



Music maestro

If you fancy yourself as the next big musical phenomenon and have more dignity than to join the wide-eyed throng of ITV's *Popstars*, you could always use your PC to record and mix a demo CD showcasing your talent. Having been stung by the cost of studio hire, Spencer Dalziel gets musically converted

Recording music professionally is expensive. Studio hire begins at around £1,000 per day and that's just the start. On top of that you have to lay out for expensive mixing and recording equipment all of which has to be professionally tweaked by a studio engineer. Even if the band members managed to play faultlessly and the engineers worked 12 hours a day, it would still take an entire day to lay down a single track. And no record company is going to pay attention to a band with a one-track demo CD.

The band I play in found itself in this very situation last year. We had a collection of songs that we wanted to record professionally. We'd saved all our collective pennies from countless pub gigs but still we could only afford to record one track in the studio.

Digital dilemma

But if we had gone the digital route, with just £1,000 we could have produced as much professional sounding material as we wanted. We could even have formatted it to MP3, ready for online

distribution. Using a PC we already owned and by adding appropriate software we could have purchased everything that we needed to produce and distribute our own music and we would still have had money left to burn – burn our songs on to a couple of hundred of CD-Rs, that is.

Over the following pages I'll take you through my own musical learning process, explaining exactly how I went about creating my own demo tracks. The results (I hope) speak for themselves. Load up this issue's cover CD to hear the final tracks from both studio and PC.

Whether you're an absolute beginner or an established maestro, there is music-creation software and hardware available to suit your budget as well as your abilities

Bring me a higher logue

The PC has been making itself useful to musicians ever since multitrack sequencers became available for DOS and Windows in 1983. However it only really became central with the advent of digital music.

Playing instruments using analogue sources is still a vital part of recording, but digital music operates on a level above analogue. The original form of digital music, Midi (musical instrument digital interface), was developed to allow sequencers to talk to synthesisers. The real advantage of Midi is that it allows the user to produce countless different sounds from one keyboard.

The functions of this Midi keyboard can actually come in several forms: software in sound card or sequencer packages; a relatively costly hardware keyboard that has its own bank of Midi files; or a controller keyboard from a manufacturer such as Evolution.

Controllers don't generate their own sounds but use the Midi files held in sequencer or sound card software and only work when hooked up to a PC. The best-selling Evolution keyboard is the MK-249, a great starter board.

MP3 is the magic number

These days digital music has a wider definition thanks to the arrival of MP3 (Mpeg audio stream, layer III). The compression techniques of MP3 means it's easy to manipulate digital sounds on your PC and takes up relatively little storage space when your songs are converted from the raw audio of WAV (waveform audio) files to highly compressed MP3. Because of this, MP3 is now the format of choice for online music, making the web an ideal way of showing off unsigned talent.

Whether you're an absolute beginner or an established maestro, there is music-creation software and hardware

available to suit your budget as well as your abilities. What you will need, though, is a reasonably well specified PC. Making music on a PC is about as intensive a task as you can ask it to handle. There's a direct relation to the amount of memory in your system and the number of audio channels you can run.

For example, recording on eight tracks has your PC making a positively bewildering number of mathematical calculations, so RAM is at a premium. Storage space is a must as well: your eight-track tunes will take up about 80MB of hard drive space per minute.

Consequently, professional sequencer packages, such as Steinberg's Cubase SX, Emagic's Logic Audio Platinum 5.0 and Cakewalk's Sonar 2.0, typically have recommended system requirements of a 1GHz Athlon/Pentium III and 512MB RAM. But don't despair. There are cut-down consumer products that aren't as demanding. We would recommend a minimum 500MHz processor with 256MB of RAM.

Obviously a good sound card is indispensable. Not only does it provide you with the necessary DACs (digital-to-analogue converters) so you can process analogue sounds in a digital environment, but it also comes with all the inputs for plugging in microphones, headphones, Midi keyboards and electric guitars.

