Seriously sound

Serious sampling requires the best performance from your sound card. Steven Helstrip looks at how to achieve this with assistance from some upgrades, and to help your understanding of MIDI, explains Control Change messages.

Most sound cards perform a reasonable job when it comes to sampling, but more often than not there is a noticeable loss in sound quality. This usually occurs in the analogue-to-digital (ADC) process, where the audio signal is converted to digital information. To obtain the best results you should sample at the highest resolution and sampling rate available from your card: 44.1kHz 16-bit is the accepted standard. It is also important to use high-quality, shielded cables when connecting an external audio source to your card.

Nevertheless, even with the best cable money can buy, there will still be some distortion: this is because the ADC on a sound board is subject to interference from several computer components including the main processor, other expansion cards, and more notably, the power supply. To better your card's performance you can place it in the slot furthest from the power supply and away from others, particularly the graphics card.

If you do a lot of sampling from CDs it is worth investing in CD-Grab, a utility that copies the raw binary information from audio CDs onto your hard disk. It works better with SCSI CD-ROM drives but can be calibrated for other drives. AL Digital has just released a Windows version (costing around £99) that is also capable of grabbing CDi and MPEG files.

Since there's no analogue stage, there's no degradation of audio quality. Well, not until it's played back through your card's digital-to-audio converter (DAC). Some cards have better DACs

QED's Digit can significantly improve the audio performance of the AWE-32
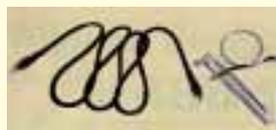
than others. The best I've seen and heard are those available from Turtle Beach (Tropez and Monterey) and MediaVision's Pro 3-D which have a respectable signal-to-noise ratio in excess of 85dB.

If you have Creative Labs' AWE-32 card, it is possible to add an external DAC because the card has a digital output in the form of an SP/DIF (Sony/Philips Digital Interface) connector. Using an external DAC dramatically improves the audio quality as the processing is carried out away from the computer, hence there is no interference from your PC and there are benefits from a stable power supply. Having searched for the best value DAC, I would recommend the QED Digit (from Turnkey) which you can buy for under £100.

The Digit uses a bitstream DAC, with 256 times oversampling, and modestly filters ultra-high frequencies (-0.6dB at 20kHz,) helping to reduce noise even further. It comes with good, gold-plated interconnects and power supply, and substantially improves the AWE-32's performance.

Connecting it to the card requires a basic cable which can be made up with a "jumpered" cable with a female phono plug on the other end. It is advisable to mount the phono socket on a blanking plate as this will reduce the risk of damaging the cable and the jumpers on the card. Creative Labs has made up this cable (with a blanking plate) to save you the hassle of getting the parts, and charges £15 including postage and packing.

What's new

Creative Labs was showing the new AWE-32 at a recent Windows 95 seminar. As you would expect it's plug and play, quite literally, but more interestingly it comprises some new software and hardware developments. The main control panel has been re-worked and has an on-screen piano to enable you to audition banks of sounds without launching a sequencer application. It will also allow you to replace preset instruments with new sound banks (SBKs). For example, if you have a piano patch that you use regularly, it can be accessed by selecting program change number 1 without sending any additional bank change message. With the plug and play version it will be possible to install several cards to provide separate audio outputs and make use of any 1Mb SIMMs you may have lurking in your cupboard.

On the subject of RAM, I have finally found out why you can only access 28Mb of RAM even when you have 32Mb installed. It's because the hardware can only address 32Mb of data and the last four have been reserved for future WaveTable upgrades.

It has been rumoured that a new version of Vienna is on its way, but Creative Labs is reluctant to shed any light on new features. Although the current version is easy to use, it's lacking in features and simple tasks can be time consuming. With any luck, the developers will have taken a close look at Akai operating systems.

Since having mentioned that Creative Labs would supply Vienna free of charge to those who bought the card before its release, I have had several angry letters

because Creative has stopped being so nice and is charging £12 for the software… Sorry.

To fix the problems in version 1, Turtle Beach has announced version 1.1 of Quad Studio. There are a number of enhancements too, including more responsive meters with peak hold, better synchronising and the ability to replace or append existing mix sessions. A new Windows driver acts as a virtual MIDI port, making it possible to route MIDI Time Code from your sequencing application for synchronising the two. Other digital multi-track systems — SAW, for example — require an exclusive physical MIDI port to do this. Quad Studio is sensibly priced at £199. For existing users, the upgrade costs £9 and is available from Et Cetera Distribution.

After eight or so years of supplying FM and WaveTable chipsets to sound card manufacturers, Yamaha has decided to launch its own card, the SW20-PC. This is the first in the range and is an entry-level product based on the OPL4. It has a programmable DSP allowing several effects to be applied to audio in real time. The SW20-PC costs £149 from Yamaha.

