

# Motherboard

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# medley

Building your own PC allows you not only to keep the project within budget, but also to choose what components you want, and it's vital to get the motherboard right, so we've put 21 Intel and AMD boards to the test

**A**lthough components such as graphics cards, CPUs and hard disks tend to get the most exposure in the PC arena, all these bits would be useless without a motherboard to plug them into. The motherboard is like the backbone of your PC and every other component is dependent on it.

The type of motherboard you choose will determine what CPU you can run, how many expansion cards you can have and what type of hard disk you can install.

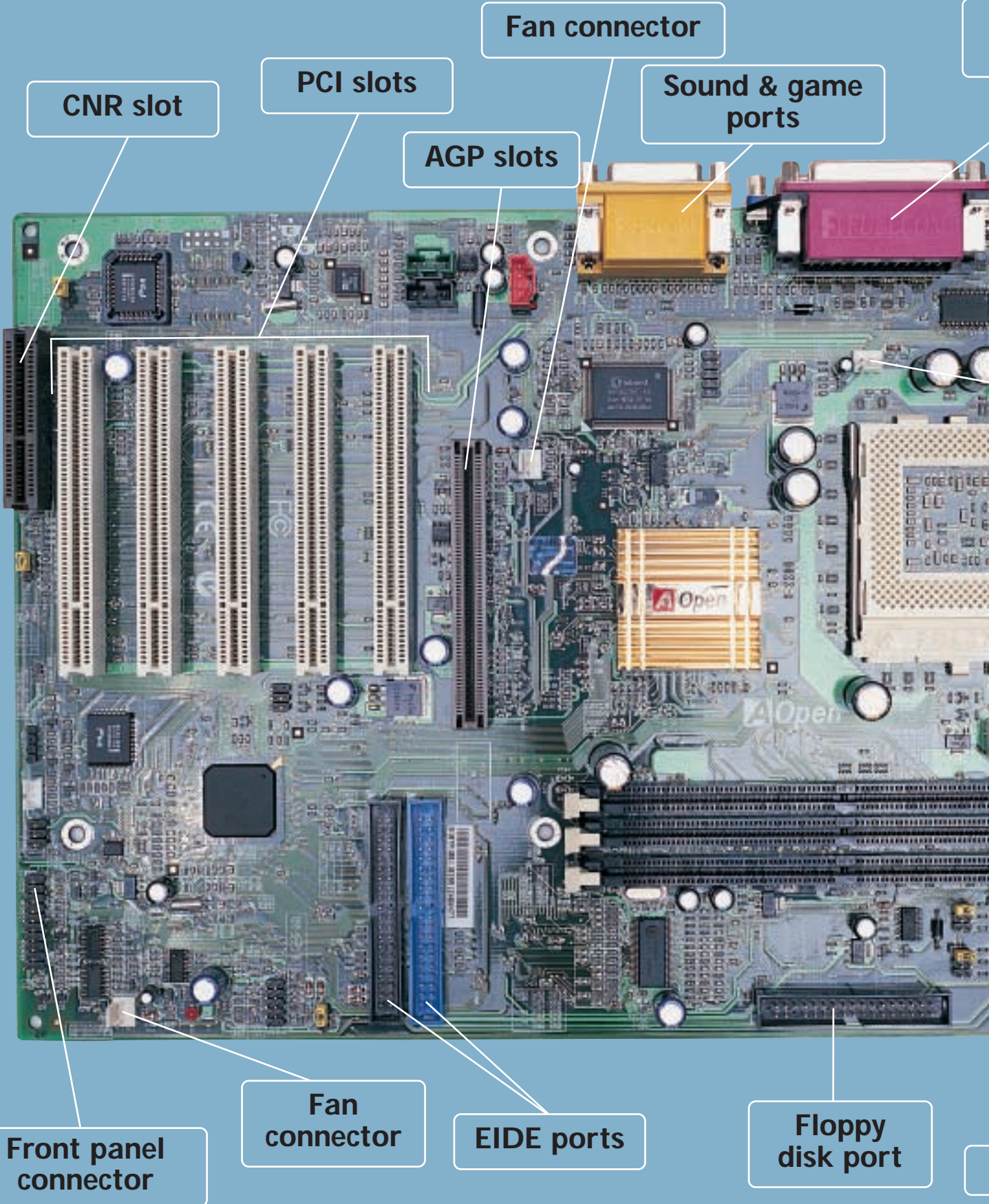
That said, there's more to a motherboard than its features. How it's designed and laid out is also vitally important. Where the power, hard disk and floppy drive connectors are located can determine whether your system internals will be tidy or messy.

Another thing to consider when buying a motherboard is the documentation that comes with it. Building a PC can be a tricky business and you want detailed and clear instructions on how to set up and configure the board you're installing.

To help you decide which motherboard is best we've rounded up 21 of the latest models and cast our very critical eye over them. We've taken all the above criteria into account to decide which board is top dog. The test is split into two categories, one for Intel chip boards and one for AMD chip boards. So, if you're looking to build a new PC or just upgrade your existing one, don't spend any money until you've perused the following pages.

PHOTOGRAPH HUGH THRELFALL

# Anatomy of a mother



Serial parallel & VGA ports

USB ports

PS/2 connectors

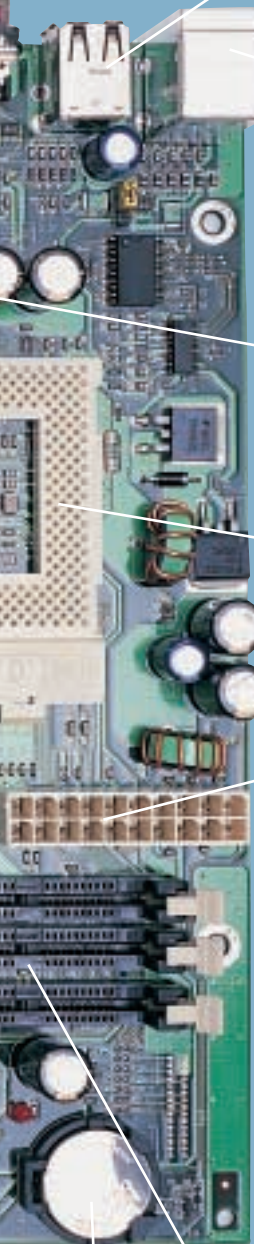
Fan connector

CPU socket

ATX power supply

DIMM sockets

Battery



**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.

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

**CNR** Communication Network Riser. Similar to AMR but also supporting LAN connectivity.

**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 motherboards can support four EIDE devices, although some can handle eight.

**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 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 but catering to a more professional 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.

**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.

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

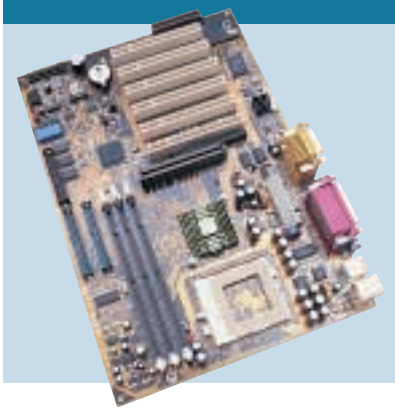
**UltraDMA66** An EIDE bus mastering standard that allows a burst transfer rate of up to 66Mbytes/sec.

**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 hot-swapability.

## Abit SE6

INTEL



**ABIT BOARDS HAVE** become very popular, with the classic dual-Celeron BP6 board earning kudos for the company.

The SE6 is an Intel CPU board based on the Intel 815E chipset. The board's

layout is good, but the position of the ATX power socket behind the parallel and VGA ports lets it down. As well as the obligatory AGP slot, you get six PCI slots, although one is shared.

Behind the three DIMM sockets are the two EIDE connectors that support the latest UltraDMA100 standard.

The VGA port is located next to the COM 1 serial port, with the second serial port supplied on a backing plate. There's also onboard sound, with complementing audio and game ports. The sound can easily be disabled via a bank of dip switches that can also manually configure CPU and bus frequency settings if you don't want to use the soft menu in the BIOS.

The documentation is superb, with a

comprehensive manual that will suit both novice and expert alike.

The SE6 is an impressive 815E board and at £99 ex VAT it offers reasonable value, placing it between the AOpen AX3S Pro and the Asus CUSL2.

