WORDS: CLIFF JOSEPH **ILLUSTRATION:** RD2 **PICTURES:** MAX BAKER

Pitch perfect

A quality sound card can add atmospheric effects to your 3D games and turn your PC into a powerful home entertainment system. To ensure you get the best, we've reviewed seven of the latest sound cards around

Sound cards have come a long way since the simple bleeps and pings of early video games. Of course, most people know that they can play music CDs on their PCs, or MP3 files that they've downloaded from the Internet, but even this is child's play for a modern sound card. Mere CD-quality stereo is simply the starting point for the modern versions.

The latest computer games boast 3D effects that can reproduce the sinister sound of a monster creeping up behind you, or a laser-beam zapping overhead, but you'll need a sound card that supports up-to-date 3D audio technologies to get the full effect from these games. Sound cards aren't just for playing, though. With a DVD-ROM drive and a good card your PC can become the centre of a powerful home entertainment system.

And, as more of us start to use digital recording devices like MiniDiscs and MP3 players, many sound cards now come equipped with digital interfaces that provide perfect digital recording facilities.

But all of these new technologies mean that buying a sound card these days can be a confusing business. Just playing games involves wading through a mess of techno-jargon – EAX, A3D and I3DL2 to name just a few. The still-immature DVD market has its own language as well, in the form of competing standards such as Dolby Digital and DTS. And where on earth are you supposed to put six speakers anyway?

It's worth taking some time to familiarise yourself with these new audio technologies, though, as a good sound card can really enhance the gaming and home entertainment capabilities of your PC. So we've rounded up the latest cards here, and explained some of the more confusing terminology.

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Creative
SoundBlaster Live! Platinum 5.1
PRICE £176.25 inc VAT **CONTACT** Creative 0800 973 069 www.europe.creative.com
PROS Excellent hardware/software balance **CONS** Live! Drive unit is tricky to install
OVERALL Needs ample PC expansion space, but it will have a long life
SCORE ■■■■□

There are several cards available in the SoundBlaster Live! range, but the Platinum 5.1 model sits right at the top of the pile with an impressive set of input and output options.
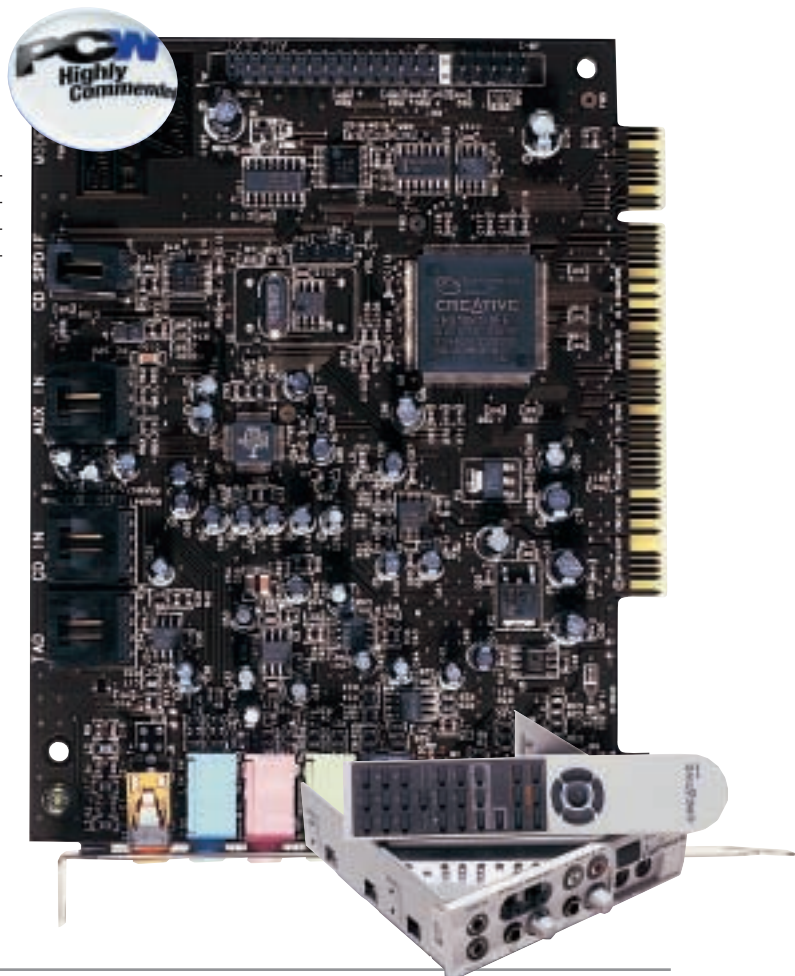
The package consists of a PCI sound card and a separate unit called the Live! Drive. The card is easy to install and provides connectors for up to six speakers using the Dolby Digital format, so it's a good option for playing DVD films, games and music. Also tucked around the back of the card are a microphone socket, an additional analog audio input, and a combination MIDI/joystick port.