What have you done for me latency?

One of the main factors in choosing a sound card is latency. This is the time taken between activating a signal and hearing it played back to you. The higher the latency the longer it will take for you to hear a sound after you've pressed a key. And as with comedy, the essence of good music is timing.

The fact of the matter is cheap cards have high latency. Preferably choose a card with a dedicated Asio (audio stream

input/output) driver as this will reduce latency and produce high-definition audio. If you can't afford a card with Asio support make sure your card has full duplex capabilities so you can record and play back at the same time. And make sure the card has a sample rate of 48Hz and a 16bit resolution for CD-quality audio.

If you look at the box or spec, you'll also see reference to dynamic range or signal-to-noise ratio measured in decibels (dB). This refers to the total usable range of audio levels, from the background noise of electronic circuitry to the point just before distortion. The greater the signal-to-noise ratio the better and typically a good sound card will provide between 85dB and 100dB.

From the cards I've had the chance to play with I recommend Terratec's DMX 6Fire or Creative's Audigy 2. Both cost around £150, which is expensive if you're used to paying £25 for PC sound, but they also come with everything you'll need, including a breakout box that slots into a 5.25in bay on the front of a PC and contains all the necessary inputs.

Professional musicians will go for something like the Delta Audiophile 2469 because it's developed by M-Audio – a trusted brand for muso bores.

Spinning around

It's essential to get a fast and capacious hard drive to store your music. If you want your songs saved as CD-quality audio (that is WAV not MP3 format) you'll need plenty of space for them. I produced a three-minute track using the Cubasis VST 3.0 sequencer and saved the track as a WAV file. The sound quality was great but it took up 30MB of memory.

Given the demanding nature of recording it's sensible to buy a hard drive with a 7,200rpm spin rate so the PC can access data quickly during real-time editing. In an ideal world you'll get two 40GB hard drives running at 10,000rpm

set up in a Raid 0 (redundant array of inexpensive drives) disk-striping configuration for raw speed.

I made do with a 20GB hard drive spinning at 5,400rpm, but suffered because of it. Note, too, that you'll need to defrag your hard drive before you start to make sure it's at its best.

Once a track has been recorded using sequencer software it normally gets saved as a WAV file but if you want anyone else to hear your talent you'll have to burn it on to a CD. A CD-RW drive is commonplace on all new PCs or can be added for under £100. Use CD-R discs because these can be played on conventional stereos.

The results of recording acoustic instruments such as a classical guitar or vocals can vary enormously. The wrong microphone will mangle the acoustic nuances of a classic guitar. I used a Shure PG81 mic, a unidirectional microphone with a flat frequency response manufactured specifically to pick up the natural sound of acoustic instruments. For vocals I used the PG58 mic, influenced by the industry standard SM58. If you want to be a singer and you haven't got one of these, don't give up the day job.

Headphones are essential for recording if you're using a microphone to pick up an external source. If you're playing audio and recording at the same time without headphones, the microphone will pick up the sound of the music from the speakers.

(Cake)walk of life

The three big developers of high-end sequencer (home recording studio) software are Steinberg, Emagic and Cakewalk. Apple acquired Emagic in September 2002 and instantly killed PC support for its Logic sequencer, so unless you fancy flying without a safety net, the Logic is for Mac users only.

There are other many other sequencers available, such as eJay and Music Studio, but the big three offer beginner and intermediate versions of the high-end packages, so I'd suggest sticking with one of these.

Steinberg's and Emagic's professional packages retail for around £500 and Cakewalk's costs about £200. These will bring you more features than you can shake a Fender at and will take a long time to get to grips with, even

if you have a background in audio recording. If you've only ever recorded an instrument on to a four track before there's no point in spending this much.

A novice would probably find themselves better off with Steinberg's Cubasis VST 3.0 or Cakewalk's Home Studio 2002. Cakewalk was originally written for Windows whereas Steinberg ported Cubase from the Mac version, but both are fully PC- and Mac-compatible.