## DETAILS

**PRICE** £116 (£99 ex VAT)

**CONTACT** dabs.com 0800 138 5204

[www.abit.com.tw](http://www.abit.com.tw)

**PROS** Great documentation; good features; reasonable price

**CONS** Poor position of ATX power connector

**OVERALL** A great 815E board up there with the AOpen AX3S Pro and Asus CUSL2

LAYOUT	★★★★
DOCUMENTATION	★★★★★
VALUE FOR MONEY	★★★★
OVERALL RATING	★★★★

## AOpen AX34 Pro

INTEL



**ALTHOUGH THIS BOARD** supports Intel CPUs it sports the VIA 694X chipset instead of the Intel 815. Several large capacitors surround the Socket 370 CPU connector, but they don't

really obstruct access. The ATX power connector is located at the very top of the PCB keeping the wiring loom out of the way. Three DIMM sockets allow a maximum of 1.5GB of PC133 memory.

On the down side, the board only sports four PCI slots, one of which is shared with an ISA slot. An AMR slot is located underneath the AGP slot. You also get two extra USB ports on a backing plate.

There are two EIDE channels, but they only support UltraDMA66 rather than UltraDMA100. There are also onboard sound and game ports.

The documentation is superb, with an incredibly comprehensive manual and a fold-out quick-start guide, so it's easy to set the board up.

Even though performance isn't an issue in this test, the AX34 Pro was very slow compared to the competition. That said it's very cheap and there's a copy of Norton Anti Virus thrown in to add value. If money's tight it's worth a look.

## DETAILS

**PRICE** £86.59 (£73.70 ex VAT)

**CONTACT** RK Distribution 01844 216 226

[www.aopen.com](http://www.aopen.com)

**PROS** Great documentation; fairly cheap

**CONS** Only four PCI slots, no UltraDMA100 interface

**OVERALL** A reasonably priced board, but AOpen's AX3S Pro is a better bet

LAYOUT	★★★
DOCUMENTATION	★★★★★
VALUE FOR MONEY	★★★★
OVERALL RATING	★★★★

## AOpen AX3S Pro

INTEL



**IF THERE WAS AN AWARD** for packaging, AOpen's AX3S Pro would win hands down and, thankfully, the board itself is as impressive. This is an Intel chip board based on the

815E chipset, covered by AOpen's gold heatsink.

There are five PCI slots and single AGP and CNR slots. The layout isn't as good as other AOpen boards as the EIDE controllers are behind one of the PCI slots. But there is an UltraDMA100/66 cable, plus a second EIDE cable and a backing plate with two USB ports.

The ATX power connector is mounted at the top of the PCB, keeping the power loom out of the way.

This board ships with AOpen's Die Hard BIOS, which keeps a basic BIOS image safe in case of a virus. If your BIOS becomes infected, you can flick a switch and revert to the rescue BIOS, the machine will then boot and allow you to flash the full BIOS and wipe the virus.

The documentation is first rate, and the inclusion of Norton Anti Virus is a bonus. Only setting the CPU frequency in the BIOS was tricky, but this is minor considering the quality of this board.

## DETAILS

**PRICE** £113.66 (£96.38 ex VAT)

**CONTACT** CMS Computers

0151 709 0900 [www.aopen.com](http://www.aopen.com)

**PROS** Excellent documentation; two EIDE cables supplied; feature rich

**CONS** EIDE connectors could be better placed

**OVERALL** A superb 815E-based board with everything you need in the box

LAYOUT	★★★★
DOCUMENTATION	★★★★★
VALUE FOR MONEY	★★★★★
OVERALL RATING	★★★★★



## Asus CUSL2

INTEL



**ASUS HAS A GREAT** reputation when it comes to motherboards and the CUSL2 only strengthens it.

This Socket 370 board is based on the Intel 815E chipset and is stacked

with features. If you're not happy with the onboard graphics, Asus has included an AGP Pro slot, ideal if you can find an AGP Pro card, but it will still happily accept a standard AGP card. There are also six PCI slots, one of which is shared with a CNR slot, while a second CNR slot nestles at the bottom of the board.

Layout is a little cramped with too many capacitors scattered around the board, but none of the major areas are obstructed. The location of the ATX power socket behind the COM ports is a little disappointing, but the floppy and EIDE channels are neatly placed on the far right of the board. The EIDE bus supports the UltraDMA100 standard but, unlike AOpen, Asus has only supplied a single cable. As well as the

two USB ports on the board, there is a backing plate with another three USB ports in the box.

The in-depth manual is very good and the Asus is an excellent board with solid performance, but it's not cheap.

### DETAILS

**PRICE** £136.30 (£116 ex VAT)

**CONTACT** dabs.com

0800 138 5204 [www.asus.com](http://www.asus.com)

**PROS** Well built and feature rich; great documentation

**CONS** Expensive, but worth it

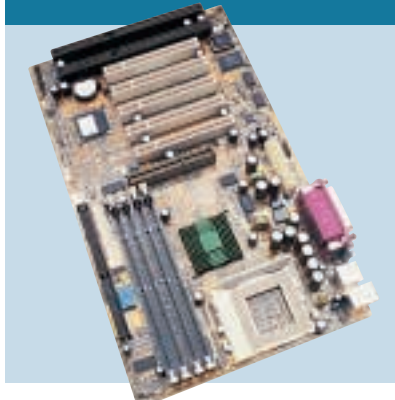
**OVERALL** If you've got the money to spend, this is a fantastic board

LAYOUT	★★★★
DOCUMENTATION	★★★★★
VALUE FOR MONEY	★★★★★
OVERALL RATING	★★★★★



## FIC FB11

INTEL



**THIS BOARD IS UNLIKE** any other in the test in that it sports the old Intel BX chipset. This is not necessarily bad since our tests have shown that the BX chipset is not much slower than the newer

chipsets. The BX chipset is only rated to run with a 100MHz FSB, but FIC has modified it to support a 133MHz FSB.

The FB11 suffers from poor placing of the ATX power socket; it's located below the COM ports and surrounded by capacitors. The EIDE and floppy connectors are well placed at the far right, although the EIDE channels are only UltraDMA33 compatible. On the plus side, the FB11 sports four DIMM sockets as opposed to the standard three. There are five PCI slots, with one shared with one of the two ISA slots, but there are no CNR or AMR connectors.

The documentation is fairly comprehensive with enough information to get the board up and running easily.

There's no soft CPU and FSB

frequency setting and this must be configured via dip switches. This board uses old technology, but at £59 ex VAT it's the cheapest board on test.

### DETAILS

**PRICE** £69.32 (£59 ex VAT)

**CONTACT** Stac Trading 01788 844 444

[www.fic.com.tw](http://www.fic.com.tw)

**PROS** Very cheap; four DIMM slots; good manual

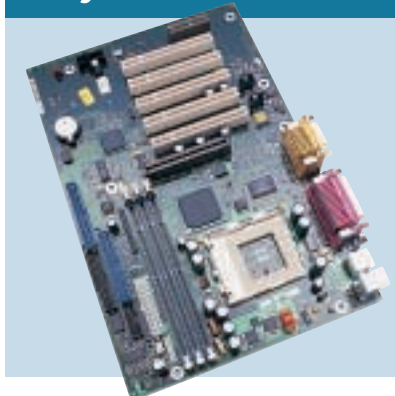
**CONS** Old chipset; UltraDMA33 EIDE; no soft CPU setup

**OVERALL** A good board if you're on a very tight budget, although the TMC TA64-B costs only a little more

LAYOUT	★★★
DOCUMENTATION	★★★★
VALUE FOR MONEY	★★★★
OVERALL RATING	★★★★

## Fujitsu Siemens D1184-81X

INTEL



**SPORTING THE INTEL** 815 chipset, you get onboard graphics in case you don't have a card. There's also onboard sound to save you another expansion slot.

The board layout is a bit of a mixed bag, the bottom half of the PCB is pretty spartan, but the ATX power supply, floppy disk controller, EIDE connectors and front panel connectors are all squeezed in to the right of the DIMM sockets. This kind of positioning will result in a mass of tangled cables when a PC is built around the board and the front panel connectors are not labelled, leaving you to look through the manual for the correct assignments.

The manual is a sparse, lightweight pamphlet of 12 pages and looks very poor in comparison to some of the others.