And that's just the start of it. The Live! Drive carries two optical inputs and two optical outputs, plus a set of left- and right-channel analog inputs. There's another pair of microphone and head-phone sockets, and both MIDI input and output ports. For home-cinema buffs the Live! Drive has a hand-held infra-red remote control unit.

The only minor drawback is that the Live! Drive needs to be installed into a spare PC drive bay. So, not only do you need a large machine with enough room, but you have to contend with an assortment of screws and cables in order to install the unit and connect it to the main card.

However, Creative does score higher marks for its software bundle. There are full copies of Rage Rally and MDK2, while the PlayCentre software provides a good set of MP3 playing and encoding tools. There's an interesting program called Future Beat 3D, which acts as a kind of 3D mixer, so that you can experiment with the card's 3D and surround sound capabilities, plus copies of Cubasis VST, WaveLab Lite and Recycle Lite.

It could be a little easier to install, but the SoundBlaster Live! has all the hardware and software features that any gamer, DVD buff or musician is likely to need.

Genius SoundMaker Live 5.1
PRICE £34 inc VAT **CONTACT** A-To-Z Computers 01509 215 435 www.genius-kye.com
PROS Inexpensive; six-channel support **CONS** No Dolby Digital processing
OVERALL Ideal for gamers, but not quite ready for the home cinema/DVD market
SCORE ■■■□□

Its admirably low price clearly puts it at the budget end of the market, yet the Genius SoundMaker Live 5.1 is a good option for gamers who are looking for a new sound card.

This sound card has two analog output connectors. The first is for use with ordinary stereo speakers, while the second provides six-channel output for 5.1 speaker systems. An adaptor cable is supplied for two-, four-, or six-speaker setups to the second connector.

There's also a microphone input, separate analog line-in and a combined MIDI/joystick port. The card supports just about every version of Windows going, except 3.1. But it does provide SoundBlaster emulation for DOS games, so it will work equally well with the old classics or the latest 3D shoot-'em-ups.

The drivers support both Aureal's A3D and Microsoft's Direct Sound for 3D audio in games. There's not much in the way of bundled software apart from a few demos, but Genius does include an interesting utility called Q3D. This works with older games that may only have a conventional stereo soundtrack and attempts to convert it into an approximation of 3D. The one drawback is that the card only provides four- or six-channel sound when used with 'consumer' versions of Windows – Windows 9x and Me. The 'professional-level' Windows 2000 and NT are limited to stereo output.

But while the SoundMaker is a good card for gamers, it's less suitable for home cinema or digital audio recording work. It doesn't provide any digital inputs or outputs, so you can only record or play back using its analog audio connectors. And, while it supports six-channel audio output, it doesn't support the Dolby Digital format used for DVD soundtracks.

However, its low price, six-channel output and support for DOS and Windows games makes the SoundMaker Live 5.1 a good choice for diehard games fans.

Hercules Game Theater XP

PRICE £150 inc VAT **CONTACT** Hercules 020 8686 5600 **www.europe.hercules.com**
PROS Versatile external rack **CONS** Software bundle is rather basic
OVERALL This is an excellent sound system for gamers and DVD fans
SCORE ■■■■■

Hercules is well known for its gaming peripherals and 3D graphics cards, so it's no surprise that its latest sound card is aimed precisely at the hard-core games fan. However, the Game Theater XP is crammed with so many features that it will also appeal to home cinema buffs and even those wanting to experiment with home music recording.

The best part of this sound card, though, is that all its controls and input and output options are conveniently located on an external 'rack' unit. The card itself simply slots into a spare PCI slot and is immediately detected by the New Hardware Wizard in Windows 95 or above. Installing the drivers takes just a few minutes and you then connect it to the rack unit with a single large cable that carries multiple audio signals.
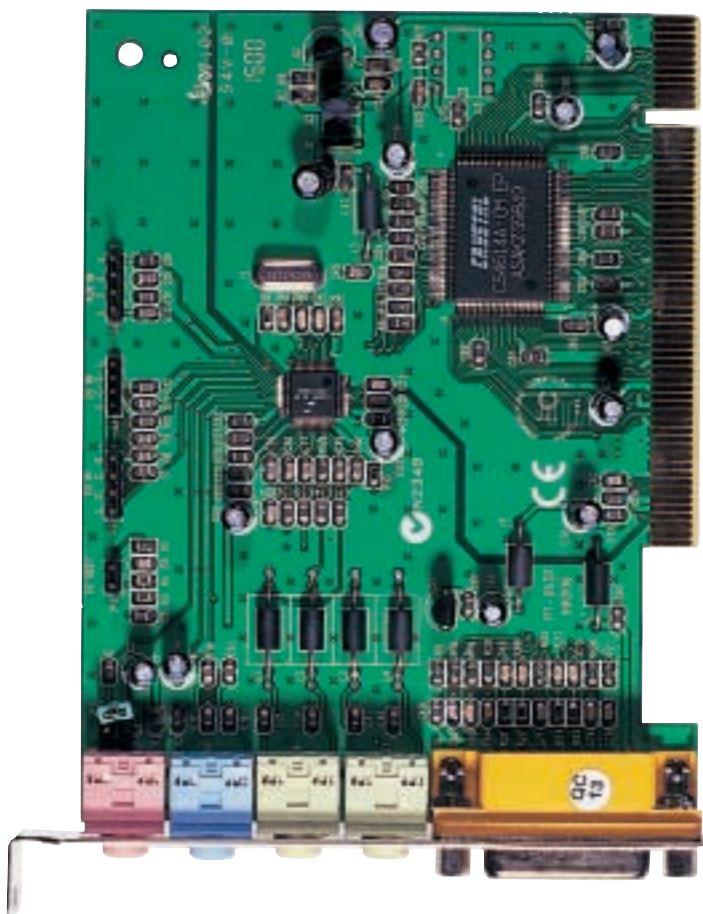
The Game Theater XP supports Dolby Digital output for DVD films, so there are outputs for five speakers and a sub-woofer. There are two analog inputs, two digital inputs, and two digital outputs for connecting your PC to digital audio devices, such as a CD player or MiniDisc. The Game Theater's rack has a dedicated joystick port and separate MIDI input and output ports, instead of the normal shared port.

