

THE LABS
Sound cards

Sound cards

The definitive verdict on 14 sound cards, breakout boxes and even some external USB devices

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It's easy to fall into the trap of thinking you don't need a proper sound card. After all, you've got 5.1 surround sound on your motherboard, so why shell out an extra £100 for a card to do the same job?

There are several answers, with appeal for just about anybody. If your priority is games, you'll be intrigued by Creative's EAX Advanced HD API, FireWire ports for setting up a fast gaming network and 6.1 surround sound. If you're into movies, you can reap the benefits of Dolby Digital EX setups, with up to 7.1 speaker sets and THX certification.

But if music is your passion, there's 24-bit/96kHz recording and playback. You'll also find digital ins and outs and high-quality DACS. A couple of cards even offer a phono pre-amp for digitally mastering your old vinyl records, and another two offer DVD Audio support.

Musicians will find they get a lot out of a decent sound card too, especially as the 15-pin MIDI/joystick connector is becoming increasingly absent from motherboards – MIDI

ports can still be found on ten of the sound cards on test. Some of the higher-end cards also support ASIO (see p126), which cuts down latency in professional recording packages like Cubase VST and makes virtual studios like Propellerhead Reason run more smoothly too.

In short, whatever kind of card you're looking for, this Labs holds the answer.

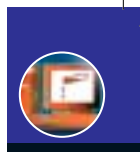
AUDIO DYNAMITE

Once you've decided which sound card to buy, make sure you read our Labs dedicated to speakers (see p145), with everything from 2.1 to 6.1 sets on test. Also, take a look at our revealing feature, Artificial Mozart (see p137), on the social and technological issues behind computer-generated music.

CONTRIBUTORS

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Performance analysis

How we rate the 14 sound cards

GAMES/DVD

If a card supports EAX or Sensaura, we run the Anubis Botmatch demo in Unreal Tournament 2003 to see how it affects the frame rate. The test machine is a 1.8GHz Pentium 4 with 512MB of RDRAM and a 64MB ATI Radeon 8500 graphics card. The resolution is set to 1,024 x 768 in 32-bit colour, and the sound is set on Hardware Accelerated + EAX.

The frame rate accounts for up to five points in this score, and if a card doesn't support EAX or Sensaura it will score zero for 3D gaming. In the games/DVD score, we also take into account API support such as EAX Advanced HD as well as FireWire ports, which can be used to set up a gaming network.

DVD movie features are also weighed up in this score, including the number of speakers supported and the level of DVD movie software included. Extra points are awarded for a remote control in the bundle, while THX certification gets half a point.

MUSIC

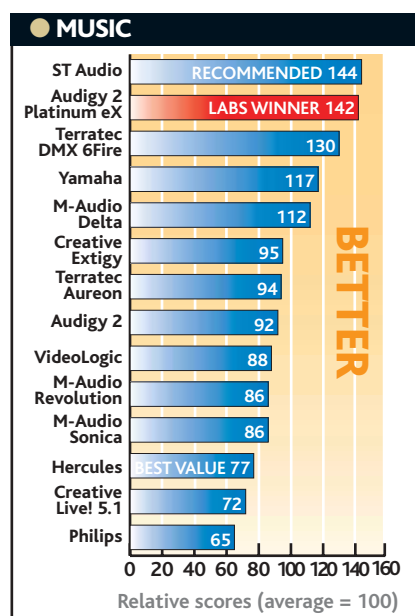
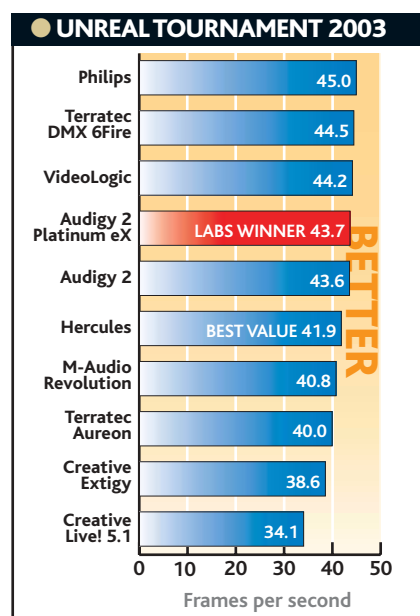
This is an overall assessment of a card's musical capabilities, combining both sound engineering and hi-fi features in one. High points are awarded for 24-bit/96kHz support as well as ASIO drivers and how flexible they are. Each digital in and out also gets a point, and full-size MIDI ports get more points over a standard 15-pin MIDI/joystick connector.

Extra features like a phono preamp also gain points here, as does the software bundle and a weighing up of the ins and outs on offer. Each line-in gets a point, and extra points are on offer for having full-size jack and phono sockets over standard mini-jacks. There's also a subjective assessment on sound quality, where points are rewarded or deducted for noticeably good or poor sound quality.

Also, to be fairer to specific music cards like the Yamaha UW500 and M-Audio Delta 66, we changed their overall score's weighting to ignore the Games/DVD score.



The Advanced features for both music and games make Creative's Audigy 2 Platinum eX the Labs Winner.



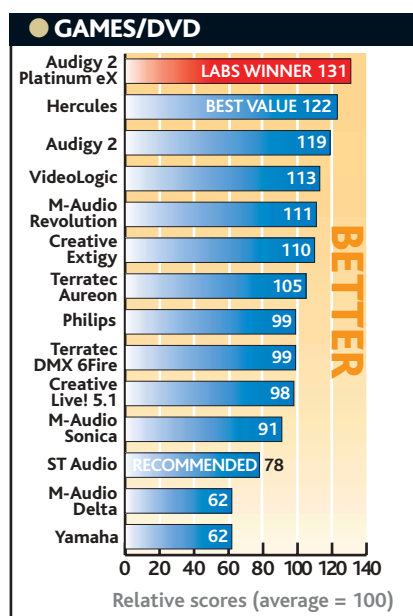
Why haven't we tested sound quality?

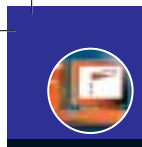
After weeks of trying to find a way to test a sound card's output accurately, we've come to the conclusion that there's no way of doing real-world testing to the degree needed to distinguish between the top-end cards without using a specifically constructed labs and an oscilloscope.

Some people use RightMark Audio Analyzer (<http://audio.rightmark.org>), which is an excellent analysing utility, but the usual loopback method of recording for testing is flawed. You're measuring both the line-in and line-out at the same time, so you could have a great line-out and poor line-in and never know from the end result. Also, even with everything else muted, there are several volume control setups for each sound card that can achieve the 0dB and -6dB test targets, and each one produces a slightly different result. With the line-in gain and output levels different on each card, it's impossible to get the same mixer setup, and with the difference between results often up to 2dB we felt it was unfair to test like this.