There are five PCI slots available, none of which are shared. Besides the AGP slot, the only other expansion area is the single AMR slot, which is a little

disappointing since most other 815 boards sport CNR slots instead.

We were disappointed with the Fujitsu Siemens, which performed no better than the Abit that offers a better solution for a similar price.

### DETAILS

**PRICE** £129.25 (£110 ex VAT)

**CONTACT** AGP Distribution 01794 528 000

[www.fujitsu-siemens.co.uk](http://www.fujitsu-siemens.co.uk)

**PROS** Good performer

**CONS** Badly designed layout; poor documentation

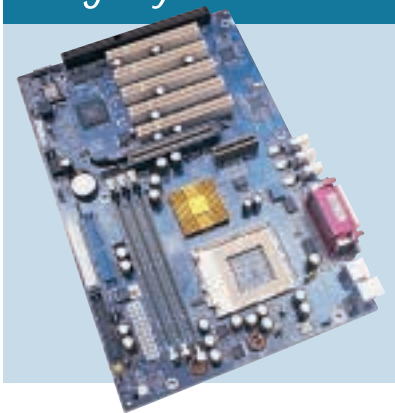
**OVERALL** A disappointing board from a major IT player

LAYOUT	★★
DOCUMENTATION	★
VALUE FOR MONEY	★
OVERALL RATING	★★



## Gigabyte GA GVX7-1394

INTEL



**THIS IS SOMETHING** really special. As well as the usual array of USB, serial and parallel ports, the GVX7-1394 sports three FireWire ports. This makes this board the ideal choice for anyone

building a PC for digital video editing.

Resplendent in Gigabyte's usual blue, the layout of the board is first rate. The EIDE, floppy and ATX power connectors are all at the top right of the PCB so there shouldn't be any cables trailing over the surface of the board. Because the chipset is VIA's Apollo Pro 133A there's no UltraDMA100 support, but you do get UltraDMA66.

Below the AGP slot are the five PCI slots, one of which is shared with the single ISA slot. There's also an AMR slot above the AGP.

Documentation is comprehensive and easy to follow so installation should be no problem. Adding considerably to the package is a copy of MGI VideoWave III to kickstart your digital video editing –

assuming you have a DV camcorder. The only downside is that you have to set the CPU and FSB frequencies via dip switches.

Even with the extra connectivity and the bundled software the GVX7-1394 only costs £95 ex VAT.

## DETAILS



**PRICE** £111.62 (£95 ex VAT)

**CONTACT** dabs.com

0800 138 5204 [www.gigabyte.com.tw](http://www.gigabyte.com.tw)

**PROS** FireWire ports; great layout; solid documentation; good value

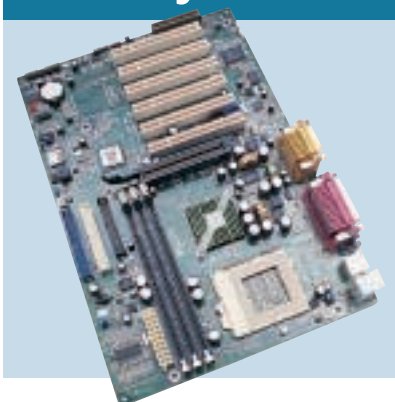
**CONS** No UltraDMA100 support

**OVERALL** A feature-packed board that's unique in the group

LAYOUT	★★★★
DOCUMENTATION	★★★★
VALUE FOR MONEY	★★★★
OVERALL RATING	★★★★

## QDI SyntactiX 2E

INTEL



**QDI'S INTEL-BASED** motherboard sports the 815E chipset. The EIDE ports and floppy connectors are on the far right of the board and the ATX power connector is placed at the top right of

the PCB to keep the wiring loom out of the way. The ZIF socket is free from obstructions and the AGP slot has a clasp to stop the card from slipping out. Unfortunately, QDI has positioned the modem and CD audio connectors for the onboard sound chipset between the top two PCI slots. Not only does this make connecting them more difficult, but it also means that the cables have to drape across PCI cards. On the plus side, there are six PCI slots, although one of them is shared with the single CNR slot.

As with all 815-based boards, one of the serial ports is supplied on a ribbon cable and backing plate to accommodate the VGA port for the onboard graphics. The latest UltraDMA100 standard is supported by the EIDE

ports, assuming that you have a compatible drive.

Documentation is pretty good and you shouldn't have any trouble getting the board set up.

QDI has built a decent, reasonable value board out of Intel's latest chipset.

## DETAILS

**PRICE** £108.10 (£92 ex VAT)

**CONTACT** Swift Tech 01480 433 100

[www.qdigrp.com](http://www.qdigrp.com)

**PROS** Decent documentation; good value

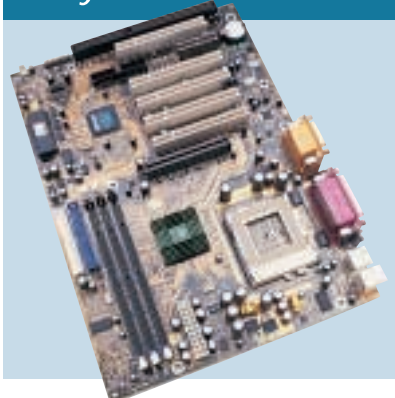
**CONS** Bad positioning of audio connectors

**OVERALL** A competent 815E board that's unlikely to disappoint

LAYOUT	★★★★
DOCUMENTATION	★★★★
VALUE FOR MONEY	★★★★
OVERALL RATING	★★★★

## Soyo SY-7VCA

INTEL



**SOYO IS A FAIRLY** well-known name in the motherboard industry. It has in the past produced some pretty good boards, so it came as quite a surprise that the SY-7VCA was a disappointment.

This is a board for Intel CPUs sporting the VIA 694X chipset rather than Intel's own 815 and its layout is a hit-and-miss affair. The ATX power connector is placed at the top of the PCB for maximum convenience and the UltraDMA66-compatible EIDE controllers are located on the far right. However, the floppy drive connector is surrounded by two PCI slots and the AMR slot, leaving the cable to trail across much of the board en route to the drive.

There are five PCI slots, although one is shared with the single ISA slot. The front panel connectors are not labelled, leaving you to search the very sparse manual for the correct pin settings.

There's onboard sound complete with the audio ports and game

connector. Unfortunately, like QDI, Soyo has placed the CD-IN connector between two PCI slots.

The SY-7VCA's saving grace is its price of £62 ex VAT, but our advice would be to spend a bit more elsewhere.

## DETAILS

**PRICE** £73 (£62.12 ex VAT)

**CONTACT** CCL Computers 01274 269 001

[www.soyo.nl](http://www.soyo.nl)

**PROS** Very cheap; Norton Ghost and Anti Virus bundled

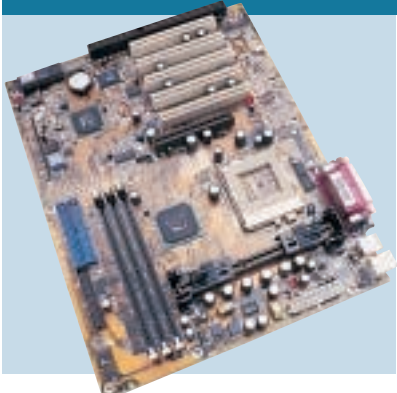
**CONS** Poor documentation; bad layout

**OVERALL** A cheap board that's lacking in some key areas

LAYOUT	★★
DOCUMENTATION	★★
VALUE FOR MONEY	★★★★
OVERALL RATING	★★

## TMC TA64-B

INTEL



**TMC WALKED AWAY** with two awards in the last motherboard group test, so we were keen to see how it would fare this time around. The TA64-B is an Intel-based board

sporting the VIA 694X chipset, but what makes it special is that it has both Slot 1 and Socket 370 connectors onboard, although you can't populate both simultaneously.

As well as its compatibility this board has some great features. For example, the front panel connectors are clearly labelled and separated so there's no need to look in the manual when installing. Although even if you did, the manual is clearly laid out and detailed.

The layout is excellent, with the ATX power socket at the top of the PCB and nothing obstructing any important areas. There are five PCI slots, one of which is shared with an ISA slot. The AGP slot is the only other expansion slot, with no sign of a CNR or AMR connector.

The only let-down is the TA64-B's lack of UltraDMA100 support, but as this board only costs £69 ex VAT, this is a minor point. So, if you're happy with a non-Intel chipset, TMC has produced a decent board at a very attractive price.