Don't Cakewalk Home Studio 2002's £79 price tag fool you into thinking this is a simple cut-down edition for beginners. It packs a lot of functionality and the helpful manual offers an excellent guide to setting up your system and getting the most out of recording.

The number of Midi and audio tracks you can record with Home Studio depends on your hardware. However, I was



Speakers

There's little point in getting a good sound card if you only have two tinny desktop stereo speakers and good speakers are amazingly cheap these days. A good sound card provides you with 5.1 channel speaker support for full surround sound and a thumping sub-woofer, so shop around for speakers that'll do the job for you.

If the budget's tight it's still possible to pick up 5.1 speakers for an amazing £50. Some of the best budget speakers I've seen are Videologic's ZXR 500 (www.videologic.co.uk) with a good 25W of power so they're able to handle fairly loud sounds without quality degradation. If you're happy to drop down to 4.1 speakers then Cyber Acoustic's CA-4400 (www.cyberacoustic.com) come with 30W power output for a mere £33 ex VAT. At the other end of the scale are Creative's MegaWorks 510D (www.creative.com) or Videologic's Sirroco Pro – beautiful sound reproduction but possibly overkill for the average user. I'm using Creative's budget Inspire 5300 which do the job magnificently for under £100.



I've produced a tune that
errs on the side of cheese
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impressed to see it currently comes with a trial version of Pyro for converting your tracks to MP3 and, like Cubasis, is a lot easier on your system requirements than professional sequencers.

Cubasis VST 3.0 still requires a healthy amount of computer literacy before you can commence recording but a bit of patience will pay dividends. It's a powerful tool for £50 and gives you 48 audio and 64 Midi tracks to play with on. You can save your songs as WAV or convert them to MP3 and there's a bonus disc with 600MB of useful samples.

The thing that most impressed me about Cubasis is the level of online support there is for the product. Tutorials guide you through the process from start to finish and there's the addition of a web utility that allows for live collaboration so your music can be shared with others or you can download other people's work.

Hey, Mr Bojingles

So, I've produced a tune that errs on the side of cheese and won't be winning any awards anytime soon (see *Work in progress* on page 120). My friend suggested that I might yet make a career as a writer of jingles for quiz shows but I want to invest my time distributing my song online. There are several avenues open to me and I'll look at three different online services for musicians searching for the best ways to get their music out there.

Some sites offer services to host your music and contact details but it's all too easy to find your information sidelined and your songs in virtually inaccessible areas. The Audio Construction Kit is a great place to start if you want to get your music and accompanying information online in a neatly assembled package. The site allows you to put the song and contact information into a single EXE file. When a user double-clicks the EXE file it opens a mini music player and displays your information while playing your tune.

The user can sit back and listen while perusing your cover art, track information, web details or contact info. There's also a space to type in feedback and a Send button so the information can be forwarded to your email.

What I particularly liked was the WAV support. This means you don't have to opt for the highly compressed MP3, which is the standard format for online tunes. As I mentioned earlier, WAV takes up about 10MB a minute, so although you get top-quality digital audio, only broadband users will have the bandwidth to hear it. What the Audio Construction Kit does is compress the WAV files into the 2MB player so narrowband users can download it quickly.

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Work in progress

My goal was to produce a track using a mixture of audio and Midi on my home system. My PC has a 1GHz Athlon processor with 640MB of SDRAM, a 5,400rpm 20GB hard drive and a Plextor PlexWriter 16/10/40 CD-RW drive. For sound I used an Audigy 2 with a breakout box, Creative's budget Inspire 5300 speakers and Philips headphones. Shure microphones, three guitars and a JX-305 Roland Midi keyboard (which provides vital additional Midi features and hooks up with the Audigy's breakout box), and Steinberg's Cubase SX sequencer software completed my home recording studio.