With the difference between high-end cards often out of the range of human hearing, we felt it was fairer to judge the cards on their features, unless the sound quality was noticeably good or bad, in which case this is mentioned in the review and taken into account in the Music score. So unless stated in the review, the sound cards on test produce good sound quality.

BEN HARDWIDGE





THE LABS Sound cards

● FEATURE TABLE



	Creative Sound Blaster Live! 5.1 Digital	Creative Sound Blaster Audigy 2	Hercules Digifire 7.1	M-Audio Revolution	Philips Sonic Edge 5.1	TerraTec Aureon 7.1 Space	Videologic SonicXplosion DVD
OVERALL SCORE	95	103	101	98	92	97	101
Price ¹ (inc VAT)	£22 (£26)	£67 (£79)	£51 (£60)	£75 (£88)	£34 (£40)	£91 (£107)	£60 (£71)
Supplier	PC Nextday (Web only)	Simply 0870 727 2100	Overclock.co.uk (Web only)	Tradeprice.co.uk (Web only)	Watford Electronics 0870 220 0700	dabs.com (Web only)	Simply 0870 727 2100
Supplier's website	www.pcnextday.co.uk	www.simply.co.uk (code: 64961)	www.overclock.co.uk	www.tradeprice.co.uk	www.savastore.com	www.dabs.com/2bbd	www.simply.co.uk (code: 64697)
Manufacturer's website	www.soundblaster.com	www.soundblaster.com	http://europe.hercules.com	www.maudio.co.uk	www.consumer.philips.com	www.terratec.com/ttuk	www.videologic.co.uk
Warranty	2yrs	2yrs	1yr	1yr	2yrs	2yrs	5yrs
SPECIFICATIONS							
Maximum sample rate	16-bit/48kHz	24-bit/96kHz	16-bit/48kHz	24-bit/96kHz	16-bit/48kHz	24-bit/96kHz	16-bit/48kHz
Maximum ASIO sample rate	N/A	16-bit/48kHz	N/A	24-bit/96kHz	N/A	24-bit/96kHz	N/A
Hardware MIDI wavetable	✓	✓	✗	✗	✗	✗	✓
Chipset	Creative EMU10K1-SFF	Creative Audigy 2	Crystal CS4624	VIA ENVY24 HT	Philips Sonic Engine DHMFKN	VIA ENVY24 HT	Crystal CS4630
CONNECTORS							
Internal connectors	TAD, CD, Aux, S/PDIF	TAD, CD, Aux, S/PDIF, joystick	2 x CD, Aux, S/PDIF	✗	TAD, CD, 2 x S/PDIF	2 x CD, Aux, S/PDIF	2 x CD, Aux, S/PDIF
Number of stereo line-ins	1	1	1	1	1	1	1
Number of stereo line-outs	3	3	4	4	3	4	3
MIDI ports	15-pin joystick	15-pin joystick (via backplate)	15-pin joystick (via backplate)	✗	15-pin joystick	✗	15-pin joystick (via backplate)
Optical I/O	✗	✗	Out	✗	✗	I/O	I/O
Coaxial I/O	Out	Out	✗	Out	Out	✗	✗
Number of FireWire ports	✗	1	2	✗	✗	✗	✗
Wavetable daughterboard connector	✗	✗	✗	✗	✗	✗	✓
ACCESSORIES							
Cables	Internal S/PDIF	Internal S/PDIF	✗	✗	Internal analog	Optical	✗
Remote control	✗	✗	✗	✗	✗	✗	✗
Other	✗	✗	✗	✗	✗	✗	✗
STANDARDS SUPPORTED							
ASIO	✗	✓	✗	✓	✗	✓	✗
Sensaura/EAX	EAX	EAX	Sensaura	Sensaura	EAX	Sensaura	Sensaura
EAX Advanced HD	✗	✓ (multiple environments)	✗	✗	✗	✗	✗
5.1 surround	✓	✓	✓	✓	✓	✓	✓
Dolby Digital EX 6.1	✗	✓	✓	✓	✗	✓	✗
Dolby Digital EX 7.1	✗	✗	✓	✓	✗	✓	✗
DTS 5.1	✗	✗	✗	✗	✗	✗	✓
THX certification	✗	✓	✗	✗	✗	✗	✗
SOFTWARE							
Wavetable synthesizer	Creative	Creative	Yamaha S-YXG50	✗	✗	✗	✗
Sequencing/multitrack recording	✗	✗	✗	✗	✗	Emagic Logic Fun	Steinberg Cubasis In Wired
Looping	Sonic Foundry ACID XPress 2	✗	Sonic Foundry ACID XPress 3	MixMan Studio	Sonic Foundry ACID XPress 3	✗	Sonic Foundry ACID XPress 3
Sampling	Creative WaveStudio	Creative WaveStudio	✗	✗	✗	Steinberg WaveLab Lite 2	Syntrillium Cool Edit 2000
DVD movie playback	✗	✗	CyberLink PowerDVD Pro EX	InterVideo WinDVD 4	✗	CyberLink PowerDVD XP 4	InterVideo WinDVD 4
DVD Audio playback	✗	Creative MediaSource	✗	✗	✗	✗	✗
Games	eRacer	Soldier of Fortune II, Hitman 2	✗	Tony Hawk's Pro Skater 3	✗	✗	✗
Windows versions supported	95B, 98, ME, 2000 and XP	98 SE, ME, 2000 and XP	98 SE, ME, 2000 and XP	ME, 2000 and XP	98 SE, ME, 2000 and XP	98 SE, ME, 2000 and XP	98 SE, ME, 2000 and XP

1. Prices were all correct at time of going to press.

All about ASIO

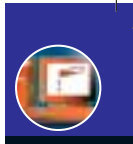
When Windows was first being developed back in the dark mists of time, high-quality audio wasn't the highest priority on Bill Gates' wish list. It was only years later, as recording studios and home users began to appreciate the serious potential of computing for audio, that software developers realised they'd need to develop a new way of handling audio streams and addressing audio hardware.

The principal downfall of Windows

MME (MultiMedia Extensions) drivers is the length of time it takes for an audio event to be processed, as well as the inconsistency of this delay. This is often referred to as a driver's latency. As a general rule, anything greater than about 20ms latency is enough to make software instruments or live monitoring difficult to use effectively. The Windows Multimedia system introduces a latency of 750ms.