### DETAILS

**PRICE** £81 (£69 ex VAT)  
**CONTACT** TMC Technology 01438 842 300  
[www.tmc-uk.com](http://www.tmc-uk.com)  
**PROS** Great layout; Slot1 and Socket 370; good documentation; very cheap  
**CONS** No CNR; no UltraDMA100  
**OVERALL** A great value board, ideal for the transition from Slot 1 to Socket 370

LAYOUT	★★★★
DOCUMENTATION	★★★★
VALUE FOR MONEY	★★★★
OVERALL RATING	★★★★

## Transcend TS-ASL3

INTEL



**IT'S A GOOD THING** that this board from Transcend is fairly easy to set up because the manual spans a not too impressive six pages. Of course, there is a manual on the supplied CD-ROM, but

if you're building a PC from the ground up, the chances are that you don't have access to a CD-ROM drive at the time. This issue is compounded by the fact that the Abit SE6 and AOpen AX3S Pro both ship with excellent documentation and cost less than the Transcend.

The board itself is fairly well laid out with the ATX power connector placed at the top of the PCB so that the power loom is well out of the way. The EIDE connectors are positioned behind the PCI slots, but they're not parallel to them so they shouldn't get in the way.

Like the Abit there are six PCI slots with one shared with the CNR slot.

Since it's based on the Intel 815E chipset, the TS-ASL3 only has one serial port hard-wired to the board with the

VGA port for the onboard graphics next to it. The second serial port is supplied on a backing plate with a ribbon cable.

Onboard sound adds some value, but the Transcend is hard to recommend when there are better motherboards from AOpen and Abit that also cost less.

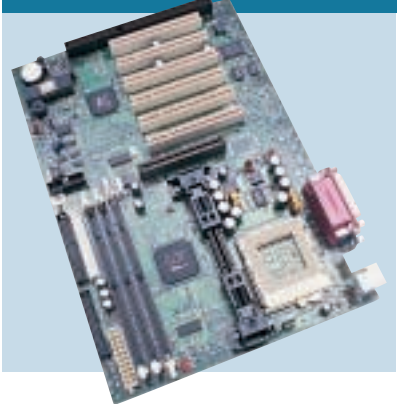
### DETAILS

**PRICE** £124.55 (£106 ex VAT)  
**CONTACT** Vortex Services 0161 343 5555  
[www.transcend.nl](http://www.transcend.nl)  
**PROS** Fairly good layout  
**CONS** Terrible documentation; over-priced  
**OVERALL** A disappointing 815E board that's eclipsed by the competition

LAYOUT	★★★★
DOCUMENTATION	★
VALUE FOR MONEY	★★
OVERALL RATING	★★

## Tyan S1854 Trinity 400

INTEL



**THIS IS ONE OF** only two examples in the test that will accept Intel processors in both the Slot 1 and Socket 370 form factor. This is useful if you have a Slot-based CPU now and want to

upgrade to a Socket version later. The board employs the VIA 694X chipset so it lacks some of the features offered by the 815-based boards. That said, it offers impressive value at only £69 ex VAT.

The layout is very impressive with the EIDE, floppy and ATX power connectors all located at the top right edge of the PCB. There are a few capacitors close to the Slot 1 but they're not in the way. The only let-down is that the front panel connectors are not labelled clearly, leaving you to trawl through the manual to find the correct configuration.

The manual is good, although the photos are poor but there's enough info to get you up and running easily.

Another plus for the Tyan is that it's

one of only three boards in the test that ships with two EIDE cables.

If you want maximum flexibility this is a good board, but the TMC TA64-B has better documentation and layout.

### DETAILS

**PRICE** £81.07 (£69 ex VAT)  
**CONTACT** Simply 0870 727 4020  
[www.tyan.com](http://www.tyan.com)  
**PROS** Flexible; great value; decent layout; two EIDE cables  
**CONS** Poor illustrations in manual; no UltraDMA100, no CNR  
**OVERALL** A very flexible board at a great price, worth a look if you have a Slot 1 CPU

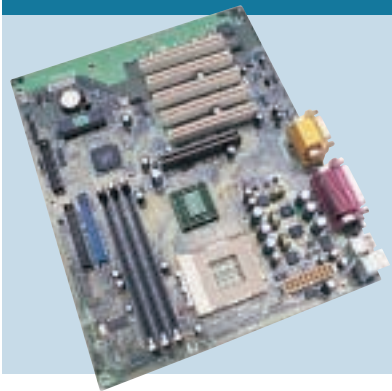
LAYOUT	★★★★
DOCUMENTATION	★★★★
VALUE FOR MONEY	★★★★
OVERALL RATING	★★★★





## AOpen AK33

AMD



**THE AK33 IS THE** fastest AMD board on test, but since it's only one point ahead of the next fastest boards there's not much point in dwelling on the fact.

A message on the bottom of the

board says: 'We design this board with pride'. It's good that AOpen takes quality control so seriously, but this message comes at the expense of an expansion slot. You're left with five PCI slots and the AGP slot.

Unlike the other two AOpen boards in this group test, this one doesn't sport the gold heatsink, but it does have the ATX power socket mounted at the very top of the PCB to keep the wiring loom out of the way.

Two UltraDMA66 EIDE controllers and the floppy disk connector are located on the far right of the board for easy routing of the ribbon cables.

Strangely, AOpen has supplied a serial port on a backing plate with a ribbon cable instead of mounting it on

the board. There's also an array of connectors for the onboard sound.

The superb manual and quick-start guide make installing and setting up a breeze, and you get Norton Anti Virus too.

## DETAILS

**PRICE** £96.22 (£81.89 ex VAT)

**CONTACT** RK Distribution 01844 216 226

[www.aopen.com](http://www.aopen.com)

**PROS** Great documentation; uncluttered design; fastest board

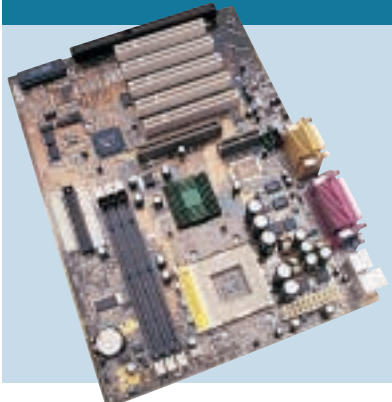
**CONS** Wasted space where an expansion slot could be; serial port on a cable

**OVERALL** A decent AMD solution that could have been better with an extra expansion slot

LAYOUT	★★★
DOCUMENTATION	★★★★★
VALUE FOR MONEY	★★★
OVERALL RATING	★★★★

## Biostar M7VKB

AMD



**THE BIOSTAR M7VKB** turned in a good performance ranking joint second in the SYSmark tests, but since most of the AMD-based boards were so closely grouped it's unlikely that you'd

see any real advantage over any of the others.

The M7VKB is based on the VIA KT133 chipset and Biostar has done a fair job of designing the board but there are still problems. Even though the ATX power socket is located at the very top of the board it's flanked on both sides by capacitors that also restrict access to the ZIF socket. The EIDE and floppy connectors are at the far right of the board and like almost every other board, only one EIDE cable has been supplied.

The front panel connectors are not labelled which leaves you to refer to the woefully inadequate documentation. The manual consists of a single A4 sheet folded in half to produce four pages of A5. This is the worst documentation of all

the boards on test. There is a full manual on the CD-ROM, but that's not much help if you're building a PC from scratch.

You get two extra USB ports in the box, making a total of four, but this does not make up for terrible documentation.

## DETAILS

**PRICE** £92.82 (£79 ex VAT)

**CONTACT** Simply 0870 727 4020

[www.biostar.com.tw](http://www.biostar.com.tw)

**PROS** Fast performer; ISA and AMR slots

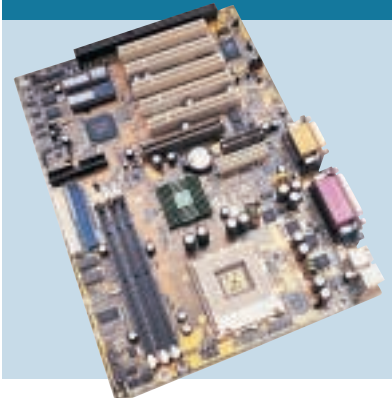
**CONS** Terrible documentation; unlabelled front panel connectors

**OVERALL** The lack of manual overshadows any good points that this board may have

LAYOUT	★★★
DOCUMENTATION	★
VALUE FOR MONEY	★★★
OVERALL RATING	★★

## Chaintech CT-7AJA

AMD



**THIS IS A SOCKET A** motherboard based on the VIA KT133 chipset. It sports Chaintech's TwinBIOS feature which is basically a copy of Gigabyte's DualBIOS feature. This means that if

your BIOS is corrupted by a virus the board will boot from the second BIOS and then copy its image to the first, thus overwriting the corrupted version.