There are headphones and microphone connectors, with volume dials for each of these, and the rack even doubles up as a USB hub with four USB ports. Hercules has crammed just about every audio widget you can think of into this device, yet the use of the external rack makes it really easy to set up and use.

Our only criticism is that Hercules' software bundle is a bit on the cheap side. The package includes a Dolby Digital-compatible DVD player, MP3 jukebox and karoake programs, which is all stuff you could download from the web for free.

However, it's difficult to find fault with a product that provides so many useful hardware features in such a compact and convenient fashion.

Pine PCI Digital 2633

PRICE £11.75 inc VAT **CONTACT** Simply Computers 020 8498 2100 **www.simply.co.uk**
PROS Inexpensive **CONS** Limited I/O; hardly any bundled software
OVERALL Cheap and cheerful upgrade for gamers with older PCs
SCORE ■■■□□

Pine operates at the cheap and cheerful end of the market, but its PCI Digital card is still a worthwhile option for gamers on a tight budget, or users who want to upgrade an older PC.

This is the cheapest card we came across that still provides support for 3D audio. It supports Microsoft's DirectSound 3D, Creative Labs' Environmental Audio (EAX), and the lesser-known Sensaura 3D system. It also provides four-channel output, so you can use it with a four-speaker surround sound system for playing digital, so DVD fans who want to use 5.1 speaker systems should look at more modern rivals from VideoLogic, Creative and Hercules.

The card has a microphone jack and an analog input socket, plus a combined MIDI/joystick port. There are no digital inputs or outputs so you can't make digital recordings from devices such as a CD or DAT drive. You can still record from these devices using the card's analog inputs, but there will be some loss of quality.

There is also an internal 'AUX' (auxilliary) connector on the sound card, so you could connect it to a DVD drive, but you'll be limited to just four-channel sound with no support for a sub-woofer or Dolby Digital 5.1.

The bundle comprises basic drivers and the MusicMatch MP3 player, but at this price you can hardly criticise Pine for that. The drivers provided with our review unit only catered for Windows 9x and NT4.

One word of warning: there are three different versions of this card, and they can only be told apart by their part numbers. So make sure you ask about any specific features that you need before buying your card.

It seems churlish to criticise such an affordable product as the PCI Digital 2633. Its input and output options are limited, and it's not ideal for playing DVD films, but its low-cost 3D audio support may well appeal to gamers who don't want to pay for expensive cards with features that they don't need.

