALL**

QDI used to make some well-featured and fast motherboards, but in this group test the Chinese manufacturer is languishing at the bottom of the performance tables. That said, the Advance 12 looks like a decent board on paper and we were surprised by its lacklustre performance.

The board utilises the VIA Apollo Pro266T chipset which allows it to make use of faster DDR SDRAM. There are three DIMM slots accommodating up to 1.5GB of memory.

There are five PCI slots as well as single AGP Pro and ACR slots. Unfortunately, the AUX and modem audio ports are between

two expansion slots, so it is almost impossible to keep things tidy. The rest of the layout is pretty good with floppy and EIDE ports on the right-hand edge and the ATX power socket near the top, although placing it to the right of the DIMM slots could make things messy when upgrading memory.

The northbridge chip has a large heatsink and fan assembly to keep it cool, while there are sockets for a further two chassis fans and a CPU fan. On the bottom edge are connectors for Wake on LAN and Wake on Modem.

Documentation is fair, the price is reasonable, but performance is very disappointing.

## SuperMicro 370SDA

SOCKET 370

**PRICE** £110.44 (£93.99 ex VAT) **CONTACT** Simply [www.simply.co.uk](http://www.simply.co.uk) 0870 727 2160  
**PROS** Excellent manual; good layout **CONS** No onboard sound; price  
**OVERALL** A well-built board with superb documentation

**LAYOUT**  **DOCUMENTATION**   
**VALUE FOR MONEY**  **OVERALL**

SuperMicro has a reputation for producing high-quality boards with excellent documentation and the 370SDA is no exception. The manual is amazing with over 150 pages of information about the board and the BIOS.

The board is based on the VIA Apollo Pro266 chipset so it takes advantage of the faster DDR SDRAM running at 266MHz. There are three DIMM slots supporting up to 3GB of memory.

Layout is very good, with the floppy and both EIDE ports to the right of the DIMM slots allowing a neat cable path to your drives. A little disappointing is the ATX power connec-

tor, which is jammed between the I/O ports and a group of capacitors. At least it's at the top of the board, though, so the power loom won't get in the way.

There are five PCI slots, an ACR and an AGP Pro slot. There's no AMR or CNR slot, but five PCI slots should keep most users happy. There's no onboard sound, but you do get both Wake on LAN and Wake on Modem sockets, and an extra USB port is bundled.

Performance isn't breathtaking, with a SYSmark score of 73, placing it 10 points behind the leader. However, it is a well laid out, solid board with superb documentation.



# GROUP TEST MOTHERBOARDS

## Transcend TS-ASP3

SOCKET 370

**PRICE** £101.06 (£86.01 ex VAT) **CONTACT** [www.reflextechnologies.net](http://www.reflextechnologies.net) 0800 074 8564

**PROS** Very fast with good layout **CONS** 512MB memory limit

**OVERALL** If you don't need masses of memory this is the board to go for

**LAYOUT**  **DOCUMENTATION**

**VALUE FOR MONEY**  **OVERALL**

Topping the SYSmark chart with a score of 83, this board is fast. Even though the TS-ASP3 is only one point faster than the EPoX, it has some solid features.

The TS-ASP3 is based on the Intel 815EP chipset, which means it can't use the faster DDR SDRAM. That said, using standard PC133 SDRAM hasn't done it any harm in the performance stakes.

Layout is very good, with the ATX power socket placed at the very top of the PCB, making it easy to connect and keep the wiring loom out of the way. The floppy connector is on the right-hand edge next to the

three DIMM slots. The EIDE ports are also on the right-hand edge a little lower down.

Expansion is impressive with six PCI slots, a CNR slot and an AGP slot. Even though this board doesn't have onboard VGA, the second serial port is still missing, leaving a gap and forcing you to waste an expansion slot if you need two serial ports.

Onboard sound comes courtesy of an AC97 chip that's backed up with the usual game and audio ports.

Documentation is taken care of by a 60-page paper manual. This is a great board if you're happy with the 512MB memory limit.



## Abit KG7-RAID

SOCKET A

**PRICE** £139.02 (£118.32 ex VAT) **CONTACT** [www.komplett.co.uk](http://www.komplett.co.uk)

**PROS** Four memory slots; EIDE RAID; six PCI slots **CONS** Price; no AGP Pro

**OVERALL** A very well-designed board with plenty of features that would make anyone proud to own it

**LAYOUT**  **DOCUMENTATION**

**VALUE FOR MONEY**  **OVERALL**

In certain circles, this has been one of 2001's most anticipated motherboards, as it was the first to support four memory slots. Although the previous theoretical limit of 2GB of memory for DDR motherboards might not seem a problem, with memory prices at an all-time low, many power users are stocking up.

That said, the recently announced 1GB DDR modules still carry a high cost. The downside with the KG7-RAID is that you have to use registered modules if you want to use all four memory slots, although the cost difference is only marginal.

The board is based on the AMD 761 northbridge and the VIA 686B southbridge, a common configuration on several of the DDR boards. Furthermore, a Highpoint EIDE RAID controller offers basic RAID functions such as striping for extra performance.

There are six PCI slots, which is good for expansion-hungry users. There's no AGP Pro slot, which is disappointing, since it appears on other boards here. Performance is also very good and the only downside is the hefty price tag.

Overall this is a great product and the ultimate AMD board for the enthusiast.

## AOpen AK77 Pro

SOCKET A

**PRICE** £105.74 (£89.99 ex VAT) **CONTACT** [www.jungle.com](http://www.jungle.com) 0870 727 1771

**PROS** Price; three memory slots **CONS** Performance; lack of extras

**OVERALL** Not the board to go for if you're after high performance

**LAYOUT**  **DOCUMENTATION**

**VALUE FOR MONEY**  **OVERALL**

AOpen has a proven track record of producing quality equipment of all kinds, and it is one of the biggest motherboard manufacturers in the market.

The AK77 comes in two versions, the Pro that we've reviewed here and the Plus that features an onboard EIDE RAID controller from Promise.

The Pro is based on the VIA Apollo KT266 chipset and thus supports up to 1.5GB of DDR SDRAM. Sadly, the overall design of this board is not as good as previous products from AOpen, which tended to be a cut above the competition. It's clear, however, that the

AK77 Pro is a fairly mainstream board with no special features to make it stand out from the crowd. The Pro is geared a bit towards the overclocker as it features a stepless FSB speed up to 248MHz, but we doubt that you'll be able to achieve this kind of performance enhancement.

Performance is poor compared to the rest of the contenders, as the AK77 Pro lands itself third from bottom in our SYSmark tests. It's hard to recommend this board even with its reasonable asking price. There are better boards on test here for about the same price.



# GROUP TEST MOTHERBOARDS

## Asus A7V266

SOCKET A

**PRICE** £132.50 (£112.77 ex VAT) **CONTACT** Komplett.co.uk [www.komplett.co.uk](http://www.komplett.co.uk)

**PROS** AGP Pro; six-channel sound **CONS** Performance; price

**OVERALL** Sadly, the performance of this board is not up to scratch, making it poor value for money

**LAYOUT** **DOCUMENTATION**

**VALUE FOR MONEY** **OVERALL**

Asus is probably the most well-known motherboard manufacturer around and it has been producing high-quality PC backbones for a very long time.

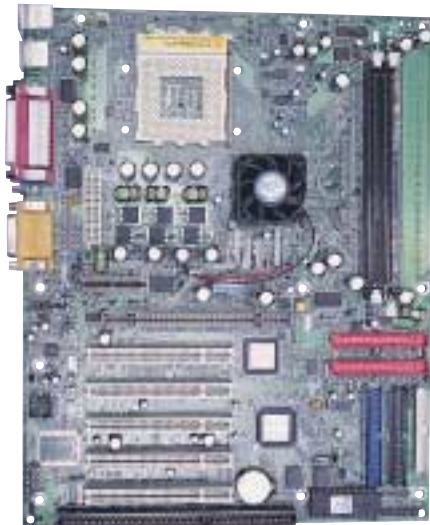
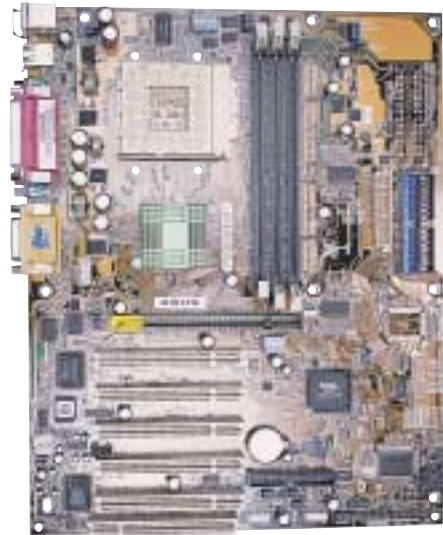
Part of the reason Asus has earned this reputation is its ability to produce components that perform faster and more reliably than the competition. Unfortunately, this model doesn't quite hit the mark. We've seen quite a few Socket A boards from Asus in the past and the A7V266 is the first one based on the VIA Apollo KT266 chipset.

