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OCTOBER 1988

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EDITORIAL
Survey Results

IF YOU'VE BEEN reading MT for the last several months (or longer), you'll no doubt remember that in our May issue we included a comprehensive readers' survey. We asked you to fill it out and send it in to us and in return we offered three prizes to lucky winners whose names were to be selected in a random drawing. Well, a lot of you sent those completed surveys back to us and we fell a bit behind schedule, but we're happy to announce that we've now compiled the information and selected our lucky winners. **Michael Perez** of Huntington Beach, CA, **Ken Jacobson** of Moorpark, CA and **Tom Martin** of Boston, MA (all of whom are profiled elsewhere in this issue) were recipients of the **Kawai K1**, **Alesis HR16** and **Shure SM94** respectively. Congratulations, guys.

As far as the information contained in the survey was concerned, some of it proved to be rather enlightening. For example, we knew that most of you were going to check the box marked "Male," but we certainly didn't think it was going to be by a whopping 98% to 2% margin! C'mon ladies, there's got to be a *few* more of you out there. (Heck, in the editorial department here at Music Maker Publications the women outnumber the men . . .)

Similarly, I found it rather interesting that the most well-represented age group in the MT readership (37%) is 31-35. I guess the Baby Boomers really are making an impact everywhere . . .

On a less surprising note, 55% of you own one or more computers according to the survey. Interestingly enough, however, the breakdown of ownership was very close. Apple's Macintosh led with 40%, followed by 35% for the Atari ST, 32% for IBM PCs and compatibles, 24% for the trusty Commodore 64 or 128, 13% for the Amiga, 11% for the Apple II, 3% for the Atari XE and 4% of you selected Other. The numbers add up to a figure well over 100% because some (or perhaps a lot) of you obviously own several computers.

Speaking of owning several pieces of gear, 33% of you said your current setup was worth over $10,000 and 18% said it was worth between $5-$10,000. I sure hope you folks have insurance.

From a personal perspective, the most encouraging information that we gathered from the survey is that you like MT, and you like it a *lot*. Many of you made comments in the space provided at the end of the form and the general consensus seemed to be "Keep it up."

Even more telling than your comments, though, were the figures that came out of the section of the survey where you rated various sections or attributes of MT. Not surprisingly, the big winner here was our reviews; the In General rating you gave them was 4.18 on the scale of 5 that we provided. But though you approved of their quality and timeliness, you didn't quite agree on the amount of them that there should be in the magazine. 49% of you said you wanted more, 47% wanted the same amount and 4% wanted less.

You reacted to the Music sections of the magazine a bit differently. They received an In General rating of 3.84 but 73% of you thought we should keep the same amount while only 19% thought there should be more and 8% thought there should be less. The relatively new (at the time) Computer Notes section was better received than I thought it would be: 39% of you wanted more computer-related coverage, 53% wanted the same amount, 8% wanted less and its In General rating was 3.88.

The most obvious area we need to provide more coverage to is applications articles. 69% of you said you'd like to see more MIDI applications pieces, 60% want to read more about recording and sequencing applications, 58% wanted more on sampling techniques and 56% saw a greater need for articles on synth programming. We've started to respond to this request but look for even more in the future.

Of course, we're pleased by the sentiments and numbers that you provided us with, but not to the point of complacency. Some of you did make well-founded criticisms of the magazine that we need to continually address. We're very excited about the future of MT, though, and promise that some great new enhancements lie ahead. ■

Bob O'Donnell

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In fact, in less time than it takes to read the names of all the Matrix-1000's on-board patches, you could be down at your Oberheim dealer *hearing* them. Oberheim

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COOL HEADS PREVAIL.

When your creative juices are cooking, overly complex recording equipment can really get you steamed. That's when you'll love the Porta Two and Porta One.®

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READERS' LETTERS

Send any questions or comments that you may have to: Readers' Letters, Music Technology, 22024 Lassen Street, Suite 118, Chatsworth, CA 91311.

Dear Music Technology,

As much as I loved Steve Howell's warm and informative look at the ARP 2600 in your August issue, I must take exception with his statement that "there were only two manufacturers . . . Moog and ARP." Long before the ARP 2600, Moog coexisted with the Buchla, a component-based system similar to the Moog.

The Buchla was the choice of many a university electronic music lab in the sixties and early seventies including Brandeis University, Mills College, and later, Cal Arts. It was also the choice of Morton Subotnick in his pioneering works, 'Silver Apples of the Moon' and 'The Wild Bull.'

The Buchla never seemed to want to make the transition from the world of pure art into that of pop music and was thus left behind as synthesizers moved from the university lab into the commercial showroom. But it was the instrument many of us learned on, and even in this age of Synclaviers and D50s, the Buchla, in my mind's imaginings, still holds many unsolved mysteries.

