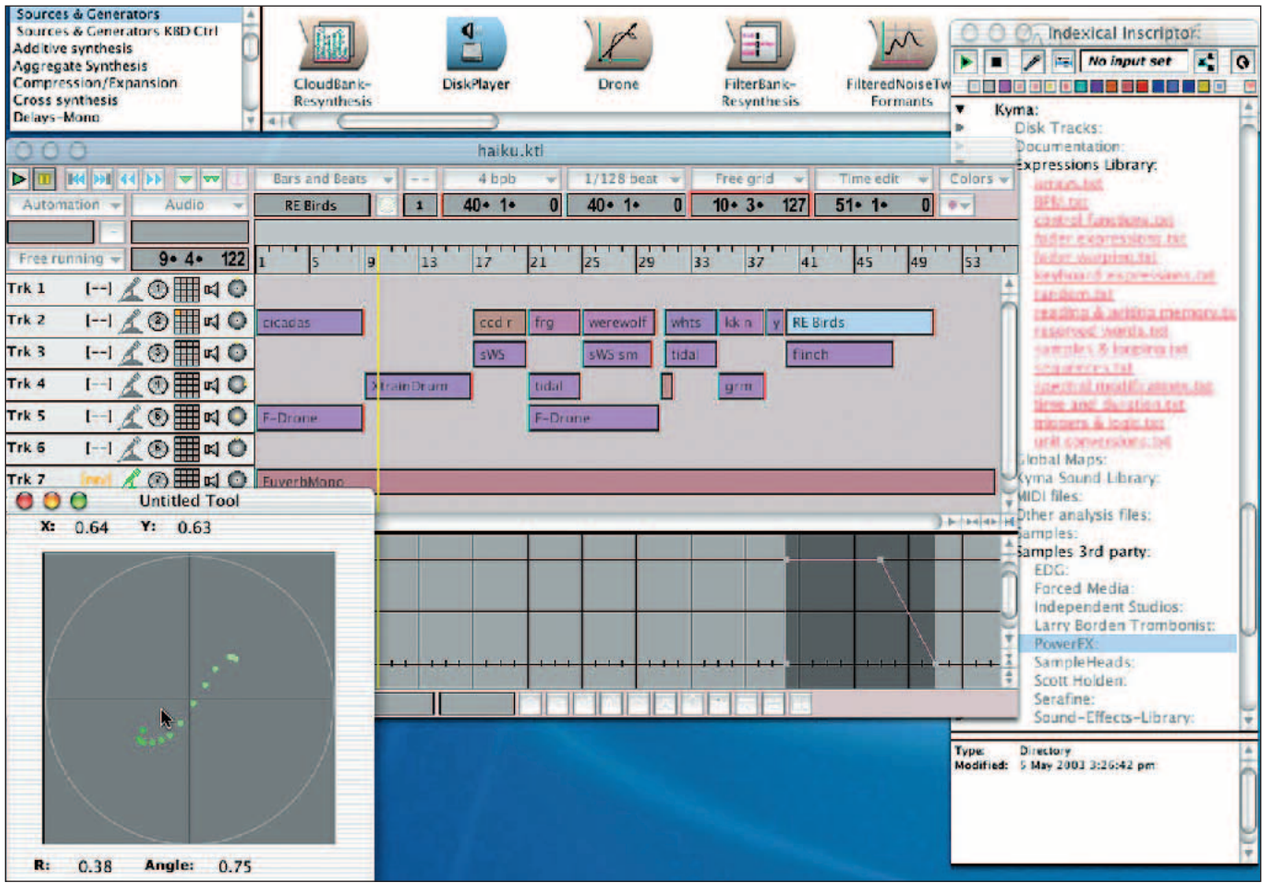


Perfect synthesis: Symbolic Sound's Kyma

SSC KYMA

A SYNTHESIZER THAT LINKS SOFTWARE AND HARDWARE COULD BE CONSIDERED THE HOLY GRAIL OF SOUND DESIGN, SAYS SCOT SOLIDA...

TRACKS 05-06

$3570

INFO

Symbolic Sound Kyma
Cross-platform software with support for Mac OS 9.1, OSX (10.2 or newer), Windows ME, Windows 2000, and XP.

System Requirements:
Mac or PC, one free FireWire or IEEE-1394 connection, 128Mb RAM, 600Mb hard disk space.