The methods used to deal with the

less than ideal MME system have resulted in technologies such as ASIO (Audio Stream Input Output). This was originally developed by Steinberg for use in its Cubase software, but has since been widely licensed and adopted as an industry-standard protocol. It allows for the effective handling of hardware-independent multichannel audio at various bit depths and sample rates. While still introducing an element of latency, it makes the real-time streaming of audio



	Creative Sound Blaster Extigy	M-Audio Sonica Theater	Yamaha UW500	Creative Sound Blaster Audigy 2 Platinum eX	M-Audio Delta 66	ST Audio DSP24 MEDIA 7.1	TerraTec DMX 6fire 24/96
	99	92	97	118	94	109	103
	£99 (£116)	£75 (£88)	£186 (£219)	£134 (£157)	£183 (£215)	£196 (£230)	£138 (£162)
	Simply 0870 727 2100	Tradeprice.co.uk (Web only)	Sounds Live 0870 757 2360	Simply 0870 727 2100	Digital Village (Web only)	Et Cetera 0870 873 8731	Watford Electronics 0870 220 0700
	www.simply.co.uk (code: 63646)	www.tradeprice.co.uk	www.soundslive.co.uk	www.simply.co.uk (code: 48328)	www.digitalvillage.co.uk	www.etcetera.co.uk	www.savastore.com
	www.soundblaster.com	www.maudio.co.uk	www.yamaha-music.co.uk	www.soundblaster.com	www.maudio.co.uk	www.staudio.com	www.terratec.com/ttuk
	2yrs	1yr	1yr	2yrs	1yr	2yrs	2yrs
	16-bit/48kHz	24-bit/96kHz	16-bit/48kHz	24-bit/96kHz	24-bit/96kHz	24-bit/96kHz	24-bit/96kHz
	N/A	N/A	16-bit/48kHz	24-bit/96kHz	24-bit/96kHz	24-bit/96kHz	24-bit/96kHz
	X	X	X	✓	X	✓	X
	Creative Extigy	VIA ENVY24 HT	Not stated	Creative Audigy 2	VIA ENVY24 HT	VIA ENVY24 HT	VIA ENVY24 HT
	N/A	N/A	N/A	Joystick	X	CD, Aux	2 x CD, Aux, S/PDIF
	1	1	2	3	2	1	3
	3	4	1	3	2	4	4
	Full-size I/O	X	Full-size I/O	Full-size I/O	X	Full-size I/O	Full-size I/O
	I/O	X	I/O	I/O	X	I/O	I/O
	I/O	Out	In	I/O	I/O	I/O	I/O
	X	X	X	2	X	X	X
	X	X	X	X	X	X	✓
	X	X	X	X	X	X	Internal analog
	✓	X	X	✓	X	X	X
	X	X	X	Headphone jack adaptor	X	X	X
	X	X	✓	✓	✓	✓	✓
	EAX	X	X	EAX	X	X	Sensaura
	✓ (one environment)	X	X	✓ (multiple environments)	X	X	X
	✓	✓	X	✓	X	✓	✓
	X	✓	X	✓	X	X	X
	X	✓	X	X	X	X	X
	X	X	X	X	X	X	X
	X	X	X	✓	X	X	X
	Creative	X	Yamaha 5-YXC50	Creative	X	X	X
	X	X	Yamaha XGWorks 3 Lite	Cubasis VST 4 CE	Ableton Live Delta 1.53	Emagic Logic SoundTrack24	Emagic Logic Fun
	X	MixMan Studio	X	Fruity Loops 3.5 CE	X	Sonic Foundry ACID XPress 3	X
	Creative WaveStudio	X	Yamaha TWE	Steinberg WaveLab Lite 2	X	X	Steinberg WaveLab Lite 2
	X	InterVideo WinDVD 4	X	X	X	InterVideo WinDVD 3	CyberLink PowerDVD 3
	X	X	X	Creative MediaSource	X	X	X
	X	Tony Hawk's Pro Skater 3	X	Soldier of Fortune II, Hitman 2	X	X	X
	98 SE, ME, 2000 and XP	ME, 2000 and XP	98 SE, ME, 2000 and XP	98 SE, ME, 2000 and XP	95, 98, ME, NT, 2000 and XP	95, 98, ME, 2000 and XP	98 SE, ME, 2000 and XP



Latency above 20ms is generally considered unusable.

a possibility. The introduction of ASIO 2 updated the specification to allow for sample-accurate timing, multithread support and zero-latency monitoring.

Steinberg isn't alone in its quest for better drivers, with Emagic's EASI (Enhanced Audio Streaming Interface) essentially a competitor to ASIO technology. Although it hasn't yet found such widespread acceptance, it can provide

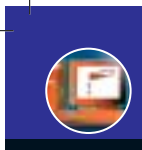
a useful performance increase with those applications and hardware that support it.

GSIF (GigaSample InterFace) is a proprietary driver architecture developed by Nemesis in order to deal with the demands of time-critical, direct-from-disk streaming of audio involved with its software sampler GigaSampler. Anyone wishing to make the most of this software should ensure their sound card includes these drivers.

Thankfully, Microsoft has a far more

proactive approach to its media handling these days and the future is, hopefully, less confusing. The potential of WDM (Windows Driver Model) drivers for providing low-latency, high-quality, multichannel audio is only beginning to be explored. First introduced in Windows 98, these provide an essentially low-latency interface as part of the Windows kernel, and offer a standardised architecture for future development.

ROSS BURRIDGE



THE LABS
Sound cards

Creative Sound Blaster Live! 5.1 Digital

PRICE £22 (£26 inc VAT)

SUPPLIER PC Nextday www.pcnextday.co.uk

VERDICT Way behind modern standards, the 5.1 Digital is only worth buying for the Sound Blaster brand at a cheap price.

At just £22, the Live! 5.1 Digital initially looks like the kind of cut-throat deal that could leave Creative bankrupt, but all that fades when you look at what it actually offers. In its day, the Live! was a decent sound card, and the addition of 5.1 surround sound made it the OEM card of choice for years. But that was then, and



its days are now looking increasingly numbered.

It doesn't help that so many motherboards already come with 5.1 surround sound integrated, but the last nail in the Digital's coffin has to be poor gaming performance. Clocking up just 34.1fps in our Unreal Tournament 2003 EAX test, the Live! was more than 10fps behind the fastest cards on test.

The driver control panel is also in dire need of a makeover. The yellow and black colour scheme is far from easy on the eye, and it's also unintuitive compared with the Audigy 2's surround-sound mixer.

Of course, you don't get any of the gimmicks usually associated with sound cards these days either, but there is a semi-decent wavetable synthesizer and a 15-pin joystick/MIDI port on the backplate. Plus, the sound quality is respectable for the price.

There's nothing essentially wrong with the Live! 5.1 Digital, but its market has become almost irrelevant when you can get 5.1 surround sound on most motherboards. The only people who should buy it are those on a tight budget who want 5.1 sound. Otherwise, save up for a fuller-featured card like the Hercules Digifire 7.1 instead.