There's more than £1,000-worth of extras here, but budget-conscious buyers could make professional music on a PC for less than £300. Look no further than Daniel Bedingfield's recent number one *Gotta Get Thru This*, produced in his bedroom using £40 of software called Making Waves 3.0.

Before you can begin the recording process, check that each piece of hardware is working properly and then open a combination of audio and Midi tracks. Next, ensure each component is set up to work with the rest of the kit. For instance, it's important that you have the correct input and output selected so the Midi keyboard can play its internal bank of sounds through the sequencer. I also had to choose which of the 16 Midi channels to use because overlapping data on the same channel causes a headache later when recording other sounds.

Using standard sounds

It makes sense to lay down the drum track first. For this I stuck to the Midi. Initially, I considered using the Wave editor in Cubase to sample a drum loop from an MP3 on my hard drive; in the end I opted for the internal keyboard sounds and General

Midi instead. This is a standard set of 128 Midi hardware sounds, known as patches, that range from percussion to special effects and are the same across all Midi devices. So, for example, patch 41 on a General Midi synthesiser is always a violin, while 115 is a steel drum.

The five General Midi drum sounds used came with my sound card and provide the backbone of the song. The bass drum came from the keyboard. For drum sounds I selected Midi channel 10 because this channel is reserved for percussion sounds.

There are myriad recording options but I used a four-beat loop so I didn't have to play the drums for the duration of the song. To do this, paste the file repeatedly into the song and simply delete it from any point at which it's not required. The rhythmic accuracy can be corrected using a feature called Quantize if your drumming performance isn't up to scratch.

Smoothing things out with software

Next, I laid down a General Midi acoustic bass track. I used a pitch wheel on the JX-305 keyboard to bend the third from last note of the bass riff. I was pleased Cubase picked up this information because I tried using the keyboard to transpose the notes of the bass for the key change but it only worked using the transpose option within Cubase.

For the melody I used a hard Fender rhodes electric piano sound from the keyboard and played it at different octaves over two tracks. It's easier to record the basic track you want and then add extras when you're mixing down. There's an infinite number of undos in Cubase SX so you have the assurance that you can always go back if you accidentally lose something or need to make changes.



Halfway through the tune I overlaid two classical guitars playing the same melody then launched straight into a guitar solo while bringing in a quick electric guitar riff. Real bongos and a tambourine gave a more natural feel

At the end of the track I added a sweeping General Midi organ sound for atmospherics. Laying down the audio tracks proved more difficult than I'd expected because of latency problems which messed up the timing. The latency-countering features in the Cubase SX software I was using (plus a bit of manual tweaking) cured this, so if it's a problem you encounter, don't panic.

Some classical guitar and a straightforward riff with my electric guitar were the final track additions and gave the tune a live feel. Halfway through the tune I overlaid two classical guitars playing the same melody then launched straight into a guitar solo while bringing in a quick electric guitar riff. Real bongos and a tambourine gave the mechanical sound of the Midi percussion a more natural feel.

Mixing the music

At this stage I had to get to grips with Cubase's editing tools. As with any piece of software, if you're not entirely au fait with the package and its shortcut keys, using it is a laborious process. But I'd made my editing job easier because nearly all the sound files were in bite-sized chunks so I simply had to break up the song into a beginning, middle and end. I also found a useful guide to the powerful Cubase software, called *Fast Guide to Cubase VST, third edition*, which was invaluable when first struggling to get to grips with it.

With the song laid out in Cubase I then had to get the Midi and audio information on to one track. Cubase SX provides a multitude of file format options for mixing down audio, such as bit-rate settings, sampling frequency, WAV or MP3. You can't save Midi tracks in the audio mix-down, because Midi is not actually audio, it's soundless data that triggers the synthesiser

sounds. There are many ways to get around this, from downloading a Midi to WAV converter (try www.midi2wav.com) to creating a new audio track in the sequencer software and putting the Midi out to the audio in.