Capybara 320 Sound Computation Engine:
3U high rack-mountable unit with FireWire break-out box. 432 x 419 x 140mm

continued opposite

THOUGH THE VAST majority of synthesizer enthusiasts has never heard of Symbolic Sound's Kyma, mention its name to the enlightened few, and it is sure to elicit wistful musings and/or lustful praise, depending on your company. Its arcane magic has graced dozens of box office smashes and scads of pop music sensations, so chances are whether you know it or not you've probably heard someone's Kyma handywork. But what exactly is Kyma?

Aside from being the Greek word for wave, Kyma is a sort of sound design construction kit. Yes, it's a synthesizer, or rather it can be, if that is what you need. But it can also be a sampler, an effects processor, a resynthesizer, a loop-mangler or just about anything else you can imagine. As a matter of fact, it's almost easier to describe what Kyma can't do than what it can.

Kyma is not a DAW. Well, not really. It can perform multi-track hard disk recording and playback and can sequence both MIDI and audio data as well as its own internal synthesis algorithms. Hmmm, all the things a DAW can do, actually.

Kyma is not a plug-in. It can't be opened up inside a host sequencer, but will run happily alongside, just as if it were any other hardware MIDI or audio device (though you won't be able to use its disk-streaming functions simultaneously with those of your DAW).

What it is...

If the truth be known, Kyma is simply a 'black box' stuffed with DSP that can be just about anything you want it to be. Consisting of the Kyma X software for building and controlling audio and MIDI devices, and the Capybara hardware unit to supply the DSP power, Kyma gives your imagination free reign. No matter how wild your audio dreams are, Kyma can probably make them a reality. And no, that isn't mere hyperbole. Want to control the speed of your hard disk's audio playback with the pitch of your voice? Kyma can do it. Want to strip every third harmonic from a recording of a string quartet in real time? No problem, Kyma has it covered. Heck, those are just a couple of examples of the presets and only hint at the power beneath that matt black hood.

Of course, such power comes at a price. Kyma carries a healthy price tag that reflects the fact that its main audience is probably the 'professional' user. With the basic system coming in at over $3,000 and additional DSP cards clocking in at around $600 a pop, Kyma

Driving force: the Capybara 320

isn't exactly a good candidate for an impulse buy. However, after spending some time with it you come to realize that it represents a bargain of sorts in that it can save you an awful lot of money, simply because it makes so many other purchases unnecessary.

I can't count how many new hardware and software 'innovations' have been released recently that might seem like old hat to a Kyma user. For instance, there has been a slew of software additive resynthesizers coming out in recent months, yet Kyma has been doing such things for ages, and, I should point out, does it with far more sophistication and accuracy. If anything, instead of being compelled to spend money on the latest and greatest software and hardware doo-dahs, a Kyma user might see such products as an inspiration to build (and improve upon) the same sort of thing in Kyma itself.

The future has arrived!

So it was with much excitement that I took delivery of the Kyma system. As a professional sound designer my work depends on the ability to come up with unique sounds that are hard to come by elsewhere, and Kyma promises to deliver just that.

The system arrived, packed very nicely in compartmentalized Styrofoam, complete with all of the necessary cables and adapters. The Capybara unit is an imposing 3U rack-mountable black box, with only a screen-printed logo and a single blue LED to give any indication as to its purpose. The rear of

A wide assortment of inputs and outputs

the unit sports a wide assortment of inputs and outputs, including four each XLR audio ins and outs, two sets of stereo AES/EBU digital I/O, and MIDI In, Out and Thru. If your system is more comfortable with S/PDIF connections, Symbolic Sound graciously provide you with a set of adapter cables.

The Capybara's power is provided by an internal power supply, though the accompanying FireWire interface requires the use of an external transformer. Included in the box are various adapters for international power supplies, in case you wish to take your Kyma on the road. Also in the box is the FireWire interface, a weighty metal box about the size of a paperback book that connects to the Capybara via a very sturdy cable. Naturally enough the FireWire cable is also included.

The Capybara supports 24-bit recording and sample rates up to 100kHz. The sound quality throughout is astonishingly good, and I quite often find myself wishing that there were ASIO drivers for the Capybara so I could use it as my soundcard and my D-A converters!

The only other physical products are the Kyma X software disc and the manual, and what a manual it is! Coming in at around 400 pages it's the size of a coffee table tome with a proper glossy cover and everything. And it's when flipping through this hefty volume that it becomes quite clear how deep the Kyma X system actually is.