PC PRO RATINGS		
OVERALL		
95		
GAMES/DVD	MUSIC	VALUE
98	72	110
100 IS THE AVERAGE		

Creative Sound Blaster Audigy 2

PRICE £67 (£79 inc VAT)

SUPPLIER Simply 0870 727 2100

VERDICT Offers a lot of features for a very reasonable price, making it a great-value all-rounder.

With its substantial size and weight, you feel like you're getting a lot for your money with the Audigy 2, which certainly seems true from the specifications. You can guarantee that something on the feature list will get your motor running.

Gamers will be pleased to see EAX Advanced HD support, a cracking Unreal Tournament frame rate of 43.6fps and the inclusion of Soldier of Fortune II. Meanwhile, movie and hi-fi enthusiasts will



appreciate 6.1 Dolby Digital EX, THX certification and DVD Audio support.

The latter will be a big money-saver for anyone looking to reap the benefits of the latest standard without buying separates. Creative even includes DVD Audio support in its MediaSource software.

Musicians will be grateful for the reasonable-sounding MIDI synthesizer, 15-pin MIDI backplate, 24-bit/96kHz sampling and ASIO drivers. However, Cubase users shouldn't get their hopes up too much as these drivers are locked at 16-bit/48kHz.

Unfortunately, that's not the only evidence of corner cutting. The 6.1 Dolby Digital EX support falls one speaker short of the full 7.1 standard, and there's no DVD movie software either.

Despite this, the Audigy 2 has something for everyone. Buy it if you're looking for a good all-rounder on a budget.

PC PRO RATINGS		
OVERALL		
103		
GAMES/DVD	MUSIC	VALUE
119	92	110
100 IS THE AVERAGE		

Hercules Digifire 7.1

PRICE £51 (£60 inc VAT)

SUPPLIER Overclock.co.uk (Web only)

VERDICT A great-value card that's ideal for gamers and movie buffs on a budget, but music lovers are better off with the Audigy 2.

When you first look at the Digifire 7.1's packaging, it's hard to believe what you get for just £51. With two FireWire ports and full 7.1 Dolby Digital EX surround sound, how has Hercules managed it?

Noting that not everyone wants low-latency recording and 24-bit/96kHz sampling, Hercules has used the basic 16-bit/48kHz Crystal CS4624 chipset instead of a more advanced chip like the VIA ENVY24 HT. And while this kind of penny



pinching won't appeal to sound engineers, it means gamers and DVD movie fans can get the features they want for less money.

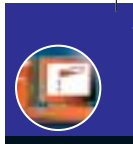
Hercules even includes CyberLink PowerDVD Pro EX to take advantage of all the outputs for DVD movies, while Sensaura support provides EAX 1, EAX 2 and A3D support for gaming. Plus, with 41.9fps in Unreal Tournament 2003, this card can manage 3D audio without putting too much strain on the system.

You can enable Sensaura in the control panel, which also gets ten out of ten for the design effort. With its red-flame background, it looks like the control panel from hell, and it also has some good touches like a MiniDisc optimal mode for outputting the right level through the optical out.

The additional 15-pin joystick/MIDI backplate and fantastic-sounding Yamaha S-YXG50 soft synthesizer are welcome inclusions too. As are the two FireWire ports, enabling you to connect a FireWire peripheral and a FireWire network at the same time.

By catering for a specific market, Hercules produces a great-value card for anyone wanting surround sound in games and movies. However, musicians would be better off elsewhere.

PC PRO RATINGS			
OVERALL			
101			
GAMES/DVD	MUSIC	VALUE	
122	77	115	
100 IS THE AVERAGE			



M-Audio Revolution

PRICE £75 (£88 inc VAT)

SUPPLIER Tradeprice.co.uk (Web only)

VERDICT An affordable all-rounder for musicians, gamers and movie buffs alike, but it's crying out for wider connectivity.

Ever since the Audigy blurred the line between consumer and professional sound cards, the pro-audio lobby has been rushing to get a piece of the consumer market. With the Revolution, M-Audio has shown that it can produce a full-on 24-bit/96kHz ASIO card, and also have a go at 3D gaming and Dolby Digital EX.

In fact, the Revolution handles the latter even better than the Audigy 2, with



the addition of another centre speaker behind you to create the full 7.1 experience. M-Audio takes advantage of this by including InterVideo WinDVD 4 and providing some advanced speaker setup options in the driver for setting the crossover frequency and size of speakers.

But that's where our enthusiasm ends, as the Revolution is otherwise sparse. It lacks internal connectors, a MIDI wavetable and a 15-pin joystick/MIDI backplate. That said, you do get 24-bit/96kHz ASIO support, unlike the similarly priced Audigy 2.

The Audigy 2 strikes back with its hardware-accelerated 3D audio, and the Revolution's Unreal Tournament 2003 frame rate of 40.8fps – compared with 43.6fps from the Audigy 2 – indicates its software-emulated Sensaura mode is straining the processor. Plus, the Audigy 2 offers DVD Audio software, MIDI support and a FireWire port for less money.

The Revolution is a good effort at an all-in-one card, but unless you need 24-bit/96kHz ASIO support go for the cheaper Audigy 2 instead.

PC PRO RATINGS			
OVERALL			
98			
GAMES/DVD	MUSIC	VALUE	
111	86	107	
100 IS THE AVERAGE			

Philips Sonic Edge 5.1

PRICE £34 (£40 inc VAT)

SUPPLIER Watford Electronics 0870 220 0700

VERDICT An excellent choice for gamers on a budget, but the cheap price is reflected by poor noise levels and limited features.

While you immediately associate names like Creative and M-Audio with sound cards, the Philips brand conjures up images of anything from shavers to light bulbs. But that's not to say that Philips doesn't take sound cards seriously. It even designs its own chipsets, with the Sonic Engine DHMFKN chip powering the Sonic Edge 5.1.

However, the chip is still basic by modern standards. Unlike the Audigy 2 and ENVY24 HT, the Sonic Engine only samples at a maximum of 16-bit/48kHz, and you can forget ASIO drivers and Dolby Digital EX



support. The noise levels were also disappointing, with the Sound Forge level meters averaging -43dB on our test system with the line-in up full. The gain on the line-in was also surprisingly low, and even with all the levels up full a standard CD input wouldn't go above a level of -2dB.

But what do you expect for £34? It may not offer audiophile quality, but at least it comes with the average gamer's essentials. In fact, the Sonic Edge's Unreal Tournament 2003 frame rate of 45fps was the fastest on test. A3D and EAX 1 and 2 are supported automatically too, without having to adjust its settings.