The A7V266 is not in any way what we've come to expect from Asus, as the

layout is very cluttered and setup is quite awkward. On the plus side, it comes with an AGP Pro slot and built-in six-channel sound as standard.

It also has the two extra USB ports Asus ships as standard with its boards, which is something we'd like to see from more board makers. Asus will also release a version of this board with an onboard EIDE RAID controller.

The performance of the A7V266 is one of the worst on test, with only the QDI KudoZ 7 doing worse. Ultimately, the A7V266 is a poor choice.



## Biostar M7MIA-R

SOCKET A

**PRICE** £125.71 (£106.99 ex VAT) **CONTACT** Simply [www.simply.co.uk](http://www.simply.co.uk) 0870 727 2160

**PROS** EIDE RAID; ISA slot; AGP Pro **CONS** Board layout; price

**OVERALL** A reasonably priced board that offers above average features, but from a less known brand

**LAYOUT** **DOCUMENTATION**

**VALUE FOR MONEY** **OVERALL**

Biostar might not be a familiar brand to many readers, but it is a reasonably big name in the OEM market and the company has recently started to push its products into the retail arena.

The M7MIA-R is based on the AMD 761 northbridge and the VIA 686B southbridge. This is a fairly standard configuration for boards that use the AMD northbridge chipset. This Biostar's design is a bit more crude than some of the more seasoned competition, but it has all the features you would expect to see on a modern motherboard.

The one downside to this board is that it only features two memory slots, as this is a limitation of the AMD chipset. On the other hand, you do get an EIDE RAID controller from Highpoint as standard. There's also an ISA slot that might be welcomed by users who still have an old scanner interface card or similar older hardware that they want to be able to use with their new system.

Performance is on a par with what we've come to expect of a board based on the AMD 761 chipset. The M7MIA-R isn't the fastest on test, but the extra features more than make up for that.

## Chaintech 7KJD

SOCKET A

**PRICE** £101.64 (£86.50 ex VAT) **CONTACT** Scan [www.scan.co.uk](http://www.scan.co.uk) 0870 755 4747

**PROS** Price; six-channel sound; performance **CONS** Poor manual; awkward to set up

**OVERALL** Not the easiest board to set up, but if you know what you're doing it's worth a closer look

**LAYOUT** **DOCUMENTATION**

**VALUE FOR MONEY** **OVERALL**

Chaintech is yet another big brand in the OEM arena, although it has also made some headway into the budget end of the consumer market. We've seen a few Chaintech boards in systems from evesham.com in the past, but not many impressed us.

Like many of the Socket A boards to date the 7KJD is based on the AMD 761 northbridge. That said, this board differs slightly from the rest as it features a new VIA southbridge, the VT8231, which is similar to the one VIA uses in conjunction with its KT266 chipset, although it's missing the V-Link functionality.

The rest of the board is fairly standard, although Chaintech has opted for a massive heatsink on the northbridge rather than the more common heatsink/fan combinations seen elsewhere. This helps keep the noise level of the system down a bit, but we wouldn't recommend overclocking this board. Furthermore, Chaintech has also fitted a C-Media six-channel sound chip with an extra back bracket for the rear and centre/sub-channels.

Coming in at number three in the speed stakes, performance is good. A decent effort from Chaintech at a reasonable price.



## ECS K7S5A

SOCKET A

**PRICE** £64.61 (£54.99 ex VAT) **CONTACT** Ebuyer.com [www.ebuyer.com](http://www.ebuyer.com) 08707 542 100

**PROS** Price; easy to set up **CONS** No extras

**OVERALL** The cheapest Socket A board on the market and it's quite straightforward to set up

**LAYOUT**  **DOCUMENTATION**

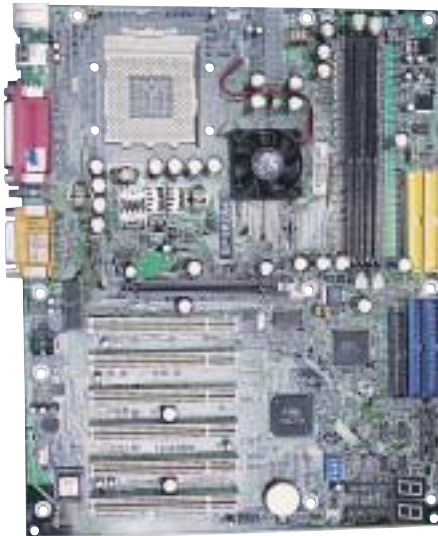
**VALUE FOR MONEY**  **OVERALL**

ECS (Elite Group Computer Systems) is the world's biggest motherboard manufacturer in terms of volume, but don't be amazed if you've never heard the name, since the majority of its boards are sold under other names or to system integrators.

The K7S5A is an interesting board as it's the first we've seen based on the new SiS735 chipset, and it's the only single-chip solution for Socket A motherboards on the market. The SiS735 chipset incorporates both the northbridge and the southbridge into one single chip with a very high-speed internal bus.

The board supports two DDR as well as two SDR SDRAM memory modules, so you could use old memory if you've got it, but you can't mix and match. The rest of the board is fairly standard without any special features whatsoever. Setting the board up is pretty straightforward, although the BIOS can be a bit confusing at times.

This motherboard didn't live up to our performance expectations, coming fourth from bottom, but it's not horrendously slow. Since we started this group test ECS has released a new version of this board that should be a better performer.



## EPoX 8K7A+

SOCKET A

**PRICE** £122.63 (£104.37 ex VAT) **CONTACT** [www.cclcomputers.co.uk](http://www.cclcomputers.co.uk) 01274 471 201

**PROS** Layout; debug LEDs; EIDE RAID **CONS** Only two memory slots

**OVERALL** An excellent range of features, but if you've got a bit more cash go for the Abit KG7-RAID

**LAYOUT**  **DOCUMENTATION**

**VALUE FOR MONEY**  **OVERALL**

EPoX is still fairly new to the motherboard market in Europe and our first experience with the company was in last year's group test, when we weren't exactly bowled over by its motherboard. Since then things have moved on. EPoX has progressed as a company and is now supplying some of the best boards on the market, both in terms of layout and performance.

The 8K7A+ sits towards the top of the pile in our performance tests. It is very similar to Abit's KG7-RAID in many areas, notably the use of a Highpoint EIDE RAID controller and the six PCI slots.

EPoX hasn't managed as well when it comes to available memory slots, however, as there are only two provided. This is because the AMD 761 northbridge only supports two unregistered memory modules, so most motherboard manufacturers have decided to opt for that, as registered modules are a bit harder to get hold of.

Another handy feature is the POST LEDs that show if there is something wrong with the system during the boot sequence. All in all this is a very good board just beaten by the Abit KG7-RAID.

## Gigabyte GA-7DXR

SOCKET A

**PRICE** £118.67 (£101 ex VAT) **CONTACT** Dabs.com [www.dabs.com](http://www.dabs.com) 0870 429 3120

**PROS** EIDE-RAID; AGP Pro; four-channel sound **CONS** Jumpers and dip switches

**OVERALL** Setup is fiddly, but it's a respectable performer that offers good value for money

**LAYOUT**  **DOCUMENTATION**

**VALUE FOR MONEY**  **OVERALL**

Gigabyte is one of the giants in the motherboard market and it has a huge range of these devices for various platforms and form factors. The 7DXR is the latest board based on the AMD 761 northbridge and the VIA 686B southbridge.