The manual includes lots of tutorials and is written in a friendly conversational tone that helps temper some of the more esoteric subjects and exercises. Even so, it can get pretty heady at times and often betrays its academic nature with an assumed knowledge on the part of the reader – and that point can't be taken lightly.

Kyma is not aimed at the casual synthesist or producer. It presumes a certain amount of background and education with regard to the nature of sound. This isn't a device that will be tamed by trial and error. If you have a background in coding, that's even

⁘ "Kyma gives your imagination free reign. No matter how wild your audio dreams are, Kyma can probably make them a reality. And no, that isn't mere hyperbole." ⁘

INFO (cont.)

Weight
6.8kg

Basic configuration
Four processors installed on the motherboard
96Mb sample RAM
12 expansion slots
I/O and external sync (see below)
External desktop or rack-mount case (protects the DSPs and converters from the electrically noisy environment inside your personal computer, and leaves valuable slot-space free to use for other cards on your host computer)
Expansion Card
Two processors installed on the expansion card
48Mb sample RAM (per card)
Up to 12 expansion cards (for a total of 28 processors) can be added

Inputs and Outputs
4-8 channels
32-100kHz sample rate
24-bit
Balanced analogue and digital (AES/EBU, adapter provided for S/PDIF)

At 48kHz:
A-D SNR: 110dB, dynamic range: 110dB
D-A SNR: 105dB, dynamic range: 107dB

At 100kHz:
A-D-A SNR: 104dB, dynamic range: 104dB

Output Level:
+14.5 dBu

Input Clipping Level:
+14 dBu
Crosstalk - 110 dB

External Synchronization
Word Clock input
House Sync input
VITC & LTC Timecode input and output

Interface options
FireWire for Macintosh OS X and OS 9, Windows XP, 2000 and ME desktop and laptop machines

Contact
SSC: +1 217 355 6273

Website
www.symbolicsound.com

YOU'VE HEARD IT ALL BEFORE

Because of its somewhat exclusive nature, your local record store isn't exactly crawling with obvious examples of Kyma in action. Kyma has never been the flavour of the week, like some of the more heavily publicised instruments of the modern age. Yet, whether you realise it or not, you have undoubtedly heard Kyma. For instance, the last time you visited the cinema, did you pay attention to the score beneath the dramatic 'THX' audio logo before the film? That was performed on a Kyma. Science-fiction fans will be pleased to know that the voice of the Borg in *Star Trek: First Contact* was processed via the Kyma, as were many of the sound effects in the most recent Star Wars instalments.

The movies aren't the only places one can hear Kyma, as a handful of popular musicians make use of its magic, too. Among the most vocal would be the ubiquitous BT, whose own music and productions are liberally doused in Kyma-based effects. And while his former Led Zep buddies were out reaping the benefits of their back catalogue, John Paul Jones was blazing his way into the future via the Kyma-laced *Zooma* and *Thunderthief* discs. Kyma also makes appearances on releases from Juno Reactor and Autechre, to name but a few.

KATHARINE LANE-SIMS

You can hear Kyma on some of Autechre's latest releases

better, as the manual contains some lengthy sections on using the Smalltalk and Capytalk languages to create your own modules (called 'prototypes' in the Kyma vernacular).

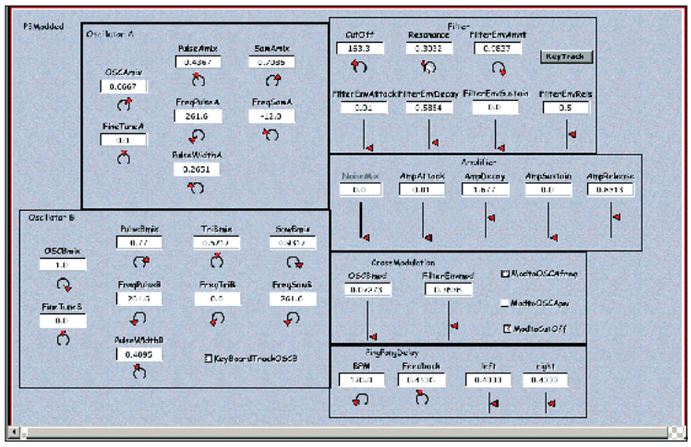
The soft centre

The real power of the system lies in the Kyma X software. Developed in one form or another since the 80s, Kyma is the brainchild of electronic music pioneers Carla Scaletti and Kurt Hebel.