Philips also gains kudos for its swish control panel, where you can enable effects like QSizzle for boosting high frequencies, QRumble for bass frequencies and QMSS, which spreads a stereo signal over 5.1 speakers.

None of these gimmicks can cover up the Sonic Edge's budget roots, though. It's only worth buying if you're a gamer after affordable 5.1 sound. Otherwise, choose the Hercules Digifire 7.1 or Audigy 2.

PC PRO RATINGS			
OVERALL			
92			
GAMES/DVD	MUSIC	VALUE	
99	65	114	
100 IS THE AVERAGE			

TerraTec Aureon 7.1 Space

PRICE £91 (£107 inc VAT)

SUPPLIER dabs.com (Web only)

VERDICT Overpriced for what's on offer, the Space is in desperate need of a driver revision and some MIDI features.

When we first reviewed the Aureon 7.1 Space (see issue 102, p80), we criticised its drivers, which wouldn't let you record in 24-bit without making a strange machine-gun noise. We assumed this problem would be fixed by now, so downloaded the latest drivers from the TerraTec site, only to find the same problem, even with Windows XP SP 1.



However, this issue only manifests itself in standard recording packages, and if you're using the ASIO driver in an app like Cubase you'll find the Space records fine in 24-bit. Plus, latency is obviously an area TerraTec has honed to a fine art, as even the maximum setting of 800 samples gives you 17ms at 48kHz, and just 8ms at 96kHz, and this setup worked fine on our Cubase test system, with no choppy clicks and pops.

The Space also has the bonus of optical ins and outs over its nearest rival, the M-Audio Revolution. Like the Revolution, however, it lacks any MIDI features and the Audigy 2's hardware-accelerated EAX support. Instead, the Space relies on Sensaura software, which resulted in a poor Unreal Tournament 2003 frame rate of 40fps.

The main advantage you get over the Audigy 2 is full 7.1 surround sound and 24-bit/96kHz ASIO support, but at £67 the Audigy 2 offers much better value. If TerraTec wants to wrestle with the consumer might of Creative, it needs to sort out its drivers, drop the price and offer a more competitive feature set.

PC PRO RATINGS			
OVERALL			
97			
GAMES/DVD	MUSIC	VALUE	
105	94	103	
100 IS THE AVERAGE			



THE LABS
Sound cards

Videologic SonicXPlosion DVD

PRICE £60 (£71 inc VAT)

SUPPLIER Simply 0870 727 2100

VERDICT Not exactly cutting edge, but it offers loads of 5.1 goodies and a wavetable connector for the money.

It's no surprise that the SonicXPlosion's brown circuit board and white lettering look familiar. Much like the SonicFury had 'Turtle Beach Santa Cruz' written on the back, the SonicXPlosion makes little attempt to cover its TerraTec SiXPack 5.1+ roots.

Even the control panel looks identical, with TerraTec's blue and dark-grey colour scheme. But this isn't necessarily a bad thing – Videologic



knows how to market competitively, and the SonicFury was our A List sound card for years.

But that was then, and the 16-bit/48kHz SonicXPlosion isn't cutting edge any more. However, the introduction of an optical in and out over the SonicFury's Versa-jack is very welcome, as are the gold-plated connectors. The SonicXPlosion is also one of the few sound cards with a wavetable daughterboard connector, which is good news for Yamaha DB50XG owners.

The bigger deal with the SonicXPlosion, though, is the DVD support. It may only offer up to 5.1 channels, but it's the sole card with 5.1 DTS support in addition to Dolby Digital 5.1. It also supports Dolby Pro Logic II, which spreads a stereo signal over all 5.1 channels.

With this and the solid 44.2fps Unreal Tournament frame rate in mind, the SonicXPlosion is an ideal card for gamers and movie enthusiasts with a 5.1 speaker setup. But, sadly for Videologic, that's the limit of its appeal. The Hercules offers 7.1 surround sound for similar money, while the Audigy 2 offers superior features for musicians.

PC PRO RATINGS		
OVERALL		
101		
GAMES/DVD	MUSIC	VALUE
113	88	112
100 IS THE AVERAGE		

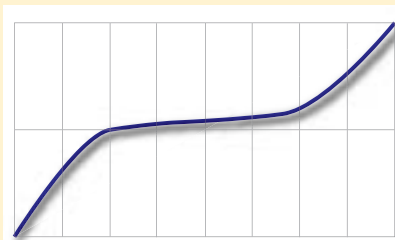
Hi-fidelity

Is 24-bit/96kHz support really worth the extra money?

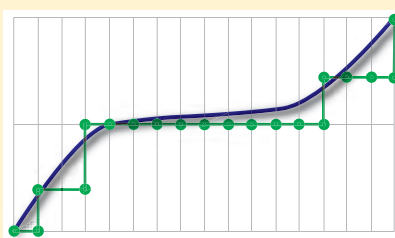
After years of scratched records and mangled tapes, CDs were just the kind of audio revolution people had been waiting for. These shiny silver discs brought us crystal-clear 16-bit/44.1kHz sound without distractions like hiss and crackles. CDs are great, but they've been around for 20 years and – surprise, surprise – sound-card manufacturers think we should move on.

The next hi-fidelity standard is 24-bit/96kHz audio, which gets even closer to natural sound. Basically, the more information you capture, the closer you get to the original analog sine wave's curves, as it's broken into smaller chunks that can step up or down more naturally. But can you hear the difference?

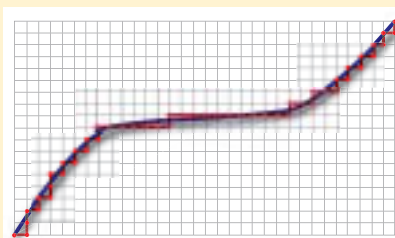
Human ears can pick up 20Hz to 20kHz, and this is the standard frequency range of most hi-fi equipment. The sample rate is double the frequency range, as you need to capture a peak and value from each cycle. So anything above a CD's 44.1kHz sample rate is theoretically out of bounds, but that doesn't mean it won't affect the whole experience.



Original analog sine wave.



Some detail is lost in a 16-bit/44.1kHz sample.



With less stepping, a 24-bit/96kHz sample gets much closer to the original.

You could, for example, feel a low bass frequency in your body, even if you can't hear it. Plus, it's not all about sample rates – the 24-bit resolution is also a factor.

Anyone who remembers sampling with an old Sound Blaster Pro will appreciate the difference between 8-bit and 16-bit samples, not only with the amount of noise generated but also the clarity.

The resolution basically determines the dynamic range (the difference between the quietest and loudest signal), and with the loudest signal always being clipped at 0dB this means less noise and more clarity at the quieter end of the scale. Each bit doubles the accuracy of the sample, so as each one is added it keeps multiplying, and a 24-bit sample is way above the accuracy you'll ever need.

