

Sound advice



Whether it's grunts and groans from the latest gory game or the sophisticated strains of a full orchestra, the quality of a computer's sound comes down to its sound card. Here, we select ten cards that will add realistic cacophony or symphony to your PC

The original PC was designed as a business machine and the ability to reproduce good-quality sound was deemed unnecessary. There has always been a small speaker inside the PC's case, but if you expect this to produce anything other than a pitiful beep, you'll be very disappointed.

Multimedia PCs can produce good-quality sound. And, fortunately, any PC can be easily expanded by plugging in bits of extra hardware – commonly known as 'expansion cards'. All it takes to get a PC to produce sound is a 'sound card' – a sound synthesiser on an expansion card.

Because it's a synthesiser, a sound card can produce almost any sound, which makes it ideal for games. On a more serious level, they can also be used to make digital recordings and most can be used with Midi instruments for composing music. This month, we've looked at ten sound cards, ranging from models at the cheaper end of the market to more sophisticated, and hence more expensive, cards.



Aztech Sound Galaxy Waverider Pro 32 – 3D

Paying just over £80 for the Waverider Pro doesn't buy you Plug and Play, but installation is extremely straightforward using the 'Add new hardware' option in the Windows 95 Control Panel. No MS-Dos drivers are installed as part of this process – they have to be installed separately using another setup program.

The Waverider Pro's wavetable samples are not the best we've heard. The piano, for example, is on the plinkety-plonk side and, while it's ideal for playing the accompaniment to some 1920s' footage of a woman being tied to a railway track by a moustached villain in a top hat, it sounds rather odd when given Debussy's 'Clair de Lune'. The other samples are decidedly mixed, but most lack timbre and sound a bit flat and artificial.

We had some problems with the card's Soundblaster compatibility. The game 'Heretic' was fine but we couldn't get any sound effects with Duke Nukem 3D, only music. This may have been rectifiable with some tweaking of the game's sound options, but since the card was using its default settings, this shouldn't have been necessary.

For the money, the Waverider Pro is good value, but if you want to make serious music then it's far from ideal.

- £80.08 (including VAT)
- Aztech: 01734 814121

Sound Galaxy Waverider Pro

Ease of installation	1	2	3	4	5
Sound quality	1	2	3	4	5
Value for money	1	2	3	4	5

Creative Labs Soundblaster 16 Value Plug and Play

For most people, if it's not Soundblaster, then it's not worth having. There's some truth in this – after all, if any sound card is going to be 100 percent Soundblaster-compatible it's going to be a Soundblaster. The Soundblaster 16 is the only non-wavetable card in the group test, but it looks a little expensive when compared to the likes of the Reveal and Pine wavetable cards.

Installation is a breeze with Windows 95 – the Plug and Play card is detected during start-up and both Windows and MS-Dos drivers are loaded by the setup program. Its lack of wavetable synthesis makes the Soundblaster 16 unsuitable for Midi playback, but its Midi interface can still be used with a sequencer for Midi recording. It's perfect for games, though – both Duke Nukem 3D and Heretic worked perfectly first time.

If you want guaranteed sound with every game, then it's worth shelling out for the Soundblaster 16. It may lack wavetable synthesis, but it won't give you compatibility headaches.

- £92.83 (including VAT)
- Creative Labs: 01245 265265

Soundblaster 16 Value PnP

Ease of installation	1	2	3	4	5
Sound quality	1	2	3	4	5
Value for money	1	2	3	4	5

Creative Labs AWE 32 Plug and Play

The AWE 32 has all the functionality of its younger brother, but has the added bonus of wavetable synthesis. It's not cheap, though – at £195 plus VAT, it's one of the most expensive sound cards you can buy. Its setup routine installs both Windows and MS-Dos drivers but some PCs may have trouble accommodating the full-length AWE 32 card – check that yours can before you buy it.

The AWE 32's sample quality is excellent, which certainly helps justify its price. The piano is rich and natural and sounds just as good with quiet classical pieces as raucous rock tunes. The other samples are just as good – all are realistic with a natural timbre. The AWE 32 is one of the few cards to have Simm slots for memory expansion. Adding up to 28Mb of extra Ram allows you to download samples from disk and make your own.

Unsurprisingly, the AWE 32 worked perfectly with our test games. What's more, Duke Nukem 3D supports the AWE 32 directly and the sound has to be heard to be believed.

It may have been around for a while, but the AWE 32 is one of the best general-purpose wavetable sound cards money can buy.

- £229.13 (including VAT)
- Creative Labs: 01245 265265

Creative Labs AWE 32 PnP

Ease of installation	1	2	3	4	5
Sound quality	1	2	3	4	5
Value for money	1	2	3	4	5



Miro Mirosound PCM12

Another colourful card (this time blue), the Miro Mirosound PCM12 has no Plug and Play, but instead an installation routine that requires you to install each component separately from the driver disk, which is a little tiresome.