Kyma's long lineage shows in the fact that it seems very, well, mature. You can see from the start that much time and effort has been put into refining and perfecting the product. It has a distinguished feel to it that is often lacking in the fast-paced, live or die world of commercial music software. Things work smoothly and intuitively (or as intuitively as they can in software this

TRACKS 05-06

A handful of preset Kyma Sounds, showcasing a wide variety of Kyma functions, including virtual analogue synthesis, morphing, random loop reconstruction, aggregate synthesis, additive resynthesis of a drum loop and more.



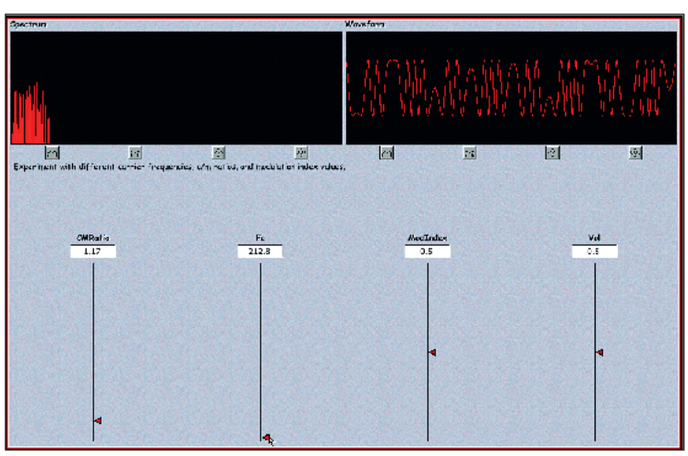
Build waves with true FM synthesis

powerful), and the program is rife with thoughtful design features that could only come from years of user input.

Installation of Kyma X is a breeze. I used it on both a Windows XP Pro and Windows XP home system (the former a laptop, the latter a DAW. The laptop was chosen for its portability – Kyma makes a fine live tool with no latency at all, once a Sound is loaded in. Installation consists of copying a folder onto your hard drive, installing the FireWire drivers and that's it. It all went off without a hitch. I did experience some slow redraws at first on the laptop, but a quick e-mail to Symbolic Sound got it ironed out in no time.

Connection

Once the program is running, Kyma takes a minute to establish its link with the Capybara unit, but then you're ready to go. The screen is fairly busy, and you may find that the more screen real estate you have at your disposal the better. If ever a program begged for the Apple Cinema-style screen, it's this one. I felt a bit cramped with the laptop monitor, but my DAW's dual 19-inch screens really made the difference.



Sometimes it could be prettier…

Initially you're met with the Sounds browser, a Prototype browser, an empty VCS (Virtual Control Surface) and a sample Timeline. You can arrange the screen any way you like and Kyma remembers which browsers and suchlike you preferred to have opened. If you're dealing with a limited number of DSP cards the 'DSP Status' window can keep you informed of your DSP usage as well as hardware I/O activity.

There are a couple of immediately noticeable things about the Kyma X interface – first, its academic heritage is apparent in the graphic design, or rather in its seeming lack of concern for the elements of design that users of flashy software synthesizers take for granted. You aren't going to get any stylish photo-realistic bit-for-bit recreations of hardware devices in Kyma. Though its icons are eye-catching in their pastel-hued finery, the Virtual Control Surfaces that contain all the knobs and sliders for your creations are utilitarian, to say the least.