Terratec DMX Xfire

PRICE £49 inc VAT **CONTACT** SCV 020 7923 1892 **www.terratec.net**

PROS Price; good 3D support **CONS** No Dolby Digital processing

OVERALL OK for games and audio, but too limited for DVD and home cinema

SCORE ■■■■□

Terratec may not be well known in the UK, but it does have a reputation for producing high-quality sound cards. Its DMX Xfire card is primarily aimed at the gaming market, and at less than £50 it's a good option for home users on a tight budget.
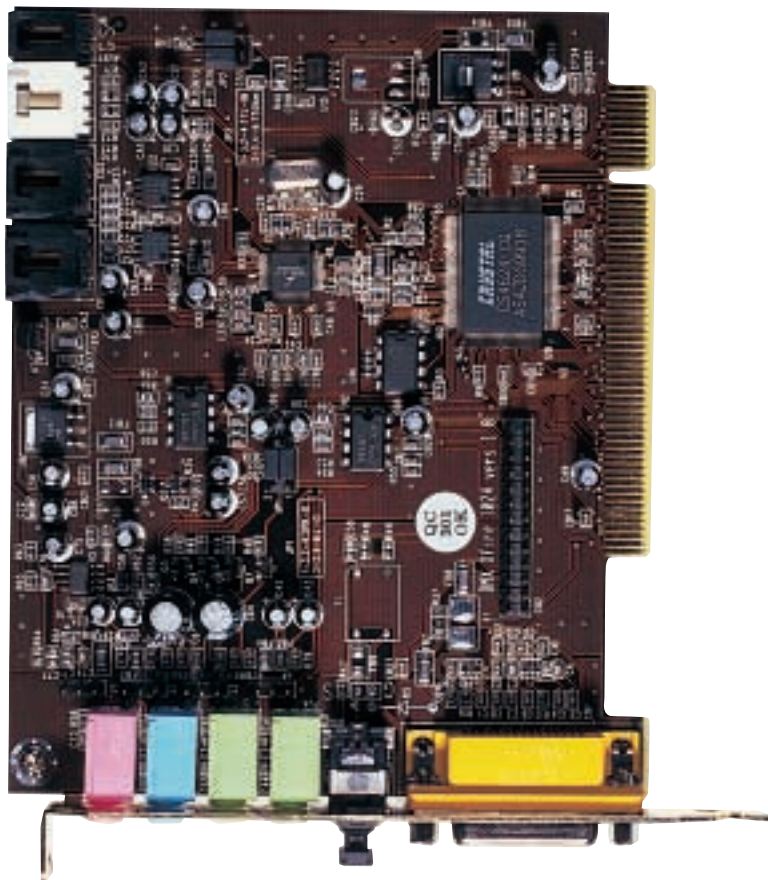
It has two analog output sockets to drive up to four speakers for surround sound effects. The card also supports main gaming 3D audio formats, such as Creative's EAX, A3D and Direct-Sound 3D. Drivers are included for Windows 95, 98, Me, 2000 and NT4, and Terratec's manual provides specific installation instructions for each version of Windows.

There's a dual-purpose MIDI/joystick port, microphone socket and a separate analog line-in. There's no dedicated headphone socket, but you can plug a set of headphones into one of the standard analog outputs. The DMX control panel software includes a feature called MultiDrive that allows you to configure the card's audio output for different speaker setups or headphones. A little less convenient is the odd positioning of the digital connectors. There's an external digital output port on the back, which allows you to record onto DAT or MiniDisc. However, the card's digital input connector is situated on the card itself.

This may cause problems if you want to record digital-quality audio from an external device onto your PC. The location of the digital input might have made sense if the card supported six-speaker Dolby Digital, as this would have allowed you to connect it to an internal DVD drive. But, unfortunately, it doesn't.

Nonetheless, the DMX Xfire provides good audio quality for playing music CDs, as well as comprehensive support for 3D audio in games. Home cinema buffs may prefer a card that supports Dolby Digital for their DVD films, but the DMX Xfire is an affordable option for gamers and those of us who still listen to music with ordinary stereo speakers.

Turtle Beach Montego Xstream

PRICE £55.21 inc VAT **CONTACT** Simply Computers 020 8498 2100 **www.simply.co.uk**

PROS Affordable 3D audio for games **CONS** Stereo output only; no digital I/O

OVERALL OK for gamers with old PCs, but lacks features found in modern alternatives

SCORE ■■■□□

Turtle Beach's Montego A3D Xstream is one of the older sound cards in this test, but it's a popular brand and an affordable option for anyone who wants to upgrade an older PC.

The card provides good quality for standard stereo recording and playback, with sampling rates of up to 48KHz. It has a single analog output jack for connecting a set of stereo speakers, an analog input jack and a microphone input. It also offers a dual-purpose MIDI/joystick port, an internal input connector for a CD-ROM drive, and an internal AUX connector.

There are no digital input or output connectors, although there is a connector on the body of the card that allows you to add a separate S/PDIF (Sony/Philips Digital Interface). This may disappoint home-cinema fans who want to use the latest all-digital sound systems, but won't worry those who want to play games or listen to CDs on their PC.

The Montego doesn't support the latest audio technologies, such as six-channel Dolby Digital, or four-channel surround sound, so it's not a good complement for a four- or six-speaker home cinema setup.

The card does support the Aureal 3D system to provide 3D audio for games, though, and works well with a standard two-speaker stereo setup. This is the only card in the rest that still provides support for both Windows 3.1 and DOS games, so it's a good option if you've got an old PC.

Turtle Beach merged with music software developer Voyetra a year ago, and the Montego card comes with a good bundle of Voyetra software. The emphasis is more on music making than games, with programs such as the MIDI Orchestrator sequencer, and AudioView Plus for editing digital audio files.

Its compatibility with old Windows and DOS games makes this a good upgrade for an older PC, but its lack of digital interfaces and support for surround sound mean it's much more limited than most of its rivals.