For some reason, the PCM12's samples were lacking in volume – it's almost as though, during recording, the musicians were told: 'shh...don't pluck/blow/hit it too hard'. The piano sound was okay, if a little weak, and the same could be said of the rest of the samples – they lacked the 'bite' that other cards had. The PCM12 was also the only card in the test to be limited to 24-note polyphony; the rest were capable of 32. In most cases, this won't matter too much, but it may be an issue if you want to compose your own music.

There were no compatibility problems with our games but

again, although the sound effects were fine, the music was very quiet.

The Miro Mirosound PCM12 didn't give us any problems, but it is fairly unremarkable, and although there are worse cards for the money, there are also better ones.

- £169 (including VAT)
- Miro: 01494 510250

Miro Mirosound PCM12

Ease of installation	1	2	3	4	5
Sound quality	1	2	3	4	5
Value for money	1	2	3	4	5

Orchid Nusound Plug and Play

Although the Orchid Nusound did live up to its Plug and Play moniker, its installation wasn't all plain sailing. Windows 95 detected its presence and prompted for the appropriate disks, but it kept on detecting hardware after each reboot. It got there in the end, though.

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Gravis Ultrasound Plug and Play

A mid-priced wavetable card, the Gravis Ultrasound stands out from the crowd by being red, rather than the usual green. Unfortunately, our test PC seemed to take exception to this and refused to boot with the card installed. Gravis's technical support thought that there may have been a conflict with the Bios of each and indeed, in a different machine, the card was detected and installed without a murmur. Sadly, this did mean that we couldn't test it with our games.

Sample quality of the Gravis Ultrasound was generally good. The piano came across as being a little timid, but it sounded realistic enough. Other samples were fine but when compared to say the AWE 32 or Tropez Plus, they

seemed to be lacking in vibrancy.

The Gravis Ultrasound is a reasonable sound card, both in terms of price and performance, and the only criticism we can make is that it didn't seem to agree with our test PC.

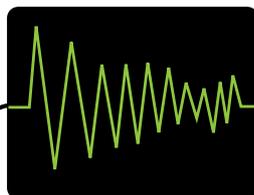
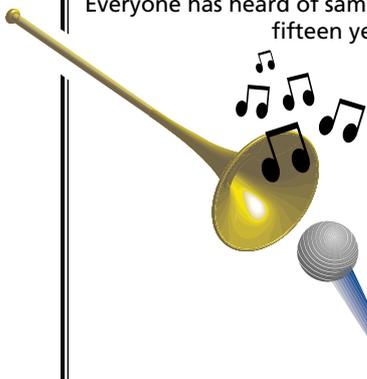
- £189 (including VAT)
- Koch Media: 01420 541880

Gravis Ultrasound PnP

Ease of installation	1	2	3	4	5
Sound quality	1	2	3	4	5
Value for money	1	2	3	4	5

Sampling

Everyone has heard of sampling, and if you've listened to the radio at all over the last fifteen years, you will have heard it in action too.



A 'sample' is a computerised recording of a sound, which can be anything from someone shouting 'Hey Lucille!' to the sound of a banjo being strummed. Basically, if you can hear it, you can sample it. Then, once a sample has been made, it can be edited, played back at any pitch and, of course, used in musical compositions.

Sound generation

A sound card can produce a sound in one of two ways. All are capable of synthesising sounds using FM (Frequency Modulation) synthesis. Although this can reproduce almost any sound, it is less successful at complex ones. So, while FM synthesis is perfect for the gunshots and engine roars of many games, it struggles with most musical instruments.

Wavetable synthesis, on the other hand, is excellent at reproducing the sound of musical instruments. Wavetable sound cards use samples of real instruments, rather than synthesising them. Thus, instead of trying to recreate the rich timbre of a violin from scratch, the sampled sound of a real violin can be used.

Wavetable synthesis really comes into its own with Midi files. Playing a Midi composition on a sound card using FM synthesis is akin to playing a vinyl LP on a gramophone – it works, but you wouldn't want to listen to it. With a wavetable sound card that has good samples, however, some Midi files are indistinguishable from real recordings.

Nusound impressed us. Its piano rendition of 'Claire de Lune' was perhaps a little more sensitive than that of the AWE 32, but the difference between the two is more down to the taste of the listener than anything scientific. The other samples are just as impressive – clean and clear with a realistic edge.