Compared to its older brother the 7DX, this board is a complete redesign. The layout has improved, although it still leaves quite a bit to be desired in terms of ease of use. Sadly, Gigabyte is not a company that believes in jumperless motherboards, so there is a multitude of dip switches and jumpers on this product.

That aside this is an excellent board with a Promise EIDE-RAID controller, as well as an AGP Pro slot and a four-channel Creative sound chip onboard. Also worth mentioning are the three DDR SDRAM slots which can use unbuffered memory.

Another plus point is that the board supports external power for the AGP Pro slot, if you intend to use a high-power AGP Pro graphics card.

Performance-wise the 7DXR is pretty much in the middle and this, together with an attractive price, makes it a good buy if you don't mind the dip switches and jumpers.



# GROUP TEST MOTHERBOARDS

## Jetway 866AS-R

SOCKET A

**PRICE** £98.20 (£83.57 ex VAT) **CONTACT** PC Ideals [www.pcideals.com](http://www.pcideals.com) 023 9286 3362

**PROS** Price; EIDE-RAID **CONS** Looks

**OVERALL** A well-featured board that stands out from the crowd, but it might be too colourful for some

**LAYOUT** **DOCUMENTATION**

**VALUE FOR MONEY** **OVERALL**

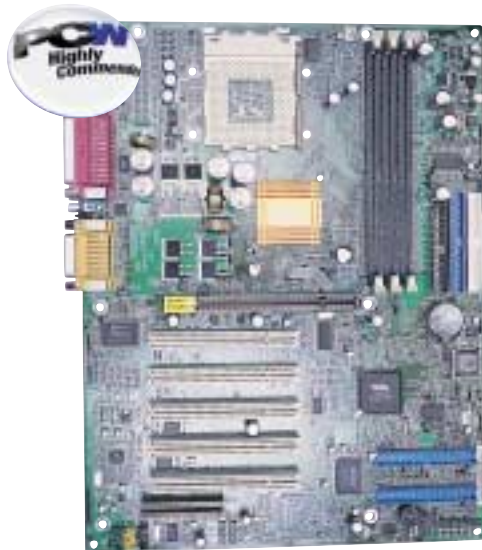
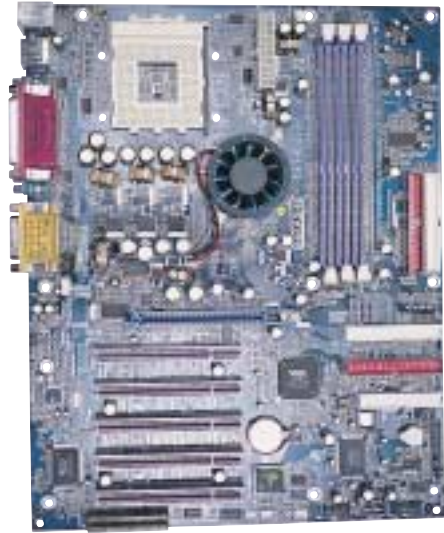
Jetway is one of those brands that you've either never heard of or know all about. The company's boards are usually found in the bargain basement in most computer shops and have so far not attained a proven track record. We were therefore very impressed by the performance and build of the 866AS-R.

The board uses the same kind of blue PCB as models that we've seen from Gigabyte in the past, but what makes the Jetway stand out from the crowd is the coloured PCI, AGP and memory slots.

The board is based on the VIA KT266

chipset which has so far been a poor performer, but somehow the engineers at Jetway have managed to get it to perform almost as well as most of the AMD 761-based boards. This is quite an achievement on its own, but add to this the onboard EIDE-RAID controller from Promise and three memory slots and this makes the 866AS-R quite an impressive product.

Jetway has also considered the overclocker, providing a BIOS full of tweaking features and the amazing heatsink on the northbridge that we've seen before in Hercules Kryo-based graphics cards.



## MSI K7T266 Pro-R

SOCKET A

**PRICE** £125.70 (£106.98 ex VAT) **CONTACT** Komplett.co.uk [www.komplett.co.uk](http://www.komplett.co.uk)

**PROS** AGP Pro; EIDE-RAID and USB networking **CONS** Price; board design

**OVERALL** A fully featured board. The price is high and layout a bit messy, but it's still a clear winner

**LAYOUT** **DOCUMENTATION**

**VALUE FOR MONEY** **OVERALL**

MSI is yet another of the big players in the motherboard market, selling most of its boards to system integrators, although it still offers a wide range of boards to end users as well. We regularly find MSI boards in systems from various PC manufacturers in both standalone reviews and monthly PC group tests.

The K7T266 Pro-R is one of MSI's latest models and is based on the VIA Apollo KT266 chipset, which has so far been fairly disappointing in the performance stakes. However, VIA has recently launched an update to this chipset. MSI has done its

homework and put together this test's performance winner, beating all the other Socket A boards in the SYSmark tests.

The K7T266 Pro-R features AGP Pro, a Promise EIDE-RAID controller and built-in USB networking. This means you get eight EIDE channels with RAID features and the ability to network to another PC with no extra kit. There will also soon be a version available with onboard USB 2.0.

The price is steep but it's far greater value for money than the Asus A7V266 and, although it only offers AC97 sound, the rest of the features make up for this.

## QDI KudoZ 7

SOCKET A

**PRICE** £81.51 (£69.37 ex VAT) **CONTACT** Ebuyer.com [www.ebuyer.com](http://www.ebuyer.com) 08707 542 100

**PROS** Price **CONS** Difficult setup; poor performance

**OVERALL** A poor performing board that is a nightmare to set up and lacks extras except a free mouse

**LAYOUT** **DOCUMENTATION**

**VALUE FOR MONEY** **OVERALL**

QDI is a company that is more well-known under the name Legend, the biggest computer manufacturer in China. With a company such as this behind QDI we expected great things, especially if you look back at last year's motherboard group test where QDI did quite well.

However, we were shocked by this motherboard, not only by its poor performance, as it's the slowest board we've ever seen, but rather by the big bag of jumpers that came with it. One of the things that QDI has been known for is its easy setup and configuration. QDI boards used to employ

soft BIOS settings for the CPU, memory and FSB speeds to save you mucking about with jumpers. But that is not the case on this board. The tweaking options are also minimal, so overclockers beware.

What put us off even more was the free mouse that came with the board, as most of us in the PCW offices felt it was the worst mouse we've ever seen.

It's a shame that things have gone this way for QDI, although the KudoZ 7 does have one saving grace, its price. But even though it's the second cheapest board on test, we'd still rather go for the ECS.



## THE MOTHERBOARDS INTEL DOESN'T WANT YOU TO BUY

Pictured is the Azza P4X2-AV motherboard that Intel doesn't want you to buy. That may seem odd as it is a Socket 478 Pentium 4 board, and it looks similar to so many others in our group test.

Intel isn't happy about this board because it uses the VIA P4X266 chipset, which supports DDR SDRAM. Essentially the P4X266 is Intel's 850 chipset but with DDR SDRAM. There's a full specification at [www.viatech.com/jsp/en/products/apollo/P4X266.jsp](http://www.viatech.com/jsp/en/products/apollo/P4X266.jsp).

Intel has licensed the Pentium 4 bus architecture to SiS, ATi and Ali, but not VIA or nVidia. VIA has produced the P4X266 anyway and claims to have a legal right based on technology it acquired when it bought S3. Intel strongly disagrees and is suing VIA for breach of patents to do with relatively obscure points about AGP 4x.

VIA is counter-suing Intel and has filed charges based on Taiwan's fair trade laws.

Right now Intel wants you to buy a motherboard with its 850 chipset using RDRAM, or its 845 with SDRAM. We understand a revision of 845 that supports DDR SDRAM will be launched early in 2002.



**Azza's P4X2-AV motherboard is based on a chipset that supports DDR SDRAM**

There is no technical issue with VIA producing the P4X266; it all comes down to money.

The problem is that manufacturers are loath to produce motherboards built around a chipset that is at the heart of a legal dispute.

In fact, VIA has offered to underwrite the legal costs of any motherboard manufacturer that may arise from this dispute.

As a result, smaller manufacturers that have little to lose are using the P4X266. We have seen motherboards from Azza and ACorp and we are aware that Shuttle has produced a Pentium 4 DDR board, too.