VideoLogic Sonic Fury

PRICE £79.90 inc VAT **CONTACT** VideoLogic 01923 260 511 **www.videologic.com**

PROS Software bundle; versatile I/O **CONS** Only one digital output

OVERALL Provides all the main features at a very attractive price

SCORE ■■■■■

It's not equipped with the same extravagant features as some of its more expensive rivals, but the Sonic Fury still manages to provide high-end features at a mid-range price.
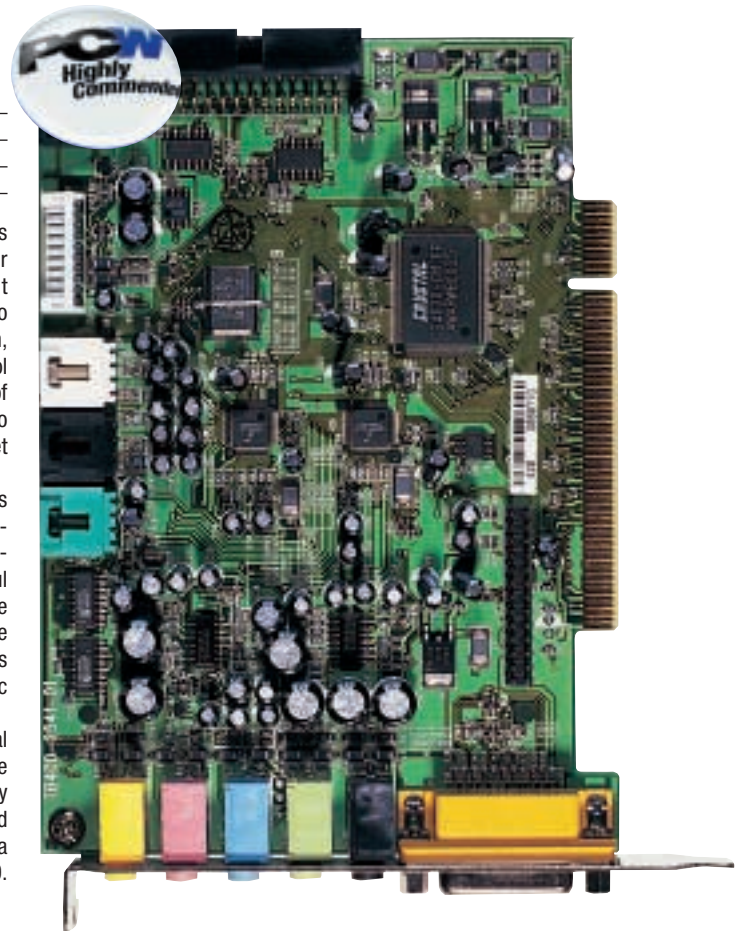
We did experience a minor problem when installing this compact PCI card, as its drivers weren't detected initially by Windows. However, we quickly reinstalled the drivers and the card worked perfectly.

The rear panel on the card has five audio connectors, plus a MIDI/joystick port. One of the audio connectors is the multifunctional VersaJack that can work in a number of different modes. There are two analog outputs, which can be used to drive four-speaker surround sound systems. You can also use the VersaJack in conjunction with these outputs to connect a sub-woofer and a sixth speaker, allowing you to use six-speaker Dolby Digital systems. Alternatively, you can use either of the analog outputs as a headphone socket.

The VersaJack can also be used as an analog stereo output for another set of headphones, or you can use it as a digital output for connecting to digital devices. To prevent confusion, the driver software includes a control panel with a simple mixer and a set of pulldown menus that allow you to select the required mode for each set of connectors.

The rest of the bundled software is pretty good. There's the usual collection of MP3 players and karaoke programs, plus a number of powerful audio and music programs. There are no games, but it does support all the main 3D audio technologies and its DSP provides a range of atmospheric environmental effects.

It may lack the multiple digital inputs and outputs found on more expensive cards, but the Sonic Fury supports the latest 3D and surround sound technologies, and throws in a good software bundle for under £100. At that price it really is hard to beat.

SENSORY OVERLOAD: 3D AUDIO

When buying a new sound card or speakers you will often hear the terms 'surround sound' and '3D audio' used as though they're interchangeable. They're actually quite different, though, and employ widely differing technologies.

Surround sound formats, such as Dolby Digital 5.1, are used to record and play back the soundtracks of films. A film such as *Starship Troopers* can make excellent use of surround sound to create the effect of spaceships zooming all around you. The film's soundtrack, however, is fixed. It never changes. The film isn't interactive, so there's nothing you can do to alter the action you see on screen or the soundtrack that accompanies that action.

Gaming audio is different, because games are interactive. If you're stomping around in a game like Quake III, you're constantly reacting to the actions of your opponents. And they, in turn, are reacting to your movements. This means that the course of the game is not predetermined. It's constantly changing – unlike the predetermined course of action in a DVD film.

So, instead of simply playing a pre-recorded soundtrack, your sound card has to create the effect of 'live' sound effects in a constantly changing 3D environment. One of the first 3D

audio technologies designed for this purpose was A3D, developed by Aureal. Recognising the potential of 3D audio for games, Microsoft developed its own 3D audio technology called DirectSound 3D (D3D). However, the first version of D3D wasn't very good.