Getting it taped

I chose a different method. Professional studios rarely convert any Midi because they mix down to DAT (digital audio tape). I haven't got a DAT player but I did borrow a Mini Disc player. Mini Discs record digitally and come with an optical-out fibre-optic cable. I plugged the cable into the Mini Disc and the other end into the optical-in port on the Audigy's breakout box. I then played the song in Cubase SX, recording to the Mini Disc to create a perfect copy.

With the tune on the Mini Disc I then sent it back to Cubase and recorded it as one big WAV file. I connected a normal stereo audio cable from the Mini Disc to the line-in on the Audigy breakout box and set up a stereo audio track on Cubase to record the Mini Disc version.

With the Midi and audio now saved as a single WAV file in Cubase, I went to the audio mix-down settings and saved a version as a high-quality MP3 at 128bit, the same sampling rate as CD-quality audio.

Right on song

Phew. The result is a five-minute song that takes up 4.53MB and has pretty good production quality. It took me five days to complete the tune. If I went to a recording studio that would have cost me £5,000 and I'd have to spend that again for each track. My setup cost less than £1,000 and I'm now free to make as much music as suits my needs.

There's no distribution service for users here, just a music library so registered users can put their work on the site.

Rat trap

Those concerned about software piracy will welcome the services of SoundWrap (www.soundwrap.com). The site aims to protect songs from web piracy and ensure payments get made directly to the artist. If I put my song online I want people to hear my music but maybe I don't want anyone to access all my songs for free. I mean, how else am I to make my millions?

Wraptech has developed the SoundWrap technology and backed it up with an online and offline distribution service. It's in their interest to organise

distribution because every time the songs get played you get a royalty and SoundWrap takes a cut. Obviously to do this you need to register and set up an online account with the service, but the result could generate revenue.

The SoundWrap program can be downloaded free of charge from the website. Once downloaded all you have to do is wrap your songs with the technology so the music is embedded with full encryption and anti-piracy control in its listen-before-you-buy format.

Electric avenues

Thousands of teenage bedroom musicians emerged from their gloom clutching hard drives full of their own angst-ridden songs

when MP3.com recently announced a localised service for UK users. The site (www.uk.mp3.com) hosts over 1.3 million tracks from more than 200,000 artists, including unsigned bands. While there aren't any avenues here for getting people to buy your music, uk.mp3.com is one of the best online sources for unheard talent and it encompasses a massive user base.

If you were unlucky enough to miss out on a WAV-to-MP3 converter in your sequencer you might find one lurking in your sound card software. If again you failed to locate one there then a quick online search will reveal sites such as www.allformp3.com, where you can download freeware, shareware or free trial offers for file format converters. ■

Contacts

Software

STEINBERG
0800 169 1341
www.steinberg.net
Cubasis: £49.50
Cubase SX: £451

SOUNDTECH
01462 480 000
www.soundtech.com
Emagic Logic Audio Platinum: £552

CAKEWALK
0870 873 8731
www.cakewalk.com
Cakewalk Home Studio: £68
Cakewalk Sonar 2 XL: £280

Online/reference resources

AUDIO CONSTRUCTION KIT
www.audioconstructionkit.com

SOUNDWRAP
0800 917 2110
www.soundwrap.com

ENGLISH MP3.COM
www.uk.mp3.com

REFERENCE
www.musicsales.co.uk
Fast Guide to Cubase VST, third edition



Hardware

EVOLUTION
01525 372 621
www.evolution.co.uk
Evolution Midi Keyboard-MK-249: £102

HW INTERNATIONAL FOR MICROPHONES
0208 808 222
www.hwinternational.co.uk
Shure PG81: £102.13
Shure PG58: £42.13

VIDEOLOGIC
01923 277 488
www.videologic.co.uk
ZXR 500 speakers: £66

CREATIVE LABS SPEAKERS
0800 376 954
www.creative.com
Inspire 5300: £77

CREATIVE LABS SOUND CARDS
0800 376 954
www.europe.creative.com
Audigy 2: TBA