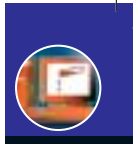
Whether you can hear the difference is debatable, but if your sound card supports 24-bit/96kHz and 24-bit/192kHz sampling it has another bonus – DVD Audio. This is the next generation of consumer audio and spreads your music over 5.1 glorious surround channels at 24-bit/96kHz, or in simple stereo at 24-bit/192kHz (Advanced Resolution). So even if you can't appreciate the advanced sound quality, you can still hear an orchestra all around you, and this is by far its most impressive selling point.

DVD Audio discs are already available, and Creative is even offering playback in its MediaSource software, which gives you high-quality surround-sound audio at a fraction of the cost of the equivalent in hi-fi separates.

The other bonus of 24-bit/96kHz support is for sound and studio engineers wanting to get the best sound quality on their original recordings. A fair amount of the data will be lost when it's downsampled to a 16-bit/44.1kHz CD or a 16-bit/48kHz DAT, but you'll want your original to have the best sound quality possible, especially when DVD Audio is already taking off.

With CDs being as good as they are, it was always going to be difficult to get the same leap in sound quality from vinyl to CD again, and it's fair to say that 24-bit/96kHz audio doesn't offer a phenomenal difference. However, if you're looking for the ultimate in hi-fidelity sound quality, it's certainly worth a listen. Plus, with DVD Audio, the surround-sound element alone is worth having.

BEN HARDWIDGE



Creative Sound Blaster Extigy

PRICE £99 (£116 inc VAT)

SUPPLIER Simply 0870 727 2100

VERDICT The best external option for all-round use, although it would benefit from full-size jacks and ASIO support.

Although almost half the height of the Audigy 2 Platinum eX, you still get the feeling that space has been wasted with the Extigy. With its large grey strip across the middle, why couldn't all the jack sockets be bumped up to the full 1/4in size, and why couldn't Creative squeeze some phono outputs onto the back?

Musicians would be better off with the Yamaha UW500, which offers full-size jacks and ASIO drivers. You can get a third-party

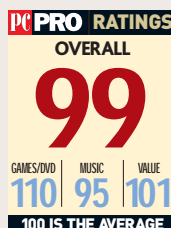


ASIO driver for the Extigy from www.usb-audio.com, but this disables the MIDI and remote-control features and locks the stereo output at 48kHz, so is far from ideal.

Otherwise, the Extigy is the best general-purpose external device on test. It's the only USB option that supports EAX (including EAX Advanced HD in one environment) and, while the 38.6fps result in Unreal Tournament 2003 is poor, it's forgivable considering the restriction of the USB interface and the fact that the Extigy is the only EAX option for notebook users.

It also supports the usual standard of 5.1 surround sound, but can function as an independent Dolby Digital decoder too, so you can connect the optical or coaxial digital input to your set-top box and have 5.1 surround sound without your PC.

With its full-size MIDI ports, great 5.1 surround features and EAX compatibility, the Extigy is the best all-rounder for notebook users. However, it would benefit from a few design tweaks.



M-Audio Sonica Theater

PRICE £75 (£88 inc VAT)

SUPPLIER Tradeprice.co.uk (Web only)

VERDICT Offers 7.1 sound but that's about it. The UW500 is better for musicians, and the Extigy is the superior all-rounder.

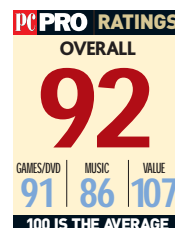
The first thing to do when you look at the Sonica Theater is ignore the hype. Despite what it says on the website, this card doesn't support Sensaura. The 7.1 outputs are purely for DVD movies, so gamers have to hope their games have 3D software emulation built in.

However, if DVD movies are your priority, the Sonica Theater could be ideal. It comes with InterVideo WinDVD 4, and its tiny dimensions mean you could carry it with your notebook and effectively have a portable 7.1-channel DVD player. What's more, the Sonica Theater is host powered, so – unlike the Extigy and UW500 – you don't have to carry a power supply with you.



The other selling point is its 24-bit/96kHz sampling support. You'd think this would make it ideal for musicians too, but unfortunately this is where both the UW500 and the Extigy take over. To start with, there are no MIDI ports, so you'll need to use up two USB ports to get both MIDI and audio features. Then there's the lack of digital connectivity. As with the Revolution, you just get a single coaxial output, rather than the optical and coaxial ins and outs found on the competition. It doesn't support ASIO either, although, to be fair, the UW500 is the only USB device that does this in a meaningful way.

The Sonica Theater provides truly mobile 7.1 surround sound, but that's about it. Meanwhile, the competition offers EAX support for games, MIDI ports and digital ins and outs, which leaves the Sonica Theater in a specialist state of limbo. Our advice is to save some extra pennies and go for the Extigy instead.



Yamaha UW500

PRICE £186 (£219 inc VAT)

SUPPLIER Sounds Live 0870 757 2360

VERDICT Ideal for the mobile recording artist. The UW500 is a well-built USB device with ASIO support and full-size jack inputs.

If you want the best, you often have to pay for it, and that's certainly the case with the Yamaha UW500. It's the most expensive external device here, but it's also the best suited to mobile music work.

It shares a few features with the Extigy, like an optical in, optical out and full-size MIDI ports, but it also offers some unique features for the mobile musician. The most

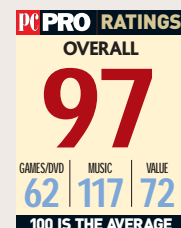


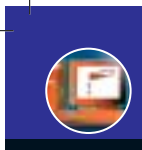
obvious have to be the two full-size jack inputs, which each have a slider switch to adjust the gain for guitar, mic or line level accordingly. They can also be linked to form a stereo line-in or even a coaxial digital input by flicking a switch at the back.

You'll find a tone generator socket on the back too, so you can hook the UW500 up to a high-quality MIDI device like Yamaha's MU128 or MU100r. Not only that, but fully functional ASIO drivers can be downloaded from www.yamahasynth.com/down, which let you record in ASIO at 32kHz, 44.1kHz and 48kHz.

It may be limited to 16-bit/48kHz sampling, but we found the noise levels satisfactory, and with 20-bit DACs for both recording and playback the sound quality is more than adequate too. XGWorks Lite 3 is also included. While limited for audio recording, it's possibly the most intuitive MIDI sequencer out there. It's also a great partner to the S-YXG50 soft synthesizer.

What's more, the UW500 is well designed, with a solid metal front. If you've got the money and want a mobile musician's recording device, this is it.