It was only when Creative developed its

Environmental Audio Extensions technology (EAX) that 3D audio really started to take off in the games market. To be accurate, EAX is actually an extension of D3D, rather than an entirely new technology in its own right. However, EAX added many new features, such as

the ability to simulate the acoustics of different rooms or environments. A game that supports EAX can use this ability to create the effect of echoing dungeons, claustrophobic corridors, or the intimate hubbub of a smoky jazz club.

Creative's EAX is probably the most widely used form of 3D audio in games at the moment, although D3D is quite well supported, and there are still plenty of games and sound cards that support A3D as well. Just to confuse matters, there are other companies, such as Sensaura, that offer their own 3D audio technologies.

With so many rival technologies floating around, it made sense to try to come up with a common standard that would make life simpler for both games developers and consumers. The result of this was yet another piece of jargon called I3DL2, which stands for Interactive 3D Audio Level 2.

This new standard is gradually gaining support, although EAX still seems to rule the roost for the time being. This means that you won't go wrong if you buy a sound card that supports EAX. However, Microsoft's much-hyped Xbox will support I3DL2, so it's possible that this could become the standard for 3D audio in games over the next few years.

IMMERSION THERAPY: SURROUND SOUND

Most computers and home music systems are still equipped with a standard two-channel stereo sound system. So, if you use your computer to play games or listen to audio CDs, your sound card will split the output into two channels – left and right. You'll have two speakers connected to your computer and you can adjust the balance to create the illusion that the sound is moving from left to right, but you always know that the sound is basically coming from somewhere right in front of you.

Now that's fine if you're listening to a Madonna CD, but it's not very realistic. In real life sound comes from all around us, and if you want the most realistic sound effects when playing 3D games or DVD films, you need a 'surround sound' system that can put sound all around you.
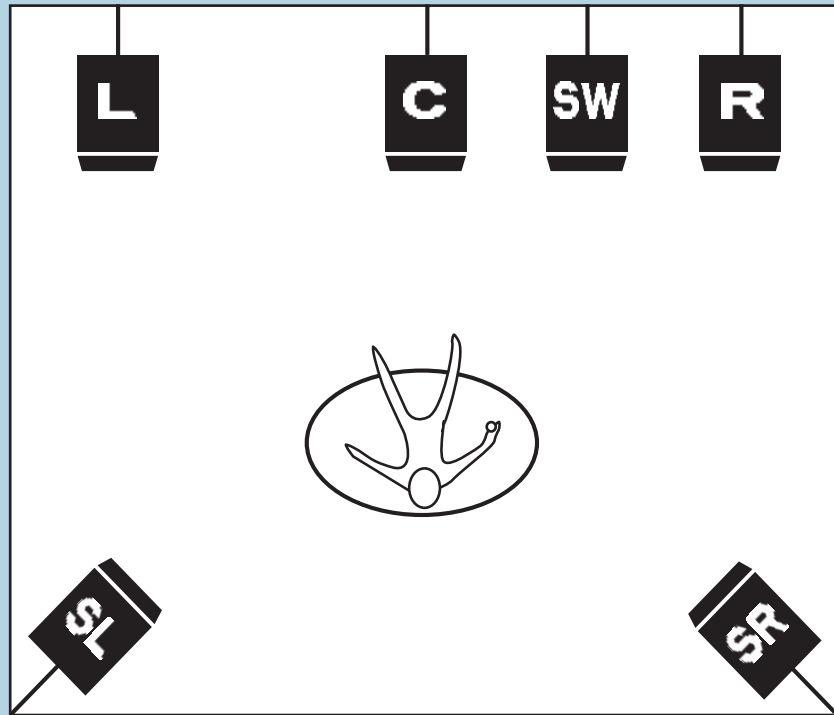
There have been several systems developed to achieve this in the past, going right back to CinemaScope in the 1950s. However, the market these days is pretty much dominated by Dolby Laboratories, the company that developed the Dolby sound system used in cinemas all over the world.

In the early 1980s, Dolby developed a system called Dolby Surround that allowed filmmakers to record four separate channels. This would then be played back by a four-speaker system that positioned two speakers in front of the audience and two behind. Each speaker had its own separate audio channel, so by altering their balance you can create the effect of sound realistically moving around the listener.

Dolby Surround has been further refined and enhanced over the years, and there are various different names used to describe this evolving system, such as Dolby ProLogic, Dolby Digital and many others.

Forget the jargon, though. The best way to tell one type of surround sound from another is simply to count the number of channels produced by your system. A basic surround-sound setup, sometimes known as 'four-point surround', produces four channels of sound, played back on four speakers – front left and right, and rear left and right. It's quite common for this type of system to also include a sub-woofer, but the sub-woofer doesn't have its own sound channel. Instead, the sound coming out of the sub-woofer is a kind of pseudo fifth channel that is created by combining low-frequency sounds taken from the other four channels.