The layout is somewhat lacking with the ATX power socket close to the middle of the PCB behind the sound and game ports. At least the UltraDMA66 EIDE channels and the floppy drive connector are on the far right of the board, but the floppy connector is at 90 degrees to the edge of the board. The reason for this is that there are four banks of dip switches on the right that the manual says are reserved and shouldn't be touched.

There are five PCI slots, one shared with the single ISA slot. The AGP slot and single AMR slot are above the PCI slots.

There's onboard sound, but the CD

and AUX-IN sockets are located to the left of the PCI slots making it difficult to route the cables tidily.

Documentation should get you through the setup easily, but there are better Socket A boards available.

## DETAILS

**PRICE** £92.82 (£79 ex VAT)

**CONTACT** evesham.com 0800 038 0800

[www.chaintech.com.tw](http://www.chaintech.com.tw)

**PROS** TwinBIOS feature

**CONS** Poor layout; space wasted by unused dip switches

**OVERALL** A disappointing board that could easily have been better

LAYOUT	★★★
DOCUMENTATION	★★★
VALUE FOR MONEY	★★★
OVERALL RATING	★★★

## EPoX EP-8KTA

AMD



**EPoX MAY NOT BE** big in the motherboard world, but many system integrators supply EPoX boards. The EP-8KTA is a motherboard for AMD chips and is based on the VIA KT133 chipset.

The board has three DIMM sockets, one AGP slot and six PCI slots, one of which is shared with a single ISA slot.

The layout is quite poor with the ATX power socket hidden behind a large bank of capacitors. These obstruct the ZIF socket making it quite difficult to insert and remove CPUs. Also, the two UltraDMA66 EIDE connectors are positioned behind the PCI slots, which could cause problems if you have a long card.

There's a full complement of hard-wired ports, including two serial connectors. There's also an onboard sound chip with audio and game ports.

Setup was fairly simple with decent documentation and all the front panel connectors clearly labelled. A bank of dip switches controls the core voltage

supplied to the CPU if you want to overclock your processor, but it could result in a burnt-out chip.

The EPoX has some decent features, but poor layout makes it less attractive.

### DETAILS

**PRICE** £92.82 (£79 ex VAT)  
**CONTACT** Ceratech 01420 85470  
[www.epox.nl](http://www.epox.nl)

**PROS** Fairly cheap; Norton Ghost and Anti Virus supplied

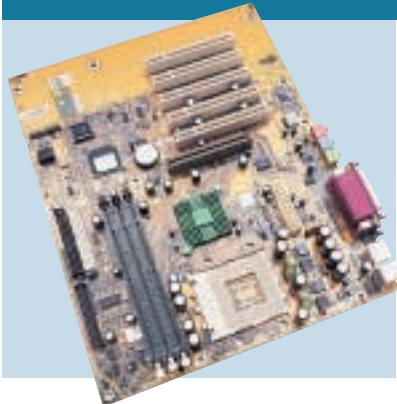
**CONS** Bad layout makes it hard to install and work with

**OVERALL** A bit more thought at the design stage could have resulted in a better board

LAYOUT	★★
DOCUMENTATION	★★★★
VALUE FOR MONEY	★★★
OVERALL RATING	★★★

## FIC AZ11

AMD



**THIS IS A STRANGE** looking board from FIC with the bottom quarter of the PCB exhibiting no lines or solder. In fact it looks almost like a micro ATX board with a couple of extra PCI slots stuck on

the bottom. The AZ11 is a rather mediocre motherboard. There are five PCI slots although there's more than enough room for another one. The oddities continue elsewhere with the onboard sound chip sporting audio inputs and outputs, but no game port. There's only one serial port even though there's room for two, and unlike other boards a second port hasn't been supplied on a ribbon cable.

The ATX power connector is just behind the parallel port among a group of capacitors, leaving the power loom to trail across the ZIF socket. Thankfully the EIDE and floppy connectors are on the far right of the board, and FIC has supplied two EIDE cables in the box.

The documentation isn't bad and

you get Norton Ghost, Anti Virus and Virtual Drive in the box which adds some value to the package.

The FIC AZ11 is a disappointing board and with a price of £79 ex VAT, there's better value elsewhere.

### DETAILS

**PRICE** £92.82 (£79 ex VAT)  
**CONTACT** Stac Trading 01788 844 444  
[www.fic.com.tw](http://www.fic.com.tw)

**PROS** Two EIDE cables supplied

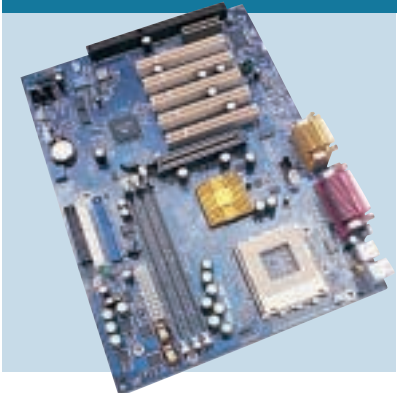
**CONS** No game port; missing expansion slot; only one serial port

**OVERALL** A disappointing board that doesn't even redeem itself by being cheap

LAYOUT	★★★★
DOCUMENTATION	★★★
VALUE FOR MONEY	★★
OVERALL RATING	★★★

## Gigabyte GA-7ZX

AMD



**LIKE GIGABYTE'S** FireWire-equipped Socket 370 board, this Socket A offering is also deep blue in colour. The layout is pretty clean with nothing major out of place and all the important areas

unobstructed. The only bad design points are the placement of the modem audio-in connector among the PCI slots and unlabelled front panel connectors. The UltraDMA66 EIDE channels, floppy disk connector and ATX power socket are all located towards the top right.

This board sports Gigabyte's DualBIOS feature, which means that it has two BIOS chips. If something should go wrong the system will then boot from the second BIOS and flash the original one so it is safe to boot from that again.

As well as the AGP slot you get five PCI slots. An ISA and an AMR slot share the bottom backing plate in the system case.

The documentation is of Gigabyte's usual high standard with a clear, comprehensive, well illustrated manual.

Finishing things off is the onboard sound, saving you a bit of cash and an expansion slot. There's no denying that the GA-7ZX is a great VIA KT133 board, but at £93 ex VAT it doesn't come cheap.

### DETAILS

**PRICE** £109.24 (£93 ex VAT)  
**CONTACT** dabs.com  
 0800 138 5204 [www.gigabyte.com.tw](http://www.gigabyte.com.tw)

**PROS** Good layout; solid documentation; lots of features

**CONS** Quite pricey for an AMD chip board

**OVERALL** If you've got the money you won't be disappointed with this board

LAYOUT	★★★★
DOCUMENTATION	★★★★
VALUE FOR MONEY	★★★★
OVERALL RATING	★★★★



## MSI K7T Pro

AMD



**MSI HAS FAIRLY CLOSE** links with AMD that generally enable it to get the first boards out for AMD's new chips.

Even though the K7T Pro was the first VIA KT133 Socket A board to hit the

market it's still a very good product. The layout is a little cramped, but none of the main areas are obstructed. Also, the ATX power socket is at the top of the board and the UltraDMA66 EIDE channels and floppy connector are at the far right so the cabling is out of the way.

There are six PCI slots, one of which is shared with a CNR slot and the single AGP slot. There are some rather large capacitors around the ZIF socket, but they don't get in the way when inserting a CPU.

It has onboard sound and all the input connectors are located behind the output ports so the cables don't have to be draped across expansion cards.

Documentation is well presented and easy to follow, but what's really

impressive is the array of diagnostic LEDs on the board. If there's a problem the LEDs indicate exactly where it is.

This is an excellent motherboard with the diagnostic feature setting it a notch above the competition.