Our test games gave us no problems: both Duke Nukem 3D and Heretic worked first time using standard Soundblaster 16 emulation. **It's cheaper than the AWE 32 and, to some ears, it has better samples. Installation is not as foolproof though and there's no Ram expansion capability.**

- £151.58 (including VAT)
- Orchid: 01256 479898

Orchid Nusound PnP

Ease of installation	1	2	3	4	5
Sound quality	1	2	3	4	5
Value for money	1	2	3	4	5

Pine PT201 Maestro Bach with wavetable daughterboard

As well as being cheap, the Pine Bach is also small – half-length and half-height. The optional wavetable daughterboard is even smaller – just two inches square. This plugs onto the sound card in half a second and takes it from mere FM synthesis into the world of wavetable sound.

Well, technically it's wavetable, though in reality the wavetable synthesis is pretty uninspiring. It's certainly better than no wavetable at all, but the piano, for example, is more Fischer Price than Steinway. The other samples were just as



lightweight and the only Midi file we could get it to do justice to was the theme to the Charlie Brown cartoon and that's only because Schroeder played it on a toy piano in the first place.

Actually, that's a little harsh as you'd have to be crazy to expect astounding samples for under twenty-five quid. On the plus side, it worked perfectly with our test games, and although other cards gave better sound with Duke Nukem 3D, none did it quite so cheaply.

If you're hoping to emulate Kraftwerk for just £51.98 including VAT, then you're going to be disappointed with the Pine system. If, on the other hand, you want a cheap wavetable sound card and don't have unrealistic expectations, then it might be for you.

- £26.99 (including VAT)
- Wavetable daughterboard: £24.99
- Pine: 01908 610689

Pine PT201 Maestro Bach

Ease of installation	1	2	3	4	5
Sound quality	1	2	3	4	5
Value for money	1	2	3	4	5

Reveal Wave Xtreme 32

Although the Wave Xtreme fulfilled its promise of being Plug and Play and installed all of the Windows 95 drivers in one fell swoop, it failed to load any for MS-Dos.

It did, however, create two Windows .PIF files to configure MS-Dos sessions started within Windows 95, but this may not be to the taste of everyone.

The samples of the Wave Xtreme were pleasant enough, and although well below that of the AWE 32, they nevertheless performed well with our Midi test files. They were, however, extremely quiet, even with the volume set to maximum on our amplified speakers.

Although Heretic's sound and music was fine, Duke Nukem 3D performed badly with the Wave Xtreme. The effects were okay, but the music playback had bits missing. This may have been a fault of the drivers or the card's setup and could perhaps have been fixed with some fiddling but, again, this shouldn't be necessary.

What is Midi?

Midi is an acronym for Musical Instrument Digital Interface. It's a standard that allows musical instruments to communicate electronically. A Midi instrument cannot produce any sound by itself – it's merely a controller, like a mouse or joystick and so it has to be connected to a computer.

Usually, the electrical signals sent by a Midi instrument to a computer's Midi interface are turned into notes by a program called a 'sequencer' that can display played notes on the screen in much the same way as a word processor displays letters typed on a Qwerty keyboard. A sequencer can also be used to edit the notes and even rearrange them into a different order.

A Midi instrument can be used to play any sound. If you have the right software

and samples, you can set your Midi keyboard to play anything

from a glockenspiel to a Tibetan nose flute each time you press a key. If you fancy hearing a rendition of 'Eine Kleine Nachtmusik' on a banjo, no problem.

Finally, Midi controllers aren't just limited to keyboards. Midi controllers are available as flutes, saxophones, drums and guitars, to name but a few. If you don't play an instrument then don't worry – voice-to-Midi converters are also available, which means that you can record yourself whistling 'Whole Lotta Love' and then play it back using a sample of Jimmy Page's electric guitar.



Sound cards compared

Model	Card length	Plug and play	FM synthesis	Wavetable synthesis	Voice polyphony	Maximum sampling	3D sound	Compatibility		
								Sound-blaster	Ad-Lib	General Midi
Aztech Sound Galaxy Waverider Pro	1/2	○	●	●	32	48kHz	●	●	●	●
Creative Labs Soundblaster 16	2/3	●	●	○	20	44.1kHz	●	●	●	●
Creative Labs AWE 32	Full	●	●	●	32	44.1kHz	●	●	●	●
Gravis Ultrasound Plug & Play	2/3	●	●	●	32	48kHz	○	●	●	●
Mirosound PCM12	2/3	●	●	●	24	48kHz	○	●	●	●
Orchid Nusound PNP	2/3	●	●	●	32	48kHz	●	●	●	●
Pine Maestro	1/2	○	●	○	32	44.1kHz	○	●	●	●
Reveal Wave Xtreme 32	1/2	●	●	●	32	44.1kHz	○	●	●	●
Spea Media XTC	2/3	●	●	●	32	44.1kHz	○	●	●	●
Turtle Beach Tropez Plus	Full	●	●	●	32	48kHz	○	●	●	●

● = Yes ○ = No

The Wave Xtreme isn't expensive, but it's a capable performer when it comes to Midi. Our only concern is its Soundblaster compatibility.