That isn't what Kyma is about, and those users who need the familiar com-

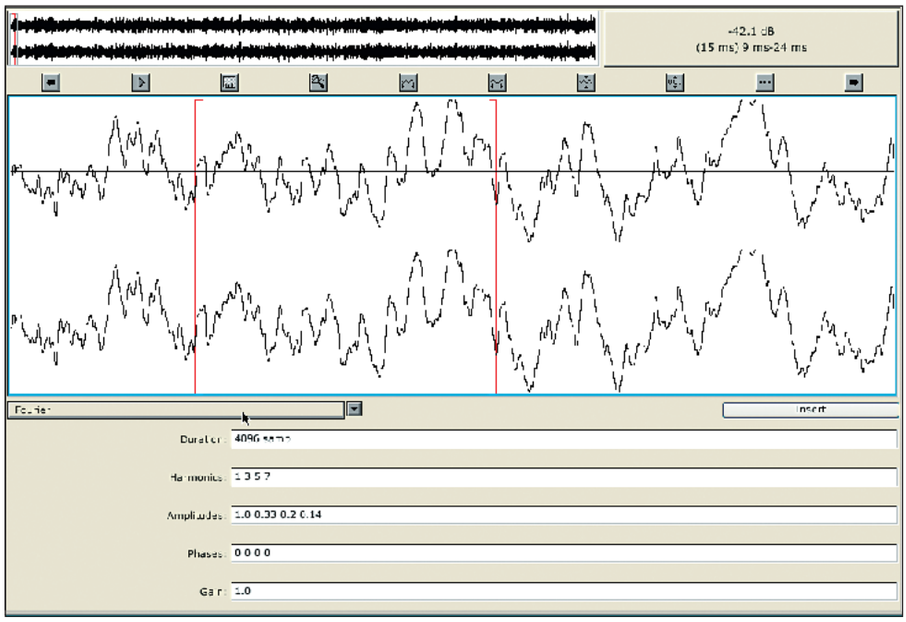
KYMA COMMUNITY

As any user of Native Instruments' mighty Reaktor software will tell you, an active online community can make or break a complicated piece of software. Part of that product's success can be attributed to the fact that there is a vast community of users who are willing to share their work, as well as advise others in the fine art of synthesis. Symbolic Sound recognizes this fact, and created the 'Kyma-Tweaky' site for that very reason.

Kyma-Tweaky is a nifty interactive website where Kyma users can swap Sounds, information and experiences with other Kyma-ites. Users are encouraged to use the site to create a personal profile, a webpage and more. Unlike many online forums, Tweaky members can actively edit and add to any of the posts made to the site. This fosters a fairly sophisticated and mature attitude, and one that is refreshingly free of flame-wars and platform evangelism. There are dozens of Kyma Sounds available for download at the site and each one has a dedicated discussion thread attached to it.

In addition to the Tweaky site, there's also the 'normal' Kyma forums, where users can pose questions to each other as well as the Symbolic Sound head honchos. When posting inquiries there the responses from Symbolic Sound are polite and informative.

The 'Kyma Tweaky' website



View and modify samples with the built-in wave editor

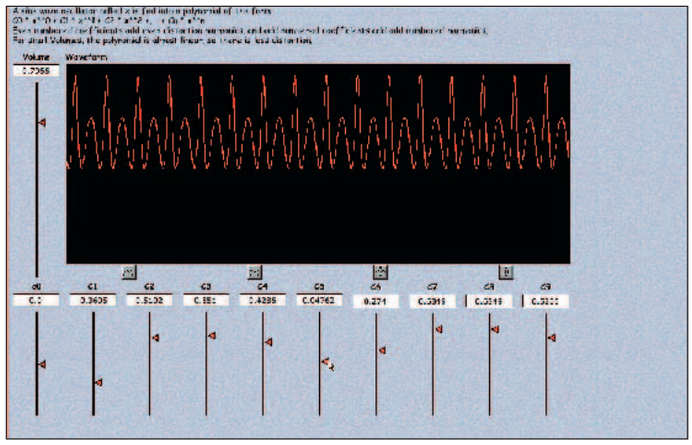
forts of their favourite retro compressor plug-in, complete with glowing valve graphics are likely to be less than enthralled with the way the Kyma widgets appear on screen.

Also, there are many ways in which Kyma X wants you to interact that are a little hard to get used to, but I suspect these might be due to the fact that I was running the Windows version, and Kyma began its life on the Mac. For instance, double clicking on a folder full of Sounds in the Sound browser doesn't open the folder in the browser itself, but in a separate window. Turns out you only have to click once, and on the triangle icon next to the folder you wish to open. It's been months, and I still haven't got used to that one!

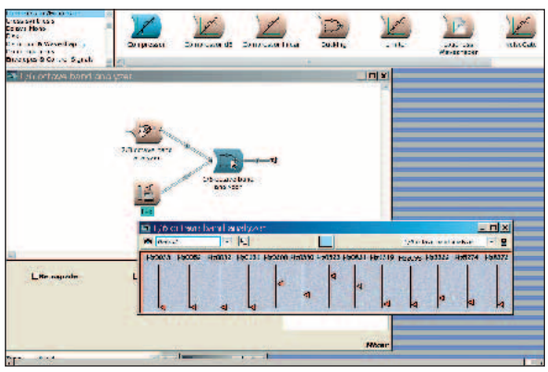
Those minor quibbles aside, the user interface in Kyma is a delight. Everything that might be dragged and dropped can be dragged and dropped, and there are numerous and complete mouse-over tips throughout to keep you enlightened on your quests. Opening and modifying any of the 1,000-plus preset Sounds is simplicity itself and the results are nearly instantaneous. You do have to wait a second or two for the Capybara to reconfigure itself if you make any drastic changes deep in the lowest levels of the Sounds, but that is certainly understandable, considering what has to be going on under this particular hood.