THE LABS
Sound cards

Creative Sound Blaster Audigy 2 Platinum eX

PC PRO
A LIST

PRICE £134 (£157 inc VAT)

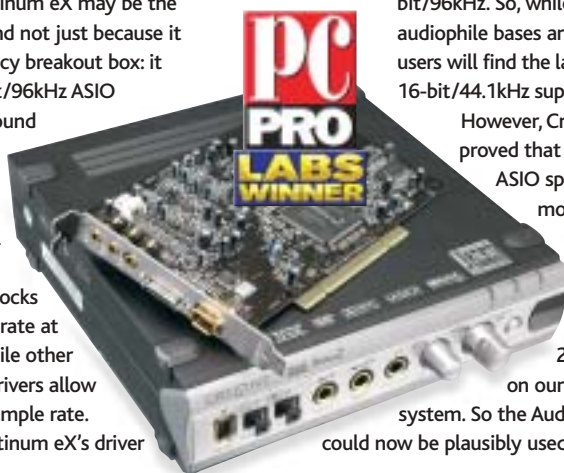
SUPPLIER Simply 0870 727 2100

VERDICT Adds 24-bit/96kHz ASIO support and a breakout box to the already impressive Audigy 2. This affordable setup has it all.

With its mainstream retail success, Creative was always going to find it hard to convince music professionals that the Sound Blaster was the way to go. But the Audigy 2 Platinum eX may be the ticket it needs, and not just because it comes with a fancy breakout box: it also brings 24-bit/96kHz ASIO support to the Sound Blaster masses.

This is where many Cubase users feel let down by the Audigy 2, which locks the ASIO sample rate at 16-bit/48kHz while other manufacturers' drivers allow practically any sample rate. However, the Platinum eX's driver

still isn't that flexible. Rather than the usual method of having everything in one control panel, you get two ASIO drivers to choose from – one at 16-bit/48kHz and one at 24-bit/96kHz. So, while the important audiophile bases are covered, many users will find the lack of CD-quality 16-bit/44.1kHz support frustrating. However, Creative has now proved that the 24-bit/96kHz ASIO specifications are more than token figures for publicity, and we found a latency setup of around 20ms worked fine on our Cubase test system. So the Audigy 2 Platinum eX could now be plausibly used in a home studio



setup, particularly with the breakout box.

Two full-size jack inputs are provided on the front of the breakout box for plugging in instruments or microphones, and there are further left and right phono inputs on the back for hi-fi equipment. Then there's the inclusion of both optical and coaxial digital ins and outs, and two full-size MIDI ports.

The breakout box also offers a second FireWire port on the front for easy access to external peripherals, while a FireWire network connection could be run from the one at the back. However, the box doesn't look as good close up. It's plastic, chunky, worryingly light and space seems to have been wasted, particularly as it's taller than the Extigy, which has all its own hardware on-board.

The size is still an improvement over the original Audigy Platinum eX, though, as it now spans the width of a standard PC case rather than looking lost on top. The black and grey colour scheme will also look great with the latest black and aluminum cases.

Despite the plastic finish, the gaming and DVD features, great software bundle, remote control and feature-packed breakout box make the Audigy 2 Platinum eX the ultimate sound setup.

PC PRO RATINGS		
OVERALL		
118		
GAMES/DVD	MUSIC	VALUE
131	142	93
100 IS THE AVERAGE		

M-Audio Delta 66

PRICE £183 (£215 inc VAT)

SUPPLIER Digital Village (Web only)

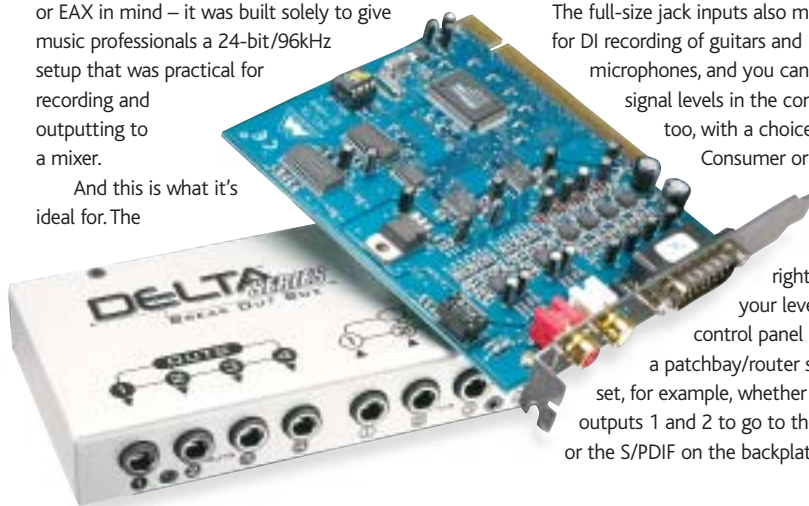
VERDICT Only for the musically inclined, the Delta 66 offers great sound quality but extremely limited connectivity.

Although it costs £183 and comes with a breakout box, the Delta 66 is still very much from the minimalist school of thinking. The smart silver box has a total of eight mono jack sockets on it – four in and four out, it's that simple. But the Delta 66 wasn't built with consumer gimmicks like surround sound or EAX in mind – it was built solely to give music professionals a 24-bit/96kHz setup that was practical for recording and outputting to a mixer.

And this is what it's ideal for. The

sound quality was the best of all the sound cards on test, and the level meters in Sound Forge 5 couldn't even be seen when monitoring a blank signal. It also supports ASIO at 24-bit/96kHz with a buffer anywhere between 128 and 2,688 samples, although we found the default of 384 fine on our Cubase test system.

The full-size jack inputs also make life easy for DI recording of guitars and microphones, and you can set variable signal levels in the control panel too, with a choice of +4dBu, Consumer or -10dBv to make sure you get the right boost to your levels. The control panel even sports a patchbay/router so you could set, for example, whether you want outputs 1 and 2 to go to the wave outs or the S/PDIF on the backplate. However,



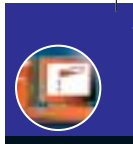
the patchbay is no match for the simple drag-and-drop line-drawing patchbay found in the ST Audio DSP24 MEDIA 7.1's control panel.

But the main problem faced by the Delta 66 is its limited connectivity. If you plan on using a hardware mixer, the M-Audio only really functions as a four-track (six at most), while the TerraTec EWS88MT offers eight ins and outs. However, for an extra £157, you can opt for the Delta 66 Omni Studio, which includes the Integrated Desktop Audio Station. This provides professional connectivity like XLR sockets, plus an auxiliary for effects and extra inputs for MIDI devices.

In fact, the Omni upgrade is available to users of any card in the Delta series, and if you're a musician you're likely to find one of the cards suits your needs. The market for the Delta 66, however, is somewhat debatable. You only get a coaxial S/PDIF in and out, there are no optical connectors, and there's no MIDI support either.