We fully tested the Azza P4X2-AV and would have included it in the group as a full review, however, we were unable to get pricing and availability details for the UK.

Performance was very similar to most 845 boards in the group in SYSmark 2001. Scores were: SYSmark overall: 152; Internet content creation: 162; office productivity: 143.

We certainly don't see those figures as proof that P4X266 is a must-have technology.

In addition, first efforts with new chipsets don't tend to get the full potential from the silicon. That is particularly true if the motherboard manufacturer is a smaller company.

By the time you read this the legal position between Intel and VIA should be clearer, and then we might see P4X266 boards from the likes of MSI and Asus. **Leo Waldoock**

## THE MYSTERY OF THE BIOS

Most of us have heard of it, the BIOS (Basic Input Output System), but what is it and what does it do? To begin with, the BIOS consists of two parts, a hardware part that is a physical chip on the motherboard and the software part that resides on this chip. The software bit is what makes the computer work, or if you prefer, this is a very low-level operating system, even though it doesn't allow you to run any applications within it. Without a BIOS there is no way that the motherboard will recognise all the parts you fit to it, nor will you be able to configure your system in any way or add any new hardware to it.

Every motherboard has a specific BIOS that is set to perform certain tasks, all working in conjunction with the chipset on the motherboard. Other features the BIOS controls are the memory settings, so you can get the best performance out of your memory, the CPU multiplier and bus speed, which allows you to run your CPU at the correct speed. You will notice that if you reset your BIOS (with a jumper on the motherboard), your CPU will run at a default speed set by the motherboard manufacturer. Moreover, the BIOS keeps track of what IRQs (Interrupt ReQuests) get associated with what expansion card, even though this is becoming less of an issue with today's operating systems and IRQ conflicts are almost a thing of the past.



**Top: PC Health lets you see temperature and power data**

**Right: Advanced BIOS features comprise setups for EIDE and cache memory**



You will also find that you can enable and disable the built-in hardware on the motherboard in the BIOS – this includes features such as onboard sound and graphics, or even a serial or parallel port.

Other features that you will find in a more recent BIOS are power management controls, as well as built-in temperature and voltage

monitors that allow you to monitor any problems your system might be experiencing (see screenshots).

For those who are a bit more vain, there are even BIOSs on certain motherboards that allow you to have your own boot logo when you start the machine, but even these have some limitations. Furthermore, you'll find that certain Phoenix/Award BIOSs feature an integrated mini web browser that will allow the motherboard manufacturer to have you connect to its website and upgrade your BIOS software without the hassle of floppies or even booting up Windows.

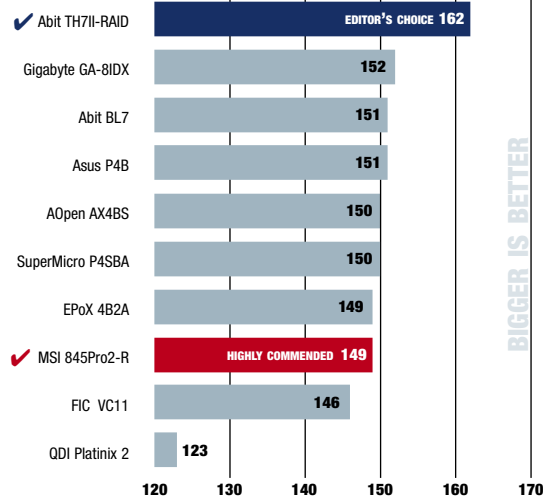
Most users will never enter their BIOS but, if you do, be careful not to change something if you're not sure what it does, as it can hamper the performance of your system or even make it unusable. That said, you can always reset your BIOS to its default settings if you mess everything up, then start again.

**Lars-Goran Nilsson**

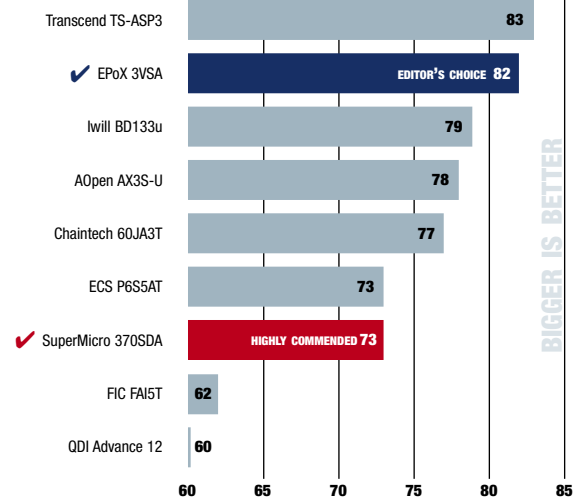
# GROUP TEST MOTHERBOARDS

## LAB RESULTS

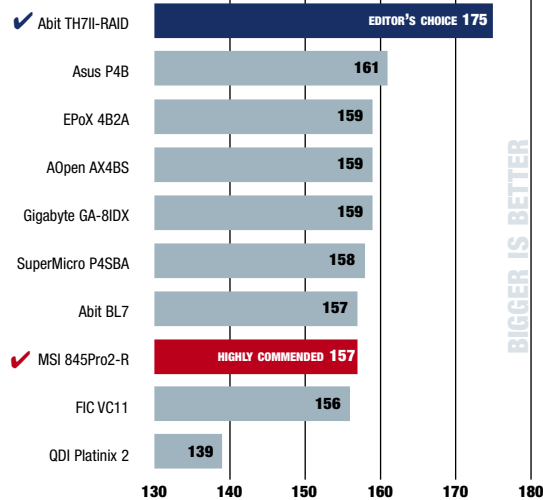
### SYSmark 2001 overall Socket 478 motherboards



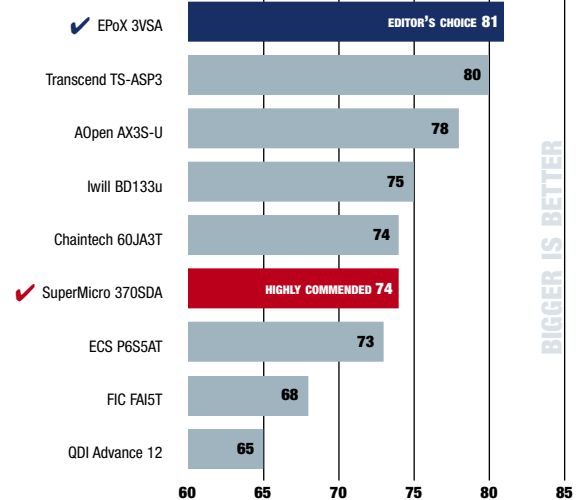
### SYSmark 2001 overall Socket 370 motherboards



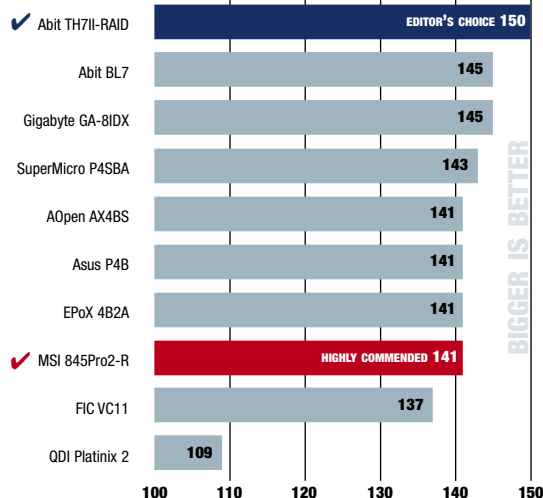
### SYSmark 2001 Internet content creation (478)



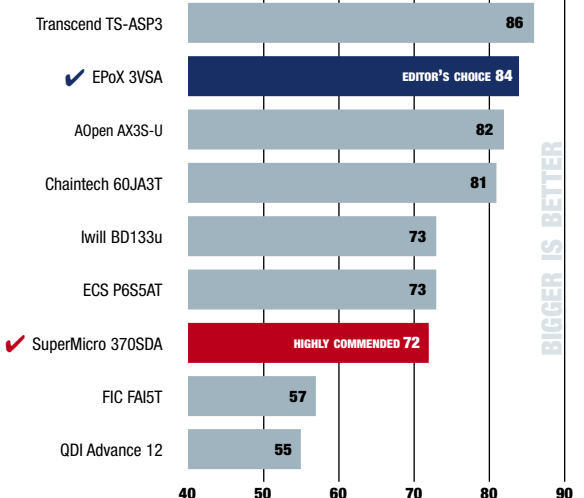
### SYSmark 2001 Internet content creation (370)