What's that sound?

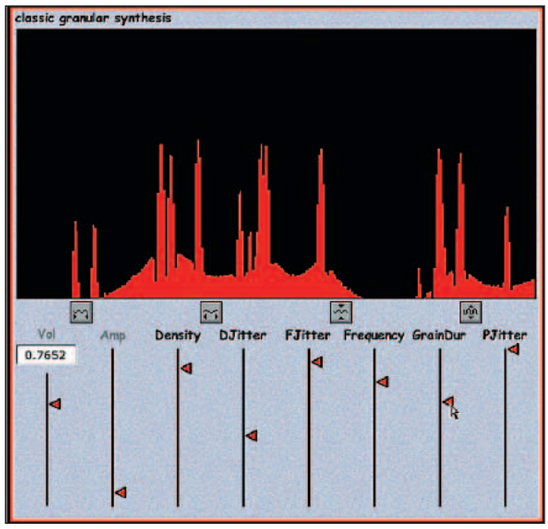
You will have noticed that we have consistently used the term 'Sound'. In Kyma, a 'Sound' is different from a plain old 'sound'. A Sound is any program or set of instructions that can be run on the Capybara's computer. It can be a filter module, a sample streamed from a disc, a live input, a virtual synthesizer oscillator, a



Build a waveform from scratch



Frequency analysis tool



One of many spectrum displays available

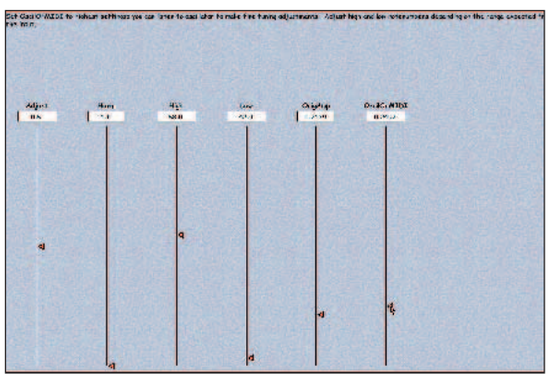
reverb unit or even a patch that combines any or all of these things and many, many more.

Understanding this is vital to understanding the vast capabilities of Kyma. You see, any Sound can be combined with any other Sound in a variety of ways to create a completely new Sound, making Kyma somewhat similar to the way that modular software synthesizers such as Reaktor and Infinity work – except in Kyma the options are virtually limitless.

Think of it this way: if disc streaming audio is a Sound, then elements of that Sound can be put into play controlling elements of another Sound, as a modulation source, for instance. This means that you can use the dynamics or pitch of that streamed audio to modulate, say, the amplitude or harmonic content of an additive synthesis sound.

Or perhaps you want to use granular resynthesis to dissolve the tail of a reverb into a grain cloud, and then control the pitch of that grain cloud from a keyboard: you can design that very sort of thing. The lines between different audio functions, effects processing, synthesis and sampling are not just blurred, they are utterly obliterated. The concept is nothing short of staggering.

Pitch to MIDI devices



Needless to say, with such complex possibilities, it would be foolish to expect instant mastery over Kyma's power, so the included library of preset Sounds is of paramount importance. The collection is vast and covers a wide range of functions, from virtual additive, FM, granular and analogue synthesizers to complex 'aggregate synthesis' algorithms (complex combinations and hybrids of heretofore-unrelated synthesis and processing types).

There are presets for morphing one sound into another (a task that Kyma achieves using complex resynthesis, not crossfading), vocoding and other sorts of effects of the type that might be useful for sound effects in film – something of a niche field for Kyma users.

The Kyma users themselves contribute a lot of the preset Sounds, and in many ways it shows. Though a great many of them are nothing short of fantastic in both sound quality and design, they often seem to have been created with a single purpose in mind. Many do one thing and do it well, but nothing more.

Potential customers looking for a Reaktor-like library consisting of a legion of complete and complex synthesizers with all of the parameters and functions drawn out for them and a healthy selection of preset patches are going to be disappointed by the rather utilitarian approach to some of the included library. But, make no mistake, these things are far more powerful than they appear on the surface. If you need access to certain controls, then it is a snap to add them in the way you want, simply by going in to the Individual Sounds that make up the device and typing a character or two. The control widget will then appear on the VCS, ready to tweak.