All of which makes the Delta 66 a very specialist card, and you expect a lot more for your £183 when other setups like the ST Audio DSP24 MEDIA 7.1 offer so much more for minimal extra cost. The box is well built, and the sound quality is great, but it needs to offer more in what's becoming an increasingly competitive marketplace.

PC PRO RATINGS		
OVERALL		
94		
GAMES/DVD	MUSIC	VALUE
62	112	73
100 IS THE AVERAGE		



ST Audio DSP24 MEDIA 7.1

PRICE £196 (£230 inc VAT)

SUPPLIER Et Cetera 0870 873 8731

VERDICT A fully featured and great-sounding setup for musicians, with the added bonus of DVD surround sound.

While M-Audio and TerraTec have seemingly given up on the whole MIDI synthesizer idea, ST Audio has bucked the trend by not only providing two full-size MIDI ports but also offering two hardware General MIDI synthesizers with the DSP24 MEDIA 7.1. They even sound decent, and we didn't notice any odd quirks like the skipping and jumping you get from so many soft synths. Of course, they're no match for the superb voices found on the Yamaha SW1000XG, but they're a useful addition to what's also an uncompromising pro-audio card.

Using the same ENVY24 HT chipset proudly flaunted by M-Audio and TerraTec, the MEDIA 7.1 also offers full 24-bit/96kHz sampling, and it can do it in ASIO too. There are several ASIO options in the control panel, from 256 to 2,048 samples per second, and it gives you the latency time in milliseconds for 22.05kHz, 44.1kHz and 96kHz sampling rates.

However, the most impressive aspect of the control panel is the patch bay, which is a perfect example of simplicity in action. You have a graphic of the ports on either side of the box and a list of outputs; you then just drag and drop lines to where you want things routed.

This is extremely useful when you've got eight outputs at your disposal. These can be set up as a two-in, eight-out multitrack recording system through a mixer, or



used for surround sound. ST Audio fully acknowledges this by providing the choice of both gold-plated phonos and mini-jacks for each output, as well as bundling InterVideo WinDVD 3. Unfortunately, this version doesn't support Dolby Digital EX, but it still means you can enjoy DVD movies in 5.1 surround sound.

The only feature notably absent is 3D gaming – with no Sensaura support, the MEDIA 7.1 can't fully compete with its consumer rivals. But if gaming isn't top priority, you'll find the MEDIA 7.1 has pretty much everything else you need, particularly for music enthusiasts.

Like the TerraTec DMX 6fire, the MEDIA 7.1 also comes with a phono input with an RIAA filter for recording from vinyl, as well as both optical and coaxial digital ins and outs. There's also a full-size jack mic input on the front, with the option for +48V power, and the noise levels – while not as low as the M-Audio Delta 66 – averaged -72.2dB in Sound Forge with the line-in at the same level.

All of this is perfectly complemented by the inclusion of Emagic's Logic SoundTrack24 software. If music is your forte, buy this card as it offers a great-sounding and fully featured setup with the added bonus of DVD surround sound.

PC PRO RATINGS		
OVERALL		
109		
GAMES/DVD	MUSIC	VALUE
78	144	71
100 IS THE AVERAGE		

TerraTec DMX 6fire 24/96

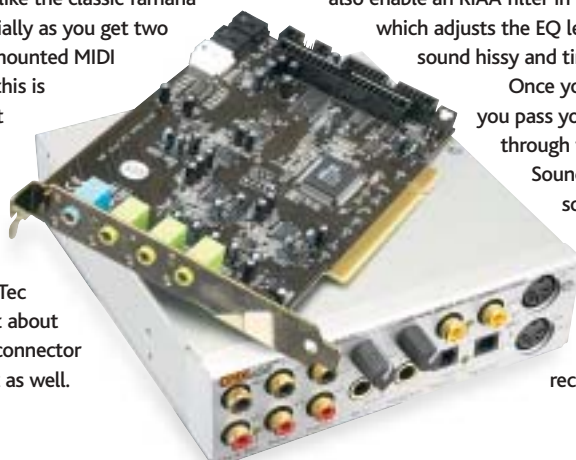
PRICE £138 (£162 inc VAT)

SUPPLIER Watford Electronics 0870 220 0700

VERDICT Providing you only want 5.1 surround sound, this is a superb setup with excellent features to cater for everybody.

Unlike the cheap-looking plastic breakout box that comes with the Audigy 2 Platinum eX, Terratec's DMX 6fire 24/96 sports a well-built metal box that slots into a 5.25in drive bay. The tasteful silver finish will look great in an aluminium case, and you can even find a wavetable connector inside after removing three screws.

This is great news if you own a wavetable daughterboard like the classic Yamaha DB50XG, especially as you get two full-size front-mounted MIDI ports too. And this is an achievement in itself considering the limited space on offer, but somehow TerraTec squeezes in just about every possible connector you could want as well.



Both coaxial and optical digital ins and outs can be found, as well as phono line-ins and outs, and there's even a second phono input with a pre-amp for hooking up to a record player. If you have an ageing vinyl collection that you want to get onto your MP3 player or even put on CD, you'll find this incredibly useful. Not only does the 6fire boost the input to the right level, but you can also enable an RIAA filter in the control panel, which adjusts the EQ levels so it doesn't sound hissy and tinny.

Once you've done that, you pass your WAV file through the provided Sound Laundry software, which cleans up most of the clicks and pops and, hey presto, you've got your record in digital

format (admittedly, this takes about 100 times longer than ripping a CD).

Musicians will also appreciate full 24-bit/96kHz ASIO support for high-quality, low-latency recording. There are even settings in the control panel for mixing ASIO surround sound over the six outputs, so perhaps your own DVD Audio recordings could be just around the corner.

While on the subject of surround sound, the DMX 6fire was even faster than the Audigy 2 on our Unreal Tournament 2003 EAX test, coming out at 44.5fps. As with the TerraTec Aureon Space 7.1, you enable Sensaura through the control panel, although this also annoyingly locks your master clock (and hence your ASIO sampling rate) at 44.1kHz, so only enable it if you want to play games.

The only disappointment is the limit of 5.1 surround sound for DVD movies, especially when so many cards are supporting the next-generation Dolby Digital EX standard. Plus, the Audigy 2 Platinum eX has the added bonuses of full-size jacks and FireWire ports. But 5.1 surround sound is still a respectable standard with the right speaker setup, and for everyone else the DMX 6fire is a high-quality and well-featured choice.

PC PRO RATINGS		
OVERALL		
103		
GAMES/DVD	MUSIC	VALUE
99	130	92
100 IS THE AVERAGE		