## DETAILS



**PRICE** £98.70 (£84 ex VAT)

**CONTACT** MICROteq  
01733 896 667 [www.msicomputer.com](http://www.msicomputer.com)

**PROS** Well designed; good documentation; diagnostic indicators

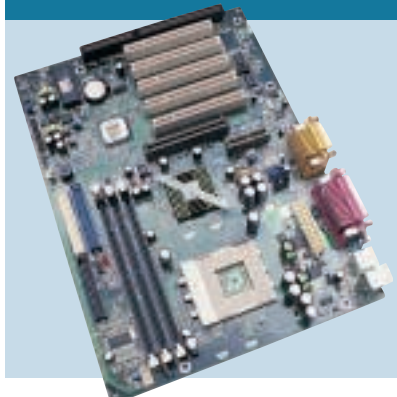
**CONS** Only two fan connectors

**OVERALL** An excellent motherboard for Duron and Athlon chips

LAYOUT	★★★★
DOCUMENTATION	★★★★
VALUE FOR MONEY	★★★★
OVERALL RATING	★★★★

## QDI KinetiZ 7T

AMD



**THIS BOARD IS BASED** on VIA's KT-133 chipset, so the three DIMM sockets can be filled with PC133 memory. The layout of the board is generally good but the ATX power connector could be

better placed. The two EIDE channels and the floppy drive connector are situated on the right edge of the board, which is more than likely near where the drives themselves will be. Unfortunately, the EIDE controllers are only UltraDMA66 compliant rather than UltraDMA100. There are five PCI slots, although one of them is shared with the single ISA slot. There's also an AMR slot above the AGP connector.

The Socket A CPU connector is easily accessible but as the power connector is behind the serial and parallel ports this might change once a system is built. Strangely, only one of the serial ports is hard-wired to the board even though there is space for two. COM 2 is supplied with a ribbon cable that plugs

into the board. There's also on-board sound. Documentation is fair, and you shouldn't have any problems setting up.

We liked the KinetiZ 7T, but there are better designed boards on offer.

## DETAILS

**PRICE** £84.60 (£72 ex VAT)

**CONTACT** Swift Tech 01480 433 100  
[www.qdigrp.com](http://www.qdigrp.com)

**PROS** Decent documentation; fairly easy to set up

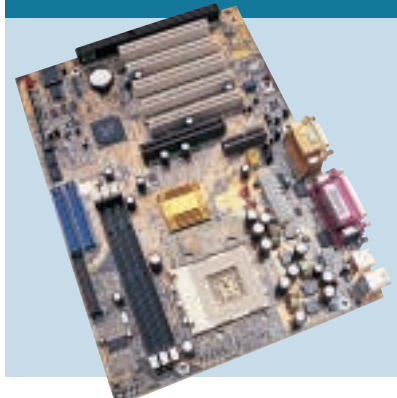
**CONS** Poor location for power connector; only one COM port hard-wired

**OVERALL** A decent enough Socket A board, but not as good as some

LAYOUT	★★★
DOCUMENTATION	★★★★
VALUE FOR MONEY	★★★★
OVERALL RATING	★★★★

## TMC AK74-SC

AMD



**THIS SOCKET A** board from TMC, based on the VIA KT133 chipset, shares many of the positive aspects of its Socket 370 sibling, although it doesn't share the same price. At £88 ex VAT it

isn't expensive, but it doesn't represent the same value as its stablemate.

The documentation is reasonable and the front panel connectors are also clearly marked and separated for easy installation.

You get five PCI slots, one of which is shared with the single ISA slot, and there is an AMR slot above the AGP slot.

Layout is reasonable with the EIDE and floppy ports on the right-hand edge of the board. Unfortunately the ATX power socket is behind the COM ports adjacent to a bank of capacitors. These capacitors make it a tricky to open the ZIF socket when inserting the processor.

There is an onboard sound chipset with sound and game ports. Both COM ports are wired to the PCB.

In the box you'll find a single UltraDMA66 EIDE cable and the floppy cable along with the driver disc and manual.

The AK74-SC is a competent board, but doesn't rise above the competition.

## DETAILS

**PRICE** £103.40 (£88 ex VAT)

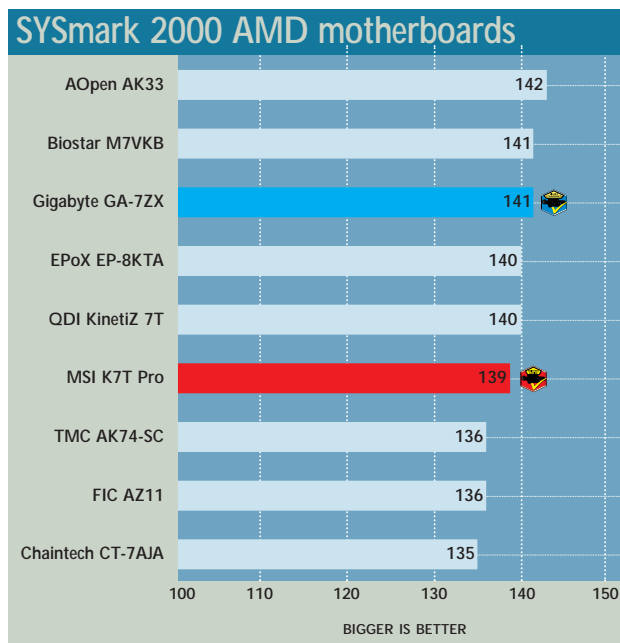
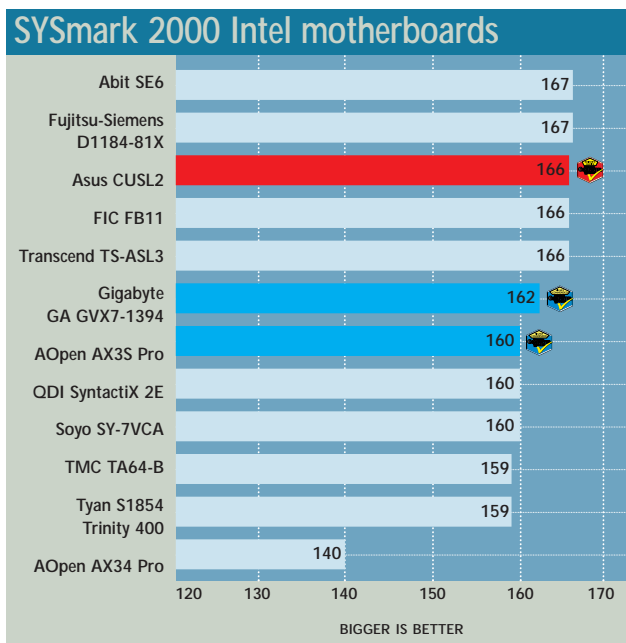
**CONTACT** TMC Technology 01438 842 300  
[www.tmc-uk.com](http://www.tmc-uk.com)

**PROS** Decent documentation; well placed EIDE connectors

**CONS** Poor placement of ATX power connector; capacitors hinder ZIF socket

**OVERALL** Not a bad board, but nothing special either

LAYOUT	★★★
DOCUMENTATION	★★★★
VALUE FOR MONEY	★★★★
OVERALL RATING	★★★



## How we evaluated the motherboards

To test the motherboards we ran them through our SYSmark benchmarking suite. SYSmark is made up of several office-based applications that simulate the everyday use a PC is subjected to. The applications employed by SYSmark include CorelDraw 9; Corel Paradox 9; Microsoft's Word 2000, Excel 2000 and PowerPoint 2000; Dragon Naturally Speaking Preferred 4; Netscape Communicator 4.61; Adobe Premiere 5.1; Adobe Photoshop 5.5; Avid Elastic Reality 3.1; MetaCreations Bryce 4; and Microsoft Windows Media Encoder 4. 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 put on a level playing field, so the same peripherals were used for every board, with the

only differing factor being the AMD and Intel CPUs.

For the AMD boards we used a 700MHz Athlon Thunderbird chip with 256KB of full-speed Level 2 cache and for the Intel motherboards we used an 866MHz Coppermine Pentium III, again with 256KB of full-speed Level 2 cache. Therefore, the AMD and Intel boards are comparative only to themselves since different speed CPUs were employed.