CD-Grab copies raw binary information from audio CDs, onto your hard disk

Understanding MIDI

What are Control Change messages? What do they do and how do you use them? Having covered the basic principles of MIDI, we can now take a close look at CCs, or controllers (as control change messages are sometimes known).

CC messages are MIDI messages used to change the parameters, or settings, on a MIDI device. The most common controller is modulation: when you move the modulation wheel, or lever, on a synthesiser it sends a Control Change message (Control Change number 1) with a value between 0 and 127. Because modu-

MIDI control change numbers

0	Bank Select		72	Release Time
1	Modulation Wheel		73	Attack Time
2	Breath Controller		74	Brightness
3	Undefined		75	Sound Controller 6
4	Foot Controller		76	Sound Controller 7
5	Portamento Time		77	Sound Controller 8
6	Data Entry MSB (most significant bit)		78	Sound Controller 9
7	Volume		79	Sound Controller 10
8	Balance (between two sources)		80-84	General Purpose
9	Undefined		85-90	Undefined
10	Pan		91	Effects Depth 1 (External Effects)
11	Expression		92	Effects Depth 2 (Tremelo Depth)
12	Effect 1		93	Effects Depth 3 (Chorus Depth)
13	Effect 2		94	Effects Depth 4 (Celeste Detune)
14	Undefined		95	Effects Depth 5 (Phaser Depth)
15	Undefined		96	Data Increment
16	General Purpose 1		97	Data Decrement
17	General Purpose 2		98	Non Registered LSB
18	General Purpose 3		99	Non Registered MSB
19	General Purpose 4		100	Registered Parameter LSB
20-31	Undefined		101	Registered Parameter MSB
32-63	LSB for controllers 0-31 (least significant bit)		102-119	Undefined
64	Damper Pedal		120	All Sound off
65	Portamento on/off		121	Reset All Controllers
66	Sostenuto		122	Local Control on
67	Soft Pedal		123	All Notes Off
68	Legato Switch		124	Omni Mode off
69	Hold 2		125	Omni Mode On
70	Sound Variation		126	Mono Mode On
71	Harmonic Intensity		127	Poly Mode On

D-Zone WorkStation Volume One

D-Zone currently offers nine dance-orientated sampling CDs for under a tenner. And despite having only a fraction of the samples when compared with Time + Space compilations (average price, about £60), they offer excellent value. WorkStation Volume One is one of the better CDs and contains 24 drum loops, or breakbeats, and one-shot samples from the Roland JD-800 and Proteus World synths.

The breakbeats vary in style from slow soul grooves to jungle beats and just about everything in between. The breakbeats are diverse in style, have been well produced, and last for around 90 seconds.

But there is no variation — just the same loop, over and over and over again. This is fine for mixing between records on the dance floor, but for sampling? Do we really need this much?

Samples from the JD-800 seem to be wasted since they have only been recorded at middle C. This works fine when sampling string pads, which the JD-800 does so well, but the piano and clav-type sounds need to be multi-sampled in order to sound any good. There are 75 samples from the JD: all the presets (and a few more besides), including organ, bass and synth patches. Proteus World samples are equally presented; all at middle C and not level matched.

For ten quid though, there are a lot of usable samples to be found on this CD. We have decided to put one of them on next month's cover CD, so I have chosen what I think is one of the better drum loops. You'll also find it as a sample bank for the AWE-32. It will load into the standard 512kb sample RAM.

lation was the first controller to be implemented, almost every MIDI device responds to modulation by applying vibrato to the sound being played. Vibrato will be applied until the modulation wheel is returned to its original position, sending a value of 0.

There are two types of Control Change messages (128 of them in total). The first of these, modulation, is a Continuous Controller since it has 128 values, or steps. The second type of controller is a Controller Switch which sends either an "On" message or an "Off" message. When you use a sustain pedal, for instance, a controller switch message is sent (CC number 64).

Not all synthesisers recognise every control change message, especially some older models, but most should respond to MIDI volume, pan, breath controller and effect controllers if the synth has on-board digital effects. Effects parameters include reverb depth, level and chorus depth, to name but a few. (See the table "MIDI Control Change Numbers", page 323.) All MIDI devices have a MIDI implementation chart (usually towards the end of the user manual) and list what CCs are supported.

It isn't just synthesisers that respond to CCs, most MIDI devices can utilise them in some way too; notably, effects units and other outboard gear. Of the 128 CCs a handful are undefined, leaving them free for you to experiment. From the control panel of your synthesiser or other equipment, you should be able to assign a control change number to a parameter which will allow you to edit or adjust the synth's setting from within a sequencer, etc.

Next month we'll look at how to do this, and set up mixer maps in Cubase to control external devices.

PCW Contacts

If you have written any utilities or can offer hints and tips related to MIDI, send them in to the usual *PCW* address, or to **steve_helstrip@pcw.ccmail.compuserve.com**

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