### SYSmark 2001 office productivity (478)

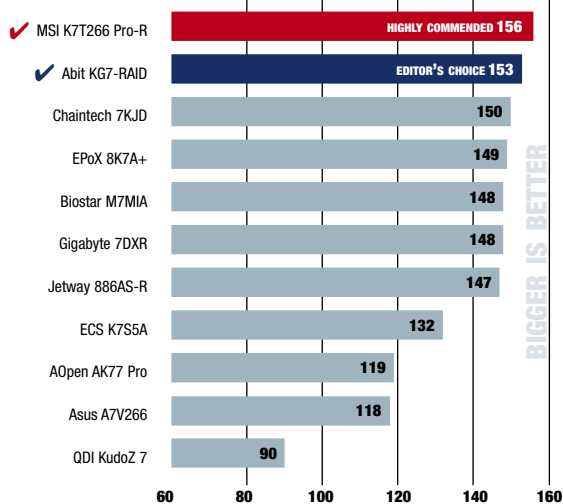


### SYSmark 2001 office productivity (370)

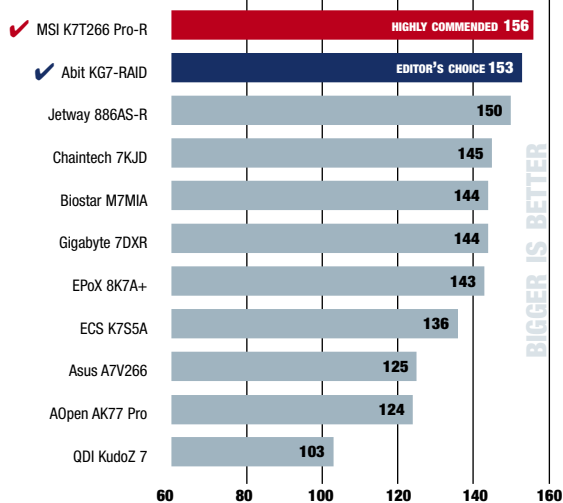




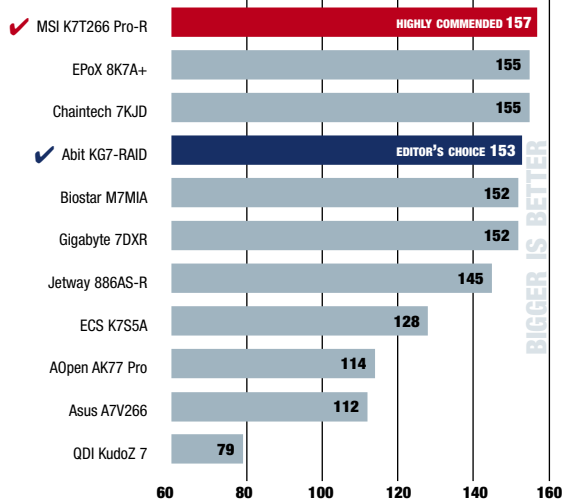
## SYSMark 2001 overall Socket A motherboards



## SYSMark 2001 Internet content creation (Socket A)



## SYSMark 2001 office productivity (Socket A)



## HOW WE TEST

To test the motherboards we ran them through our SYSMark 2001 benchmarking suite. This consists of several office-based applications that simulate the everyday use to which a PC is subjected. The applications employed by SYSMark include Adobe Photoshop 6.0, Adobe Premiere 6.0, Microsoft Windows Media Encoder 7, Macromedia Dreamweaver 4, Macromedia Flash 5, Microsoft Word 2000, Excel 2000, PowerPoint 2000, Outlook 2000, Access 2000, Netscape Communicator 6.0, Dragon NaturallySpeaking Preferred v.5, WinZip 8.0, and McAfee VirusScan 5.13.

Automated scripts are run on each application and timed, giving an indication of a PC's speed. We decided not to run 3D tests since this would be testing the graphics card rather than the motherboard.

As we were not testing complete PCs, we had to make sure that each motherboard was on a level playing field, so the same peripherals were used for every board, with the only variant being the AMD and Intel CPUs.

For the AMD boards we used a 1,400MHz Athlon Thunderbird chip with 128KB of Level 1 cache and 256KB of Level 2 cache, running on a 266MHz Front-side bus (FSB). For the Socket 478 Intel motherboards we used a 1.9GHz Pentium 4 with 8KB of Level 1 cache and 256KB of Level 2 cache, and a 400MHz FSB. Socket 370 boards were tested with Intel's 900MHz Celeron with 32KB of Level 1 cache and 128KB of Level 2 cache on a 100MHz FSB. Athlon, P4 and Celeron boards can only be compared to each other. Cooler-master supplied the heatsink/fan units and thermal compound.

To keep things as cutting edge as possible we used UltraDMA100-compatible hard disks from Seagate. These Barracuda III 7,200rpm units represent the pinnacle of EIDE technology and allowed the motherboards that supported the UltraDMA-100 standard to make use of the enhanced burst transfer rate. Each board was also tested with the EIDE cable included in the box.

For system memory we used 256MB of memory in two modules: Crucial PC133 SDRAM, Crucial PC2100 DDR-SDRAM and Kingston PC800 RDRAM as appropriate.

Graphics were provided by ATI Radeon 64MB DDR AGP cards and, although not cutting edge, these were more than adequate for comparing the motherboards.

With each new board the hard disk was formatted and Windows Me was reinstalled from scratch. Then SYSMark was installed and run, so that every test was performed under exactly the same conditions.

As the graphs show there is only a small difference in performance between the motherboards. Because of this, performance was only a small factor in our evaluation of each board. Installing a motherboard is a major operation and a manufacturer can do a lot at the design stage to make your life either easier or more difficult. The board's layout cannot only affect how easy it is to install, but also how tidy or untidy the inside of your PC is when built.

Another major factor is documentation. Some boards come with next to no paper documentation, with the full manual on a CD instead. This may be environmentally friendly, but the chances are that if you're building a PC from scratch you won't have access to a CD-ROM drive. Clear, detailed documentation is of great importance and the motherboards were rewarded or chastised accordingly.

Finally, we looked at value for money. We considered the features and whether the package justified the price. It didn't necessarily follow that the cheapest board offered the best value. Sometimes it's worth spending that little bit more to get a superior product.

Of course, buying a new motherboard is subjective to some extent. If you need a specific number of PCI slots, or require onboard sound and video, then your search will be narrowed, but whatever your criteria this test should make your choice easier.

## SOCKET 478 MOTHERBOARDS TABLE OF FEATURES



MANUFACTURER	ABIT	ABIT	AOPEN	ASUS
PRODUCT	BL7	TH7II-RAID	AX4BS	P4B
Price inc VAT (ex VAT)	£121.96 (€103.80)	£169.53 (€144.28)	£115.14 (€98)	£142.35 (€121.15)
URL	<a href="http://www.abit.nl">www.abit.nl</a>	<a href="http://www.abit.nl">www.abit.nl</a>	<a href="http://www.aopen.com">www.aopen.com</a>	<a href="http://www.asus.com">www.asus.com</a>
MOTHERBOARD FEATURES				
Chipset	i845	i850	i845	i845
Memory type(s)	SDRAM	RDRAM	SDRAM	SDRAM
Memory slots/max RAM	3/3GB	4/2GB	3/3GB	3/3GB
Front-side bus speeds	400	400	400	400
Manual memory speed settings	✓	✓	✓	✓
Overclockable front-side bus speeds	100-255 x 4 stepless	100-255 x 4 stepless	105, 108, 114, 120, 123, 126 x4	105, 111, 120, 125, 133 x 4
AGP/AGP Pro/PCI	x/✓/6	x/✓/5	x/✓/5	✓/x/6
AMR/CNR/ACR/ISA	x/✓/x/x	x/✓/x/x	x/✓/x/x	x/✓/x/x
Shared slots	CNR and PCI	CNR and PCI	CNR and PCI	CNR and PCI
PS/2/USB/serial/parallel ports	2/3/2/1	2/3/2/1	2/2/2/1	2/2/2/1
Extra USB ports/optional extras	0/2	0/2	0/2	2/0
Onboard VGA/sound	x/✓ AC97	x/✓ AC97	x/✓ AC97	x/✓ AC97
Onboard RAID (model)/EIDE channels	x/4	✓ (Highpoint HPT370A)/8	x/4	x/4
Wake on LAN/Modem	✓/x	✓/✓	x/x	x/x
Other connectors	Gameport, Audio, IrDA	Audio, Gameport on separate bracket, IrDA	Gameport, IrDA	SPDIF-Out, SD/MS card reader, SCR, Asus iPanel, Gameport, Audio
Onboard diagnostics/type	✓/2 Alphanumeric LCD	✓/2 Alphanumeric LCD	Optional Dr LED	✓/Asus POST Reporter
Number of fan connectors/onboard speaker	3/✓	3/✓	2/✓	3/✓
Jumperless/soft BIOS/BIOS type	✓/Award	✓/Award	✓/Award	✓/Award
Other features/software	N/A	Onboard Power and Reset buttons, WinDVD 2000	Norton AntiVirus 2001/ Adobe Acrobat Reader	PC Cillin, Cyberlink Power Player SE, Cyberlink Videolive Mail