There is also a four-point system known as '4.1'. This consists of four channels, just like ordinary four-point surround, but also provides a proper fifth audio channel specifically

Dolby Digital 5.1 surround sound comprises two front and two rear speakers, a fifth between the front two speakers, and a sub-woofer, each hosting a separate audio channel

for the sub-woofer. That '.1' added after the first number indicates that the sound system provides a dedicated audio channel for the sub-woofer. And that brings us to Dolby Digital 5.1, which is very much the technology of the moment.

Dolby Digital 5.1 consists of two front and two rear speakers, plus a fifth speaker positioned between the two front speakers (used in DVD films to 'centre' dialogue more accurately onto a particular point on a large screen). Finally, there's a sub-woofer that has its own dedicated sound channel as well.

But, just to confuse matters, there's also a rival 5.1 system called DTS, named after its developer, Digital Theatre Systems. This uses the same 5.1 speaker arrangement, but employs a 20bit sound format that provides higher-than-CD-quality output (CDs only use 16bit sound). There are even 6.1 and 7.1 systems available, although we've never come across a sound card that supports these. Don't be surprised, though, if new 6.1 and 7.1 sound cards appear from Creative and Video-Logic before the end of this year.

These huge speaker systems will, admittedly, be rather over the top for many people. If you just want to play games you may well be happy with a four-point system that lets you hear when there's a monster creeping up behind you. However, Dolby Digital 5.1 and DTS are becoming increasingly important because of the arrival of low-cost DVD players.

Dolby Digital 5.1 is the standard sound system used by most new DVD films, and there are some discs that also feature a DTS version of the soundtrack. So, if you want your PC to act as the focus of a state-of-the-art home cinema system you'll definitely need a sound card that supports Dolby Digital 5.1, and possibly even DTS as well.

Remember, though, that your PC's sound system consists of two separate elements – the sound card and the speakers. There's no point in buying a six-speaker setup for Dolby Digital 5.1 or DTS if your sound card can only provide two or four channels of sound. Many less expensive sound cards still only provide two-channel stereo sound. Four-channel sound is relatively common, but it's only top-of-the-range sound cards, such as the ones we've reviewed here, that provide six-channel output for Dolby Digital 5.1.

We've not yet come across any sound cards that support the DTS format, but you do have the option of buying a speaker system that has a combined Dolby/DTS decoder built in. These self-contained systems can also be used with many domestic DVD players or games consoles, such as the PlayStation 2, that can play DVD films, so they're still worth buying even if you don't plan on using them with your PC.

TABLE OF FEATURES

MANUFACTURER	CREATIVE	GENIUS	HERCULES	PINE
PRODUCT	**SOUNDBLASTER LIVE! PLATINUM 5.1**	**SOUNDMAKER LIVE 5.1**	**GAME THEATER XP**	**PCI DIGITAL 2633**
Telephone	0800 973 069	01509 215 435	020 8686 5600	020 8498 2100
URL	www.europe.creative.com	www.genius-kye.com	www.europe.hercules.com	www.simply.co.uk
Price inc VAT (ex VAT)	£176.25 (£150)	£34 (£29)	£150 (£126.65)	£11.75 (£10)
SYSTEM REQUIREMENTS				
Slot type	PCI	PCI	PCI	PCI
Processor speed	200MHz	200MHz	233MHz	200MHz
Operating system	Windows 9x, Me, 2000, NT4	Windows 9x, Me, 2000, NT4	Windows 9x, Me, 2000	Windows 9x, NT4
RAM	64MB	64MB	64MB	64MB
Other	Spare internal drive bay	✗	✗	✗
FEATURES				
DSP (digital signal processor)	EMU10K1	ForteMedia FM801	Cirrus Logic 4630	Cirrus Logic 4614
Synthesis	Wavetable	Wavetable	Wavetable	Wavetable
Environmental audio	EAX, D3D	A3D, D3D	EAX, A3D, I3DL2	EAX, D3D, Sensaura
Four-channel surround sound	✔	✔	✔	✔
Six-channel (Dolby Digital)	✔	Six-channel output for games only, no Dolby Digital support	✔	✗
Dual MIDI/joystick port	✔	✔	✔	✔
Additional hardware	Live! Drive	✗	External rack unit	✗
INPUT/OUTPUT				
Dedicated microphone jack	✔	✔	✔	✔
Dedicated headphone jack	✔	✗	✔	✗
Analog line in/out	✔/3	✔/2	✔/3 (up to six speakers)	✔/2
Digital input/output	2/2	✗/✗	2/2	✗/✗
Dedicated MIDI	Input and output	✗	Input and output	✗