When you are ready to create or customise Sounds of your own you'll find that Kyma comes chock-full of 'Prototype' Sounds. These are basic building blocks, the likes of which are normally seen on modular synthesizers and many that are entirely new. The Prototypes appear in a horizontal browser at the top of the screen, and these can be dragged into the construction window for any given Sound. Things like prefab oscillators, filters, envelopes, spectrum analyzers and more can be found among the Prototypes, and many are complete Sounds in themselves. As with all things Kyma, the lines between construction tools and constructions themselves are indistinct.

Once you've arranged all of your Sounds and Prototypes into a new creation you can then go into each module and customise its values, add widgets, assign MIDI controllers or whatever else you desire. Doing so reveals quite blatantly that you are working within a programming language – there is some mathematics to concern yourself with, and any intense customisation requires a considerable amount of data entry. Still, there are

PICK A CARD

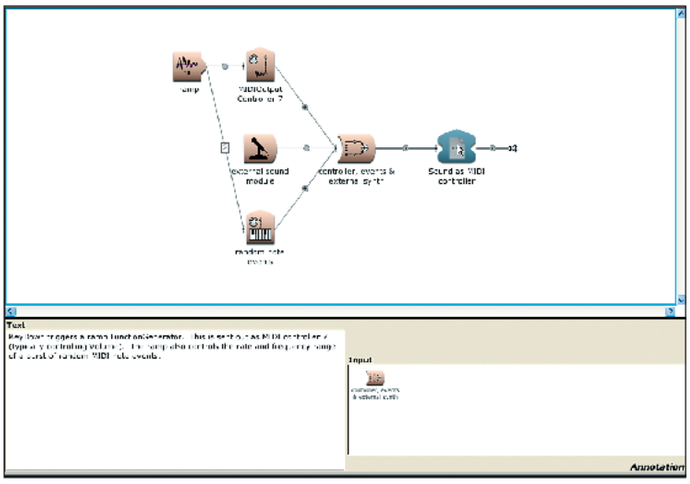
The basic Capybara unit ships with four onboard processors (one of which is dedicated entirely to the more utilitarian functions, such as I/O, disk duties and so on). If you are creating sounds one at a time for, say, sound design work, you will not likely hit the DSP wall too often. However, for anything but the basics you will probably feel the need to add more DSP cards.

Each expansion card adds 48Mb of sample RAM and two more DSP chips, and these cards are user-installable. The unit on test here had two expansion cards in addition to the basic configuration.

Installation is fairly simple, requiring only that a few screws be removed from the Capybara, after which the top panel is easily removed. The large expansion cards are installed into a row of empty slots and require that the adjacent slot to the last be filled by a special 'slot jumper' device that ships with the cards themselves. Once the cards are installed, Kyma instantly recognizes its new-found power and the new processors can be seen in the software's DSP Status window.

So what does an expansion card get you? Symbolic Sound estimates that each card can offer approximately 28 voices of polyphony, 45 vocoder bands or 129 additive synthesis partials. Of course, different jobs will require varying resources, so these are just rough benchmarks. In the case of the Kyma I used, the difference made by two additional cards was substantial.

More than just a sleek black box



More modular madness

certain patterns that become apparent, and you'll quickly memorise many of the expressions you need to enter to achieve certain things. To make it easier, Kyma contains some preset 'expressions' that can be dragged into the appropriate fields. Nice.

Time Traveller

By far one of the most powerful functions in Kyma is the use of 'Timelines'. Timelines are laid out a little like your DAW, but instead of sequencing MIDI or audio (though they can do that, too), Timelines sequence DSP processes. Any Sound can be dragged into the multitrack timeline and the Capybara will dutifully calculate the process to occur at the specified time when you push Play. Sounds can morph from one into another, modulate one another, be routed into, around and through one another in virtually any combination, DSP permitting.

Timelines can be used to create simple processes or complete songs. They can also be synchronized to a MIDI clock or their own internal clock. Audio inputs and disc streaming are not exempt from outlandish treatments in the Timeline – remember, everything in Kyma is a Sound. The Timeline's transport can be controlled via MIDI or even audio, so you can, for example, program a Timeline to stop if an audio level drops below a certain threshold, and resume when it increases above that threshold. The possibilities of the Timeline are just short of limitless, mind you. All that power takes a certain amount of grunt, and it's when working with Timelines that you are most likely to feel the need for more DSP cards in your system. Kyma takes this into consideration and allows your timelines to be 'bounced down' to a disc-streaming track. This is almost like the 'freeze' function so popular in sequencers these days.