## SOCKET 370 MOTHERBOARDS TABLE OF FEATURES



MANUFACTURER	AOPEN	CHAINTech	ECS	EPOX
PRODUCT	AX3S-U	60JA3T	P6S5AT	3VSA
Price inc VAT (ex VAT)	£95.17 (€81)	£84.01 (€71.50)	£54.03 (€45.98)	£69.95 (€58.28)
URL	<a href="http://www.aopen.com">www.aopen.com</a>	<a href="http://www.chaintech.dk">www.chaintech.dk</a>	<a href="http://www.ecs.uk.com">www.ecs.uk.com</a>	<a href="http://www.epox-uk.com">www.epox-uk.com</a>
MOTHERBOARD FEATURES				
Chipset	i815E	i815EP	SIS 635/T	VIA Apollo Pro133T
Memory type(s)	SDRAM	SDRAM	DDR SDRAM/SDRAM	SDR SDRAM
Memory slots/max RAM	3/512MB	3/512MB	2/1GB/2/1GB	3/1.5GB
Front-side bus speeds	100/133	100/133	66/100/133	66/100/133
Manual memory speed settings	✓	✓	✓	✓
Overclockable front-side bus speeds	100-200MHz in 17 steps	Stepless in 1MHz to 132MHz	N/A	N/A
AGP/AGP Pro/PCI	✓/x/6	✓/x/6	✓/x/5	✓/x/5
AMR/CNR/ACR/ISA	x/✓/x/x	x/✓/x/x	✓/x/x/x	x/x/x/x
Shared slots	PCI/CNR	PCI/CNR	N/A	N/A
PS/2/USB/serial/parallel ports	2/2/1/1	2/2/2/1	2/2/2/1	2/2/2/1
Additional USB ports/optional extras	0/2	0/2	0/2	0/2
Onboard VGA/sound	✓/✓ AC97	x/✓ C-Media CM18738	x/✓ AC97	x/✓ AC97
Onboard RAID (model)/EIDE channels	x/4	x/4	x/4	x/4
Wake on LAN/Modem	✓/✓	✓/x	x/x	✓/x
Other connectors	Dr. LED, DVI & TV-Out headers, IrDA, Game, Audio	Surround sound, SCR, IrDA, Alert on LAN, Game, Audio	Front Audio, Game, Audio	IrDA, Game, Audio
Onboard diagnostics/type	Optional Dr. LED	N/A	N/A	N/A
Number of fan connectors/onboard speaker	3/✓	2/✓	2/x	2/x
Jumperless/soft BIOS/BIOS type	✓/Award	✓/Award	✓/AMI	✓/Award
Other features/software	COM 2 on bracket/ Norton AntiVirus 2001	Bracket for surround sound/WinDVD 2000	PC-cillin AntiVirus, Norton Ghost	Norton AntiVirus, Norton Ghost



EPOX	FIC	GIGABYTE	MSI	QDI	SUPERMICRO
4B2A	VC11	GA-8IDX	845PRO2-R	PLATINIX 2	P4SBA
£118.67 (£101)	£119.85 (£102) SRP	£123.38 (£105)	£128.76 (£109.58)	£107.22 (£91.25)	£139.83 (£119)
<a href="http://www.epox-uk.com">www.epox-uk.com</a>	<a href="http://www.fic.com.tw">www.fic.com.tw</a>	<a href="http://www.gigabyte.com.tw">www.gigabyte.com.tw</a>	<a href="http://www.msi.com.tw">www.msi.com.tw</a>	<a href="http://www.qdigrp.com">www.qdigrp.com</a>	<a href="http://www.supermicro.com">www.supermicro.com</a>
i845	i845	i845	i845	i845	i845
SDRAM	SDRAM	SDRAM	SDRAM	SDRAM	SDRAM
3/3GB	3 / 3GB	3/3GB	3/3GB	3/3GB	3/3GB
400	400	400	400	400	400
✓	✓	✓	✓	✓	✓
100-250 x 4 stepless	102,105,126,130,133,136,166,200 x 4	100-200 x 4 stepless	100-132MHz x 4 stepless	100-126MHz x 4 stepless	x
✓/x/6	✓/x/5	✓/x/6	✓/x/6	✓/x/6	x/✓/6
x/✓/✓/✓	x/✓/✓/✓	x/✓/✓/✓	x/✓/✓/✓	x/✓/✓/✓	x/✓/✓/✓
CNR and PCI	None	CNR and PCI	CNR and PCI	CNR and PCI	CNR and PCI
2/2/2/1	2/2/2/1	2/2/2/1	2/2/2/1	2/2/2/1	2/2/2/1
2/2	0/2	2/0	1/0 plus USB networking	0/2	1/1
x/✓ AC97	x/✓ AC97	x/✓ Creative CT5880	x/✓ C-Media CMI8738	x/✓ AC97	x/x
x/4	x/4	x/4	✓(Promise FastTrak 100 Lite)/8	x/4	x/4
✓/x	✓/x	✓/x	✓/✓	✓/✓	✓/✓
Audio, Gameport	Front panel audio Audio, Gameport, 10/100 LAN	Gameport, SCR, Gameport, Audio IrDA, 10/100 LAN	Gameport, Audio, IrDA	Gameport, Audio, IrDA	None
None	None	None	✓/D-LED bracket and internal D-LED	None	None
3/x	3/✓	3/x	3/x	3/✓	4/x
✓/Award	✓(FSB only)/Award	✓/Award	✓/Award	Jumpers for core voltage/Award	✓/Award
PC Cillin, Norton Ghost	10/100 LAN/Norton AntiVirus, Ghost, Virtual Drive	10/100 LAN, Dual Bios, I/O panel/ Norton AntiVirus, Norton Firewall	USB Networking, Smart Key/ Trend PC Cillin	I/O panel, Norton AntiVirus	Intel LAN desk client manager