- £79 (including VAT)
- Reveal: 0181 845 7400

Reveal Wave Xtreme 32

Ease of installation	1	2	3	4	5
Sound quality	1	2	3	4	5
Value for money	1	2	3	4	5



Spea Media XTC

The Spea Media XTC is yet another Plug and Play sound card that installs everything perfectly for Windows 95, yet leaves you to figure out why there's no sound under MS-Dos until you install separate drivers using a different set-up program.

IDE	Interfaces					Price
	Sony	Mitsumi	Panasonic	Daughter-board	Simm slots	
●	○	○	○	○	0	£80.08
●	○	○	○	●	0	£92.83
●	○	○	●	●	2	£229.13
●	○	○	○	○	2	£189.00
●	○	○	○	○	0	£169.00
●	○	○	●	●	0	£151.58
○	○	○	○	●	0	£26.99
●	○	○	○	○	0	£79.00
○	○	○	○	○	0	£91.18
●	○	○	○	●	3	£269.00

The Ensoniq samples used by the Media XTC are generally of high quality. Unfortunately, its Midi performance was badly let down by its continued insistence on playing the wrong notes, or the right notes at the wrong time. Our Midi keyboard was also 'out of tune', which led us to the conclusion that the fault had to lie with the driver rather than the card itself.

There were more problems with the games: both played sound effects perfectly, but the music of each was broken up, which is something else that can be attributed to the drivers.

This has great samples at an excellent price, and it is only its apparent driver problem which prevents us from recommending it more strongly.

- £91.18 (including VAT)
- Diamond Multimedia: 01844 261886

Spea Media XTC

Ease of installation	1	2	3	4	5
Sound quality	1	2	3	4	5
Value for money	1	2	3	4	5



Turtle Beach Tropez Plus

The Tropez Plus is the most expensive card in this group test, so we were expecting big things from it. Installation was certainly smooth enough, with Windows 95 detecting the card's presence and prompting for the appropriate disks.

When it came to the samples, we were extremely impressed. The piano had a rich sound with a natural timbre and the same could be said of almost all the other samples. Our other Midi test files sounded just as good and even the instruments in some of the more complex pieces were clear and well-resolved.

Game performance was equally faultless, with both Duke Nukem 3D and Heretic producing both effects and music clearly.

If you can afford it, the topnotch sample quality of the Tropez Plus makes it a highly desirable sound card for anyone who takes their music seriously.

- £269 (including VAT)
- Et Cetera: 01706 228039

Turtle Beach Tropez Plus

Ease of installation	1	2	3	4	5
Sound quality	1	2	3	4	5
Value for money	1	2	3	4	5

Judging sound cards is obviously a highly subjective business, but of the ten we've listened to, three stand out from the crowd.

The difference in sample quality between the three is marginal, but the difference in price is more marked. So, no 'Recommended's' this month, but instead our sound card top three.

At number 3 is the Turtle Beach Tropez Plus. It has the best samples of the bunch but, at almost £270, you're certainly paying for them. A sound card for those who are serious about their sound.

At number two is the Creative Labs AWE 32. Great samples and the added bonus of guaranteed Soundblaster compatibility. Unfortunately, this too comes at a price.

In the number one slot then is the Orchid Nusound Plug and Play. Sample quality is virtually indistinguishable from the AWE 32, and yet it's over £70 cheaper. If you want a great general-purpose sound card for both games and music, then this is the one to go for.

Software

All hardware is useless without the software to utilise it, and sound cards are no exception. If playing games is your sole requirement, then the appropriate MS-Dos drivers are all you need. All sound cards, however, are capable of much more, and almost all come bundled with software to make the most of their capabilities.

Wave editor Plug a microphone in to your sound card and you can make your own samples. Such recordings will give you .WAV files which can be edited to your heart's content. Reverse a recording, mix two together or chop one into pieces – it can all be done with no loss of quality.

Sequencer/Midi player Most sound cards, wavetable or not, come with a program that can manipulate and play Midi files. The simplest allow compositions to be recorded but not edited, and instrument assignments to be changed. Some sound cards have more versatile sequencer programs that feature full note editors, and some will even take your keyboard tinklings and present you with a full musical score.

CD player CD-Rom drives can play audio as well as program CDs and most CD player programs give you a control panel much like that found on a normal CD player. Some even provide a 'hi-fi stack' that integrates Midi playback, .WAV file recording and level control.