To keep things as cutting edge as possible we used UltraDMA100-compatible hard disks supplied by Maxtor. These 7,200rpm units represent the pinnacle of EIDE technology and allowed the motherboards that supported the UltraDMA100 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 128MB of PC133 SDRAM on a single DIMM module, which we considered optimum for the majority of PC applications.

Graphics were provided by ATI Rage 128 Pro AGP cards and, although not cutting edge, these were more than adequate for comparing the motherboards with each other.

With each new board the hard disk was formatted and Windows 98 SE was reinstalled from scratch. After the Windows installation SYSmark was installed and run, so that every test was performed under exactly the same conditions.

As the graphs above show there is only a very small difference in performance between the motherboards on test. 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 can not only affect how easy it is to install, but also how tidy, or untidy the inside of your PC is when built. We therefore factored the layout into our evaluation.

Another major factor is the documentation. Some manufacturers supply next to no paper documentation for a board and put the full manual on a CD. This may be environmentally friendly, but the chances are that if you're building a PC from the bottom up you won't have access to a CD-ROM drive. We considered clear, detailed documentation to be of great importance and the boards 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 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.



## Table of features: Intel boards



MANUFACTURER	ABIT	AOPEN	AOPEN	ASUS	FIC
PRODUCT	SE6	AX34 PRO	AX3S PRO	CUSL2	FB11
Price inc VAT (ex VAT)	£116 (€99)	£86.59 (€73.70)	£113.66 (€96.38)	£136.30 (€116)	£69.32 (€59)
Supplier	dabs.com	RK Distribution	CMS Computers	dabs.com	Stac Trading
Telephone	0800 138 5204	01844 216 226	0151 709 0900	0800 138 5204	01788 844 444
MOTHERBOARD FEATURES					
Processor type	Socket 370	Socket 370	Socket 370	Socket 370	Socket 370
Chipset	i815E	VIA 133A (694X)	i815E	i815E	Intel 440BX
DIMM slots/max RAM	3/512MB	3/1.5GB	3/512MB	3/512MB	4/1GB
Front-side bus speeds	66/100/133	66/100/133	66/100/133	66/100/133	66/100/133
AGP/AGP Pro/PCI	1/0/5	1/0/3	1/0/4	0/1/5	1/0/4
AMR/CNR/ISA	0/0/0	1/0/0	0/0/0	0/1/0	0/0/1
Shared	PCI/CNR	PCI/ISA	PCI/CNR	PCI/CNR	PCI/ISA
PS/2/USB/serial/parallel ports	2/2/1/1	2/2/2/1	2/2/1/1	2/2/1/1	2/2/2/1
Additional USB ports included/optional/total	0/2/4	2/0/4	2/0/4	3/2/7	0/0
Onboard VGA/sound	✓/✓	✗/✓	✓/✓	✓/✗	✗/✗
EIDE channels	2	2	2	2	2
UltraDMA33/66/100	✓/✓/✓	✓/✓/✗	✓/✓/✓	✓/✓/✓	✓/✗/✗
Wake on LAN/ring	✓/✗	✓/✓	✓/✓	✓/✓	✓/✗
Other connectors	IrDA/COM 2 Thermal sensor	IrDA	IrDA	IrDA/Intrusion/LCD or TV out/COM 2	IrDA/PCI Audio Card (SB Link)
BIOS type	Award	Award	Award	Award	Award
No of fan connectors	3	2	3	3	2
Jumperless/soft BIOS	✓	✓	✓	✓	✗
Manual memory speed setting	✓	✓	✓	✓	✗
Onboard speaker	✓	✗	✗	✗	✗
Other	COM 2 lead provided	Die Hard BIOS (2x BIOS)	Die Hard BIOS (2x BIOS)	COM 2 lead provided	N/A

## Table of features: AMD boards

MANUFACTURER	AOPEN	BIOSTAR	CHANTECH	EPoX
MODEL	AK33	M7VKB	CT-7AJA	EP-8KTA
Price inc VAT (ex VAT)	£96.22 (€81.89)	£92.82 (€79)	£92.82 (€79)	£92.82 (€79)
Supplier	RK Distribution	Simply	evesham.com	Cerotech
Telephone	01844 216 226	0870 727 4020	0800 038 0800	01420 85470
MOTHERBOARD FEATURES				
Processor type	AMD Duron/Athlon	AMD Duron/Athlon	AMD Duron/Athlon	AMD Duron/Athlon
Chipset	VIA KT133	VIA KT133	VIA KT133	VIA KT133
DIMM slots/max RAM	3/1.5GB	3/1.5GB	3/1.5GB	3/1.5GB
Front-side bus speeds	100MHz DDR	100MHz DDR	100MHz DDR	100MHz DDR
AGP/AGP Pro/PCI	1/0/5	1/0/4	1/0/4	1/0/5
AMR/CNR/ISA	0/0/0	1/0/0	1/0/0	0/0/0
Shared	None	PCI/ISA	PCI/ISA	PCI/ISA
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 included/optional/total	0/2/4	2/0/4	0/2/4	0/2/4
Onboard VGA/sound	✗/✓	✗/✓	✗/✓	✗/✓
EIDE channels	2	2	2	2
UltraDMA33/66/100	✓/✓/✗	✓/✓/✗	✓/✓/✗	✓/✓/✗
Wake on LAN/ring	✓/✗	✓/✗	✓/✗	✓/✗
Other connectors	IrDA/COM 2/Thermal Sensor x2	IrDA	IrDA/Intrusion	IrDA
BIOS type	Award	Award	Award	Award
No of fan connectors	2	2	2	3
Jumperless/soft BIOS	✓	✓	✓	✗
Manual memory speed setting	✓	✓	✗	✓
Onboard speaker	✗	✗	✗	✗
Other	COM 2 lead provided	N/A	TwinBIOS	N/A



FUJITSU-SIEMENS	GIGABYTE	QDI	SOYO	TMC TECHNOLOGY	TRANSCEND	TYAN
<b>D1184-81X</b>	<b>GA GVX7-1394</b>	<b>SYNTACTIX 2E</b>	<b>SY-7VCA</b>	<b>TA64-B</b>	<b>TS-ASL3</b>	<b>TRINITY 400</b>
£129.25 (€110)	£111.62 (€95)	£108.10 (€92)	£73 (€62.12)	£81 (€69)	£124.55 (€106)	£81.07 (€69)
AGP Distribution	dabs.com	Swift Tech	CCL Computers	TMC Technology	Vortex Services	Simply
01794 528 000	0800 138 5204	01480 433 100	01274 269 001	01438 842 300	0161 343 5555	0870 727 4020
Socket 370	Socket 370	Socket 370	Socket 370	Socket 370 or Slot 1	Socket 370	Socket 370 or Slot 1
i815	VIA 133A (694X)	i815E	VIA 133A	VIA 133A (694X)	i815E	VIA 133A
3/512MB	3/1.5GB	3/512MB	3/1.5GB	3/1.5GB	3/512MB	3/768MB
66/100/133	66/100/133	66/100/133	66/100/133	66/100/133	66/100/133	66/100/133
1/0/5	1/0/4	1/0/5	1/0/4	1/0/4	1/0/5	1/0/5
1/0/0	1/0/0	0/0/0	1/0/0	0/0/0	0/0/0	0/0/0
None	PCI/ISA	PCI/CNR	PCI/ISA	PCI/ISA	PCI/CNR	PCI/ISA
2/2/1/1	2/2/2/1	2/2/1/1	2/2/2/1	2/2/2/1	2/2/1/1	2/2/2/1
0/2/4	0/2/4	0/2/4	0/2/4	0/0/2	0/2/4	0/0/2
✓/✓	✗/✗	✓/✓	✗/✓	✗/✗	✓/✓	✗/✗
2	2	2	2	2	2	2
✓/✓/✗	✓/✓/✗	✓/✓/✓	✓/✓/✗	✓/✓/✗	✓/✓/✓	✓/✓/✗
✓/✗	✓/✓	✓/✓	✓/✗	✓/✓	✓/✗	✓/✓
Intrusion/PSU monitoring/COM 2	IrDA	IrDA/COM 2/ SMBus/Intrusion	IrDA	IrDA	IrDA/COM 2/ modem	None
Phoenix	AMI	Award	Award/Phoenix	Award	Award	Award
2	3	3	2	3	3	4
✓	✗	✓	✓	✗	✓	✗
✗	✓	✓	✓	✗	✓	✓
✗	✓	✗	✗	✗	No	Yes
N/A	3x FireWire, Video/Wavell SE	COM 2 lead provided	N/A	N/A	COM 2 lead provided	N/A