FIC	IWILL	QDI	SUPERMICRO	TRANSCEND
FA15T	BD133U	ADVANCE 12	370SDA	ASP3
£58.75 (£50 ex VAT)	£89.99 (£76.58)	£84.48 (£71.90)	£110.44 (£93.99)	£101.06 (£86.01 ex VAT)
<a href="http://www.fic.com.tw">www.fic.com.tw</a>	<a href="http://www.iwill.net">www.iwill.net</a>	<a href="http://www.qdigrp.com">www.qdigrp.com</a>	<a href="http://www.supermicro.com">www.supermicro.com</a>	<a href="http://www.transcend.nl">www.transcend.nl</a>
VIA Apollo Pro133T	i815EP	VIA Apollo Pro266T	VIA Apollo Pro266T	i815EP
SDRAM	SDRAM	DDR SDRAM	DDR SDRAM	SDRAM
3/1.5GB	3/512MB	3/1.5GB	3/1.5GB	3/512MB
66/100/133	66/100/133	66/100/133	66/100/133	66/100/133
✓	✓	✓	x	✓
75, 83, 10, 112, 124, 140, 150	Stepless in 1MHz steps to 200MHz	105, 110, 118, 124, 137, 140, 150	N/A	Stepless in 1MHz to 166MHz
✓/x/5	✓/x/6	x/✓/5	x/✓/5	✓/x/6
x/✓/✓/✓	x/✓/✓/✓	x/✓/✓/✓	x/✓/✓/✓	x/✓/✓/✓
CNR/PCI	N/A	N/A	N/A	CNR/PC
2/2/2/1	2/2/2/1	2/2/2/1	2/2/2/1	2/2/1/1
0/2	0/2	0/4	1/1	0/2
x/✓ AC97	x/✓ C-Media CMI8738	x/✓ AC97	x/x	x/✓ AC97
x/4	x/4	x/4	x/4	x/4
✓/✓	✓/✓	✓/✓	✓/✓	✓/✓
Front Audio, IrDA, Game, Audio	Surround audio/S/PDIF, IrDA, Game, Audio	Smart Card Reader, IrDA, Game, Audio	IrDA	Serial port, IrDA
✓/Voice diagnostics	✓/Voice diagnostics	N/A	N/A	N/A
2/x	4/x	3/x	3/✓	3/x
✓(FSB only)/Award	✓/Award	✓/Award	✓/Award	✓/Award
Norton AntiVirus, Ghost and Personal Firewall, WinDVD 2000	Bracket for surround channels/PC-Cillin	I/O Plate/Norton AntiVirus	N/A	COM 2 on bracket

## SOCKET A MOTHERBOARDS TABLE OF FEATURES



MANUFACTURER	ABIT	AOPEN	ASUS	BIOSTAR	CHAINTECH
PRODUCT	KG7-RAID	AK77 PRO	A7V266	M7MIA-R	7KJD
Price inc VAT (ex VAT)	£139.02 (€118.32)	£105.74 (€89.99)	£132.50 (€112.77)	£125.71 (€106.99)	£101.64 (€86.50)
URL	<a href="http://www.abit.nl">www.abit.nl</a>	<a href="http://www.aopen.com">www.aopen.com</a>	<a href="http://www.asus.com">www.asus.com</a>	<a href="http://www.biostar.com.tw">www.biostar.com.tw</a>	<a href="http://www.chaintech.dk">www.chaintech.dk</a>
MOTHERBOARD FEATURES					
Chipset	AMD761/VIA 686B	VIA KT266	VIA KT266	AMD761/VIA 686B	AMD761/VIA VT8231
Memory type(s)	DDR SDRAM	DDR SDRAM	DDR SDRAM	DDR SDRAM	DDR SDRAM
Memory slots/max RAM	4/2GB	3/1.5GB	3/1.5GB	2/1GB	2/1GB
Front-side bus speeds	200/266	200/266	200/266	200/266	200/266
Manual memory speed settings	✓	✓	✓	✓	✓
Overclockable FSB speeds	Stepless in 1MHz steps up to 200MHz	Stepless in 1MHz steps up to 248MHz	Stepless in 1MHz steps up to 227MHz	138,140,144,150MHz	Stepless in 1MHz steps up to 165MHz
AGP/AGP Pro/PCI	✓/X/6	✓/X/5	X/✓/5	X/✓/5	✓/X/5
AMR/CNR/ACR/ISA	0/0/0/0	0/1/0/0	0/0/1/0	1/0/0/1	0/1/1/0
Shared slots	N/A	PCI/CNR	PCI/ACR	CNR/PCI	CNR/PCI
PS/2/USB/serial/parallel ports	2/2/2/1	2/2/2/1	2/2/2/1	2/2/2/1	2/2/1/1
Extra USB ports/optional extras	2/0	0/2	0/2	0/2	0/2
Onboard VGA/sound	X/X	X/✓ AC97	X/✓ C-Media CMI 8738	X/✓ AC97	X/✓ C-Media CMI8738
Onboard RAID (model)/EIDE channels	✓(Highpoint HPT370A)/8	X/4	X/4	✓(Highpoint HPT370A)/8	X/4
Wake on LAN/Modem	✓/✓	✓/✓	X/X	✓/✓	✓/✓
Other connectors	IrDA, SMBus	IrDA, Audio and Game ports	IrDA, iPanel, Audio, Game	IrDA, Audio and Game ports	IrDA
Onboard diagnostics/type	N/A	Optional support for Dr LED	N/A	N/A	N/A
Number of fan connectors/onboard speaker	4/X	3/X	3/X	2/X	2/✓
Jumperless/soft BIOS/BIOS type	✓/Award	✓/Award	✓/Award	✓/Award	✓/Award
Other features/software	N/A/N/A	N/A/Norton Antivirus 2001	N/A/N/A	N/A/N/A	5.1 sound ports on bracket/N/A

### MOTHERBOARDS AND CHIPSETS

Our reviews of motherboards tend to focus quite closely on the chipset. The chipset is more accurately named the core logic, and controls every function of the motherboard.

The most important functions and features are processor support, memory support and AGP. Lesser functions include USB, PCI, AMR, CNR, ACR and EIDE hard drive support, however they are critical to the PC.

The chipset is typically split into a northbridge and a southbridge. The northbridge controls the processor front-side bus (FSB), memory bus and AGP bus, while the southbridge manages everything else.

Chipsets with integrated graphics, such as VIA KM133 and Intel 815E, allow OEMs to build cheap PCs with no need for expansion cards. It is likely that future processors will integrate the graphics controller within the processor itself, as an aid to performance rather than a budget measure.

It is a grotesque over-simplification to say that the northbridge defines the basic nature of the PC, and the southbridge supplies the features and functionality.

It is also inaccurate to call the chipset a chipset. Most motherboards use the two-chip northbridge/southbridge arrangement, and some have a third chip for onboard graphics.

We also occasionally see a single-chip solution, such as the SiS735 for the Athlon. Clearly one chip cannot be a set.



The two chips that comprise the VIA KT133A chipset perform almost identically to the SiS735 chipset

The two chips that make VIA's Apollo KT133A chipset have almost identical functionality to the SiS735 (see pictures). But the VIA chipset supports only SDR SDRAM, and the 735 supports both SDR and DDR SDRAM.

Processors have approximately doubled in speed over each of the past two years. At the time of writing, the fastest 1,400MHz Athlon runs at 10.5 x 133MHz FSB double pumped to 266MHz. Intel's 2GHz Pentium 4 runs at 20 x 100MHz FSB quad-pumped to 400MHz.

This speed is nigh-on useless without appropriate system memory support. PC133 SDRAM has a maximum data transfer rate of 1.06Gbytes/sec and is clearly the bottleneck in high-end PCs.

VIA, AMD, SiS and ALi are producing DDR SDRAM solutions for the Athlon. Currently this is DDR PC266 or PC2100 with a rate of 2.1Gbytes/sec. Intel stands by RDRAM for the Pentium 4 with its 3.2Gbytes/sec transfer rate.

The AGP bus can transfer data at just over 1Gbyte/sec. If you consider that a GeForce3 graphics chip can perform 800 billion operations per second, it's not hard to see that the chipset and motherboard manufacturers are fighting an uphill battle, merely to allow you to play high-quality games on your PC.

As the processor, memory and AGP buses are all controlled by the northbridge, it is no surprise that some chipsets include a heatsink and even a cooling fan to keep the chip cool.