MANUFACTURER	TERRATEC	TURTLE BEACH	VIDEOLOGIC
PRODUCT	**DMX XFIRE**	**MONTEGO A3D XSTREAM**	**SONIC FURY**
Telephone	020 7923 1892	020 8498 2100	01923 260 511
URL	www.terratec.net	www.simply.co.uk	www.videologic.com
Price inc VAT (ex VAT)	£49 (£41.70)	£55.21 (£46.99)	£79.90 (£68)
SYSTEM REQUIREMENTS			
Slot type	PCI	PCI	PCI
Processor speed	200MHz	200MHz	200MHz
Operating system	Windows 9x, Me, 2000, NT4	Windows 3.1, 9x, NT4	Windows 9x, Me, 2000, NT4
RAM	64MB	Requires 16MB for Windows 3.1, otherwise 64MB	64MB
Other	✗	✗	✗
FEATURES			
DSP (digital signal processor)	Cirrus Logic 4624	Aureal 8820	Cirrus Logic 4630
Synthesis	Wavetable	Wavetable	Wavetable
Environmental audio	EAX, A3D, D3D, Sensaura	A3D, D3D	EAX, D3D, A3D, I3DLS
Four-channel surround sound	✔	✗	✔
Six-channel (Dolby Digital)	✗	✗	see * below
Dual MIDI/joystick port	✔	✔	✔
Additional hardware	✗	✗	✗
INPUT/OUTPUT			
Dedicated microphone jack/headphone jack	✔/✗	✔/✗	✔/see *
Analog line in/out	✔/2 (up to 4 speakers)	✔/1	✔/see *
Digital input	Internal digital input port on body of card	✗	✗
Digital output	✔	✗	see *
Dedicated MIDI	✗	✗	✗

*VersaJack connector acts as line in, headphone out, digital out or third line out for six-channel sound

Editor's Choice

T he main requirement of any sound card is, of course, that it produces good-quality sound. Yet all the cards reviewed here provide the 16bit, 44.1KHz stereo output required to produce CD-quality sound. And that even includes Pine's PCI Digital 2633 which, at just over £10, actually costs less than most new CDs.

This means that sound quality alone is no longer the sole factor that you have to consider when buying a card. The thing that really sets the top-of-the-range devices apart from their low-cost rivals these days is their sheer range of features. A headphone or microphone socket tucked away at the back of the card is no longer considered state of the art. Some of these cards boast a quite dazzling array of input and output options, with multiple analog connectors sitting alongside digital ports that allow you to make perfect digital recordings for use with CD players or portable MP3 players.

Many of these sound cards are also looking to the future, with support for surround sound and 3D audio technologies that are still in their infancy. The days of two-speaker stereo arrangements aren't over yet, but the popularity of DVD films points to a time when surround-sound speaker systems will be common in our homes. With this in mind, most of these cards support four-speaker surround-sound systems, and some even support six speakers, complete with Dolby Digital 5.1 decoding facilities.

Sound card manufacturers have also got their eye on the games market, and gamers should look closely at the small print on a card's packaging to see which of the many 3D audio technologies are supported before buying.

Some less expensive cards in this review are clearly aimed at the gaming market, providing support for 3D audio and up to four speakers, but not going that extra step to six-speaker surround sound required for the home cinema market. These less expensive cards also keep their prices down by omitting digital input and output facilities, but again these are features that you won't need if you only plan to play games with your PC. Terratec's DMX Xfire card clearly falls into the gaming category, as do the cards from Pine and Genius. All three cards cost less than £50, so if you're a games fan looking for a low-cost upgrade then these three all represent very good value for money.

However, PCs are increasingly being used as the centrepiece for home entertainment systems that go beyond simply playing games. If you want to use your PC as a digital jukebox you'll need a more fully featured card that also provides digital recording facilities.

The winners

You don't have to spend a fortune to buy such a card. **VideoLogic's Sonic Fury** card thoroughly deserves a **Highly Commended** award as it manages to provide 3D audio for games and six-speaker Dolby Digital surround sound for DVD films at under £100. Its multipurpose VersaJack can be used for both input and output, although it can't do both at the same time. It doesn't have digital input facilities either, so it's not quite as versatile as the rival cards from Creative and Hercules.

Creative has been the king of the sound card market for years, and the **Creative SoundBlaster Live! Platinum 5.1** boasts a truly impressive range of features — so many, in fact, that it can't fit them all into a single board and has to complement the card with the additional Live! Drive unit. We can't fault the SoundBlaster's features, and its 3D audio, Dolby 5.1, and multiple digital inputs and outputs are certainly worthy of a **Highly Commended** award.

However, our **Editor's Choice** award goes to Hercules for its **Game Theater XP**. It supports 3D audio for games, but it also provides six-speaker Dolby Digital playback for DVD films and matches the SoundBlaster Live! Platinum 5.1 feature for feature. Like the SoundBlaster it puts most of its input and output connectors on a drive unit that is separate from the actual card. That said, the Game Theater XP nudges ahead of the SoundBlaster on price and ease of use, as its external, single-cable rack unit is easier to install and set up than the SoundBlaster's internal Live! Drive. The Game Theater's rack unit even acts as a USB hub as well.

The SoundBlaster has a better software bundle, but Game Theater XP's combination of features, ease of use and price pull it ahead as the best all-round choice for games, music and home cinema use.

Hercules Game Theater XP

VideoLogic Sonic Fury

Creative
SoundBlaster Live! Platinum 5.1

These cards support a dazzling array of input and output options