FIC	GIGABYTE	MSI	QDI	TMC
<b>AZ11</b>	<b>GA-7ZX</b>	<b>K7T Pro</b>	<b>KINETIZ 7T</b>	<b>AK74-SC</b>
£92.82 (€79)	£109.24 (€93)	£98.70 (€84)	£84.60 (€72)	£103.40 (€88)
Stac Trading	dabs.com	MICROteq	Swift Tech	TMC Technology
01788 844 444	0800 138 5204	01733 896 667	01480 433 100	01438 842 300
AMD Duron/Athlon	AMD Duron/Athlon	AMD Duron/Athlon	AMD Duron/Athlon	AMD Duron/Athlon
VIA KT133	VIA KT133	VIA KT133	VIA KT133	VIA KT133
3/1.5GB	3/1.5GB	3/1.5GB	3/1.5GB	3/1.5GB
100MHz DDR	100MHz DDR	100MHz DDR	100MHz DDR	100MHz DDR
1/0/5	1/0/5	1/0/5	1/0/4	1/0/4
0/0/0	0/0/0	0/0/0	1/0/0	1/0/0
None	ISA/AMR	PCI/CNR	PCI/ISA	PCI/ISA
2/2/1/1	2/2/2/1	2/2/2/1	2/2/1/1	2/2/2/1
0/2/4	0/2/4	0/2/4	0/2/4	0/2/4
✗/✓	✗/✓	✗/✓	✗/✓	✗/✓
2	2	2	2	2
✓/✓/✗	✓/✓/✗	✓/✓/✗	✓/✓/✗	✓/✓/✗
✗/✗	✓/✓	✓/✓	✓/✓	✓/✓
Novus II	IrDA	IrDA	IrDA	IrDA
Award	AMI	Award	Award	Award
3	3	2	3	3
✗	✓	✓	✓	✓
✓	✓	✓	✓	✗
✗	✗	✓	✓	✗
No game port	DualBIOS	AGP support braces	COM 2 lead provided	N/A



# Editor's Choice

The motherboard is one of the most important components in your PC, so choosing the right one is paramount. In our round-up we found some truly impressive boards and some very disappointing ones. We were amazed at some of the designs and very surprised to see that some boards had practically no paper documentation.

As the graphs show there's very little difference in performance, so speed isn't a major factor. Instead we considered how easy it would be to install and configure each board and how tidily a PC could be built from each one.

## The winners

Since we looked at a great many boards, we came up with quite a few winners. The test was split in two, boards for Intel chips and boards for AMD chips. The **Editor's Choice** for the Intel category is the Asus CUSL2. Even though it is the

most expensive, it is of such high quality that it had to win. The Asus is well laid out and sports six PCI slots and two CNR slots. It is also the only board that had an AGP Pro slot rather than the standard AGP slot. The documentation is first rate and setting up the board was simple. Ultimately, the Asus CUSL2 is the cream of the 815E motherboard crop.

The AOpen AX3S Pro wins the first **Highly Commended** award. This is also a great board with decent layout and superb documentation. As well as on-board sound and graphics, it sports a backup BIOS design so that you can flick a switch and boot from a safe BIOS if your default BIOS gets corrupted and it's one of only three boards in the test to ship with two EIDE cables instead of one.

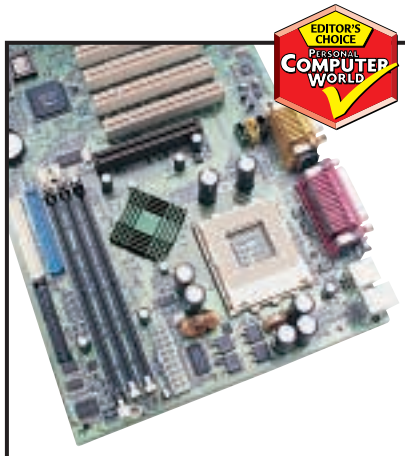
The second **Highly Commended** award in the Intel category goes to the Gigabyte GA-GVX7-1394. This board is based on the VIA 694X chipset rather

than the Intel 815E which means you have a limit of 1.5GB of memory rather than the 512MB of the 815E, assuming you can afford that much RAM. However, what makes this board special is that it has three FireWire ports hard-wired to it, making it ideal for anyone involved in digital video editing. In fact, with a price of only £95 ex VAT it's cheaper than a lot of FireWire expansion cards. As well as having a decent layout and a solid manual, you also get a copy of MGI's VideoWave III.

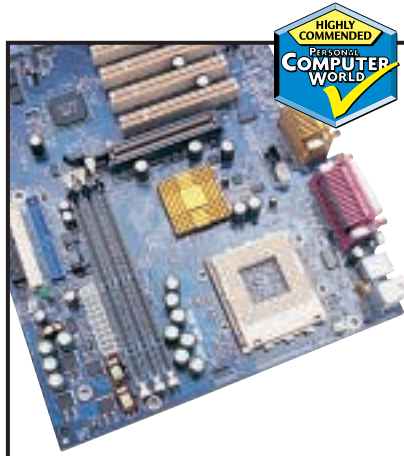
In the AMD category the **Editor's Choice** goes to the MSI K7T Pro. This was one of the first Socket A boards and it's still holding its own among its peers. The layout is excellent with all the ribbon and power connectors placed so that no cables drape across the board. There are six PCI slots with one sharing a backing plate with the CNR slot. All the inputs for the onboard sound chipset are placed behind the external audio ports. The manual is clear and comprehensive and an array of diagnostic LCDs makes it easy to track down any problems.

The **Highly Commended** award in the AMD camp goes to Gigabyte for its GA-7ZX. Based on the VIA KT133 chipset, it has an excellent layout. The EIDE, floppy and ATX power socket are all located at the top right of the PCB. There are five PCI slots with single ISA and AMR slots sharing the bottom backing plate and it also has the DualBIOS feature. It may be expensive, but it's worth considering.

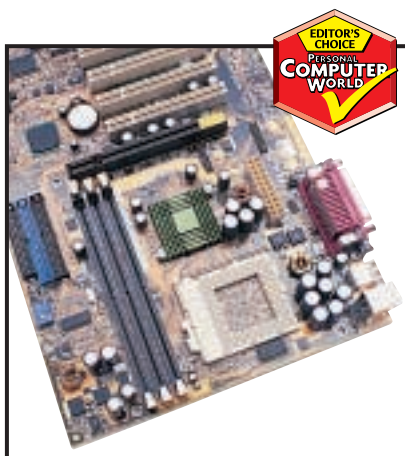
Finally we'd like to thank ATI, Atlas, Intel, Maxtor and Panrix for supplying us with the equipment used for this test.



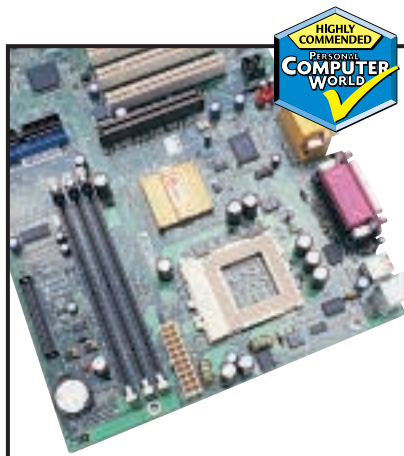
*The layout of MSI's board is excellent*



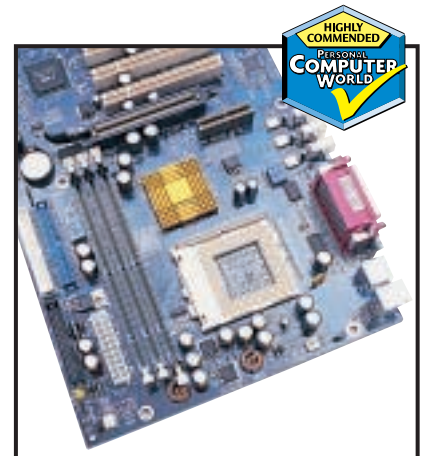
*The GA-7ZX offers a DualBIOS feature*



*Asus' CUSL2 is the cream of the crop*



*AOpen's AX3S Pro runs a close second*



*The GA-GVX7-1394 includes FireWire*