Leo Waldock



ECS	EPOX	GIGABYTE	JETWAY	MSI	QDI
K7S5A	8K7A+	GA-7DXR	886AS-R	K7T266 PRO-R	KUD0Z 7
£64.61 (£54.99)	£122.63 (£104.37)	£118.67 (£101)	£98.20 (£83.57)	£125.70 (£106.98)	£81.51 (£69.37)
<a href="http://www.ecs.uk.com">www.ecs.uk.com</a>	<a href="http://www.epox-uk.com">www.epox-uk.com</a>	<a href="http://www.gigabyte.com">www.gigabyte.com</a>	<a href="http://www.jetway.com.tw">www.jetway.com.tw</a>	<a href="http://www.msi.com.tw">www.msi.com.tw</a>	<a href="http://www.qdigrp.com">www.qdigrp.com</a>
SIS 735	AMD761/VIA 686B	AMD761/VIA 686B	VIA KT266	VIA KT266	VIA KT266
DDR SDRAM/SDR SDRAM	DDR SDRAM	DDR SDRAM	DDR SDRAM	DDR SDRAM	DDR SDRAM
2/1GB/2/1GB	2/1GB	3/1.5GB	3/1.5GB	3/1.5GB	3/1.5GB
200/266	200/266	200/266	200/266	200/266	200/266
✓	✓	X	✓	✓	✓
N/A	Stepless in 1MHz steps up to 250MHz	Stepless in 1MHz steps up to 250MHz	Stepless in 1MHz steps up to 166MHz	Stepless in 1MHz steps up to 164MHz	105,108,110,115,138,140,144,147,150
✓/X/5	✓/X/6	X/✓/5	✓/X/5	X/✓/5	✓/X/5
1/0/0/0	0/0/0/0	1/0/0/0	0/1/0/0	0/1/0/0	0/0/1/0
N/A	N/A	N/A	CNR/PCI	CNR/PCI	N/A
2/2/2/1	2/2/2/1	2/2/2/1	2/2/2/1	2/2/2/1	2/2/2/1
0/2	2/0	0/2	0/4	3/0	0/4
X/✓ AC97	X/✓ AC97	X/✓ Creative CT5880	X/✓ AC97	X/✓ AC97	X/✓ AC97
X/4	✓(Highpoint HPT370A)/8	Promise PDC20265R/8	Promise PDC20265R/8	Promise PDC20265R/8	7/A/4
✓/X	✓/✓	✓/✓	✓/✓	X/✓	✓/✓
IrDA, Front Panel Audio, Audio, Game	IrDA, Audio and Game ports	IrDA, external power for AGP Pro, Audio, Game	IrDA, front panel audio, Audio and Game ports	IrDA, USB Network, external power for AGP Pro	IrDA, SCR
N/A	N/A	N/A	N/A	4 D-LED	N/A
2/X	3/X	3/X	3/✓	3/✓	3/✓
✓/AMI	✓/FSB only/Award	✓/FSB only/Award	✓/Award	✓/AMI	X/Award
N/A/N/A	N/A/Norton Ghost & PC-Cillin AntiVirus	Dual Bios/Norton AntiVirus & Personal Firewall	N/A/N/A	USB Cable for USB networking/N/A	Free Mouse,I/O plate/ Norton AntiVirus 2001

## THE COMPANIES BEHIND THE BOARDS

Our group test includes motherboards from 15 different manufacturers, and we could have chosen products from many, many more.

Every motherboard is made using integrated circuits from Intel, AMD, VIA, ALi or SiS, and will also use a processor from Intel, AMD or possibly VIA.

The motherboard industry utterly relies on these five companies, so it's well worth knowing who they are and what they do.

The chipset market took its shape for the 1990s when Intel launched the 420 series of chipsets to support its 486 processor, back in 1989. In 1993, Intel then progressed to manufacturing motherboards, which placed it in a very strong position to launch new products without having to wait for third-party support.

Intel's focus was to provide a stable platform for its processors, and little consideration was given to the home enthusiast or overclocker.

The big change came in October 1999 when Intel launched the Coppermine Pentium III and 820 chipset with its support for RDRAM, but not SDRAM.

At the time RAMBUS memory was practically unavailable and cost a fortune. The only plausible way to buy a Pentium III system

with an Intel chipset was to give your cash to an OEM.

VIA stepped into the breach with the Apollo Pro133A that not only supported SDRAM, but also supported the memory running asynchronously. In other words, you could use PC133 memory with a 100MHz FSB processor, and see a performance boost.

This gave the customers exactly what they wanted: high performance at low cost. As a result, VIA grabbed a 50 per cent share of the desktop chipset market, and has hung on in there ever since.

VIA and Intel are fighting tooth and nail in the desktop PC chipset market. VIA has a line of Socket 370 processors, however, they are very much budget items and have a negligible share of the European and US markets.

AMD has a very successful desktop processor in the Athlon, along with the budget Duron. When AMD launched the Slot A Athlon back in 1999, it was obliged to produce the 750 chipset to give motherboard manufacturers the necessary hardware to produce Athlon motherboards. Once VIA produced the KX133 chipset to support the Athlon, AMD gratefully returned to manufacturing processors. It has made forays to support new versions of its processor cores with the

760 and 760-MP, but AMD doesn't want to make chipsets.

On the sidelines we have SiS and ALi. They each make a range of products including chipsets for the desktop market.

ALi (Acer Labs) makes other silicon controllers as well, but for some years its strength has been budget chipsets for low-end PCs.

ALi broke out of that niche in early 2001 thanks to the launch of the ALi MAGiK 1 to give DDR-SDRAM support for the Athlon, although this may be a flash in the pan. Similarly, SiS has a history of manufacturing budget chipsets, as well as mobile chipsets for notebooks.

SiS has recently extended its range to include better graphics products. It also has chipsets for Pentium III, Pentium 4 and Athlon. SiS has very cheap single-chip solutions for both Athlon (735) and Socket 370 (635), which support both DDR and SDR SDRAM.

So, as it stands at the moment, that gives us three processor makers and five chipset manufacturers. We also have nVidia on the verge of releasing its first chipset with high-end integrated graphics. The chip war is getting more intense, but hopefully the real winner will be the consumer.

Leo Waldoock

## Editor's Choice

The results of this year's motherboard group test were a bit more of a surprise to us than we'd expected, with the performance spread much wider than last year. This can be put down to the wide range of motherboard chipsets that have arrived on the market over the past year. Only the Pentium 4 boards were limited here, as to date there are no official non-Intel-based Pentium 4 motherboards on the market. The main criteria we set for the companies that supplied boards was that the motherboard had to be readily available in the UK at the time *PCW* hit the streets. Apart from that we gave them a free hand to supply any full-size ATX boards from their range.

We picked the winners by looking at the features of the board, the layout and the price, but we did also pay quite a bit of attention to the performance, and it was in this area that some of the boards fell significantly behind the pack.

### The winners

It's always hard to pick the winners, but we felt it was important that the boards we selected were going to be easy for the end user to install and configure. So our **Editor's Choice** in the AMD Athlon category (Socket A) is the **Abit KG7-RAID**, as this is an excellent board that comes with a good manual and the Soft Menu III, which makes it a breeze to set up the CPU and leaves the board jumper free.

It is also the only Socket A board to feature four memory slots, which makes it an ideal choice if you want to use it in a workstation. Our runner up in this category, receiving the **Highly Commended** award, is the **MSI K7T266 Pro-R**, another excellent board offering a host of features. Even though it wasn't the easiest unit to set up, it still offers excellent value for money, coming with more or less everything you would expect from a top-of-the-range

board while also boasting the performance figures to back it up.

When it came to the Socket 370 boards, it was a tough battle as none of the models really stood out from the crowd as far as features went, so we took a closer look at performance and stability. In the end we came up with the **EPoX 3VSA** as the **Editor's Choice**. The EPoX is attractively priced as well as being one of the easiest boards to set up. It also offers excellent performance. It might not offer you any bells and whistles, but for those who want a solid, affordable home system, this is an excellent choice.

For the high-end users who still prefer the Pentium III over the Pentium 4, we've given the **SuperMicro 370SDA** our **Highly Commended** award, as it features DDR memory support, AGP Pro and was one of the more stable boards on test. It doesn't offer any overclocking features or any extras, but it does have the best manual of any board on test.

And finally, the Pentium 4 (Socket 478) boards. The **Editor's Choice** was not that hard to pick, as we only received one board based on the i850 chipset and this outperformed every other model in this category. That said, it comes at a cost, as both the board itself and the RDRAM it uses push the price up. The board is, of course, the **Abit TH7II-RAID** and it's one of the most well-engineered units to grace the *PCW* offices to date, offering an amazing range of extra features, although many of them might not be employed by the average user. This is the tinkerer's and overclocker's board without any doubt and you can overclock the bus speed on the CPU without increasing the bus speed of the rest of the system.

The **Highly Commended** award goes to **MSI** once again and its **845Pro2-R** board, which is amazing for its price as it features both USB networking and EIDE-RAID.



Abit KG7-RAID



EPoX 3VSA



Abit TH7II-RAID

MSI K7T266 Pro-R



SuperMicro 370SDA



MSI 845Pro2-R



**It was important that the boards were easy for the user to install**