Kyma's gonna get you

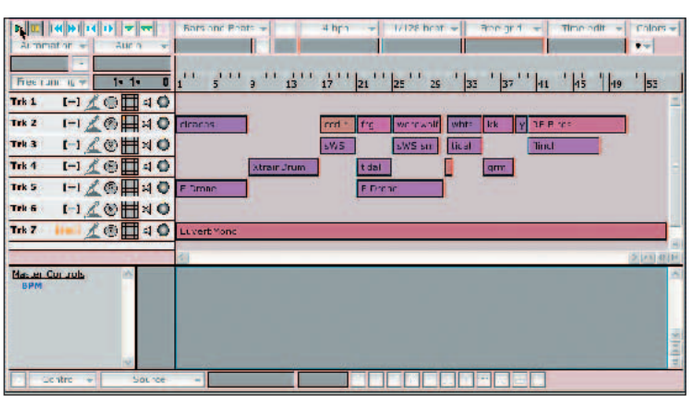
Kyma is, quite simply, a miracle. Over time, I find that Kyma has infiltrated my daily thought processes in an almost disturbing fashion. It's even become a bit of a pastime to dream up new processes and bizarre ideas with which to challenge the system. And to my continued astonishment, Kyma always seems to meet these challenges, no matter how outlandish.

Kyma is not for neophytes, by any stretch of the imagination. It assumes that the user is well versed in the nature of sound and has an established knowledge of synthesis and audio processing. (If you don't, spending some time with Kyma can be a real crash course in the subjects).

Those users looking for vast catalogues of preset synthesizers complete with knobs and sliders and pre-made patches would be well advised to spend their money elsewhere. If you are intimidated by the prospect of building your own synthesizers in, say, Reaktor or the Nord Modular, don't even think about Kyma. But those intrepid few that feel that innate urge to get inside of sound itself will have a field day.

Kyma doesn't come cheap, but to the right user it's a bona fide bargain. If you make your living from sound design or production work then Kyma can pay for itself in no time at all. **FM**

Timeline layers sounds



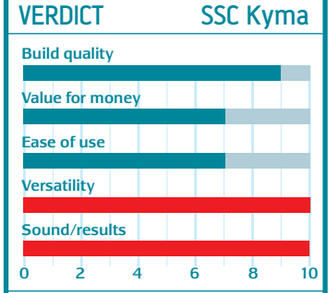
REALITY RESYNTHESIZED

It seems every third software synth these days sports some sort of 'resynthesis' function. Kyma was there well ahead of the pack, and therefore it isn't surprising that it handles this sort of thing with considerable finesse.

Resynthesis is based on the idea that every sound we hear can be broken down into its constituent sine waves – in other words, this is the stuff of additive synthesis. Once a sound is converted into an additive synthesis patch in this fashion it can be manipulated in the same way as any other additive synthesis sound.

This is a very powerful idea. Because of the nature of additive synthesis, sounds can be seamlessly morphed into each other, one of Kyma's fortes. As an additive synthesis buff, I have tried just about every additive resynthesizer to come down the pike, yet Kyma stands head and shoulders above any I have ever heard. It can resynthesize just about any sound you throw at it, and, if you set it up properly the results are indistinguishable from the original. This presents sound designers with the power to get inside any sound and essentially rearrange its DNA to order. Heady and powerful stuff.

VERDICT SSC Kyma



You get what you pay for. This hardware-meets-software audio construction kit is, quite simply, the Holy Grail of sound design.

ALTERNATIVELY

While there really is nothing quite like Kyma out there, there are some native software sound design tools that can get you in the ballpark. Of course, unlike Kyma, they rely on the power of your computer to provide the grunt.

Bonneville CPS (€140)
Deep and powerful, using CPS isn't exactly a walk in the park, but it offers a lot of flexibility at a very reasonable price – not for the uninitiated, though.
www.bonneville.nl

Cycling '74 Max/MSP ($495 plus tax and shipping)
Again, not the most immediate application but stuffed with lots of modules and more flexibility than a double-jointed yogi. Like CPS, it'll make demands on your CPU.
www.cycling74.com