Craig Safan
Los Angeles

Dear Music Technology,

Thanks very much for doing the article in the July MT on Earth, Wind & Fire, Maurice White and myself. I've had numerous phone calls about it; most of them positive, but enough confused ones to make me want to clear up a couple of points. First of all, I didn't mean to lead anyone to believe that Vance Taylor, EWF's keyboardist, "knows nothing about synthesizers" – the point I meant to convey was that by hiring someone to program for him, he doesn't have to know, and he can concentrate on the music. Music is still the most important thing – great sounds mean nothing without a great player. Also, the horrors of the road I relayed aren't every night occurrences – in fact, those were pretty much the only disasters to occur during the seven-month tour. In other words, if you're thinking about getting into this business, rest easy – it isn't as bad as it might sound!

If you are looking at getting into this business (or are just curious to know more about EWF's keyboard and computer setup), I'd be more than happy to answer your questions. I can be reached care of: Kalimba Productions, 4303 West Verdugo Avenue, Burbank, CA 91505.

Mike McKnight
Earth, Wind & Fire

Dear Music Technology,

I've followed nearly every issue since your beginnings. You seem to get better every time. However, I do have a few suggestions that may enhance your already thorough reviews and explanations:

One: It may be appropriate to follow a feature or a function you have presented in your review with a brief "what this means to you is . . ." so the novice to the new hi-tech jungle can know what the heck is going on.

Second: Pages 80 and 81 of your June 1988 issue makes the comparison of Hard Disk Recording Systems as easy as 2+3+4. Could you make the same comparisons for keyboards, modules, synthesizers, samplers, drum machines, etc? Maybe a notation on each referring to the back issue in which the machine was reviewed would be helpful also.

Third: Maybe a short feature on the latest in low-cost equipment and such for the folks on a tight budget would be helpful. Don't stop the features on the Fairlights and Synclaviers and such; that gives us something to dream of. Your reviews of the Yamaha DXII, Korg 707, and Kawai KI were great but how do they compare to their big brothers? How do they compare to each other? I suppose a "box" with each review showing a standardized set of "specifications" might be quite helpful (much like you would find in audio, stereo, and video magazines).

It used to be that comparisons were like "bear and fish" with the big bears of the industry dominating and at times devouring the fish. Now we see the industry evolving to a common standard and the comparisons are coming closer to "apples and oranges." Every thing you do to bring things to a more common denominator is always appreciated. Anything more would be a great favor. Thanks for a great magazine.

R. N. Hunsaker
Denver, CO

Thanks very much for the suggestions. Fortunately enough, we had been thinking along some of the same lines. First of all, we're starting to include some more information in our reviews and feature articles that's geared toward beginners. It is a jungle out there, as you suggest, and we want to help newcomers move along as quickly as they can. Also, as you can see from this month's survey of SMPTE/MIDI converters, we're starting to provide more comparison charts. We've also been thoroughly referencing previous reviews and articles of interest for those who want to dig more deeply into a topic. Finally, your article idea is a good one, though as you point out, we have been and will continue to cover the latest new products in all price spectrums.

Direct comparisons between products can be very difficult because what's highlighted and trumped up on one machine may not even be addressed on the second. This doesn't mean that the second machine isn't as good as the first, it may simply have a different orientation. As you said yourself – apples and oranges. Even more problematic is that the biggest difference between instruments is often their sound, which is an extremely subjective area. Politics and religion pale in comparison to the argument-generating potential of subjective sound assessments. The bottom line for any review is that it should provide the reader with accurate, insightful information about a product and its performance. From there, it's up to the reader to decide if the product is what they are looking for. – BO'D

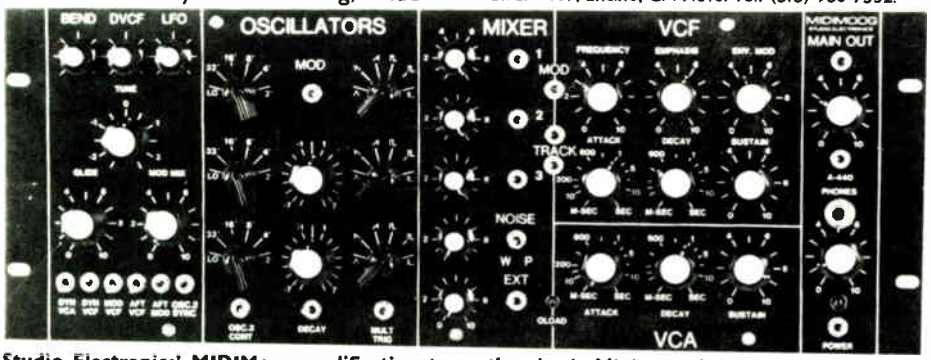
NEWS DESK

Moog on the Rack

Studio Electronics has announced a four-space standard rackmount version of the Minimoog, with full MIDI implementation. Cleverly titled the MIDIMoog, the complete unit can be purchased for $1495 or, if you supply the Minimoog, the renovation will cost you $1095. If you simply want to add MIDI to your Minimoog, Studio Electronics will do so for $795.

The added MIDI capabilities include response to velocity, pitch-bend, modulation, aftertouch, glide, and MIDI volume. Included also are MIDI channel select, three-octave transpose, an additional LFO for modulation, multiple triggering for re-keying, oscillator syncing, and MIDI Thru.

MORE FROM Studio Electronics, 18034 Ventura Blvd. #169, Encino, CA 91316. Tel: (818) 986-7532.

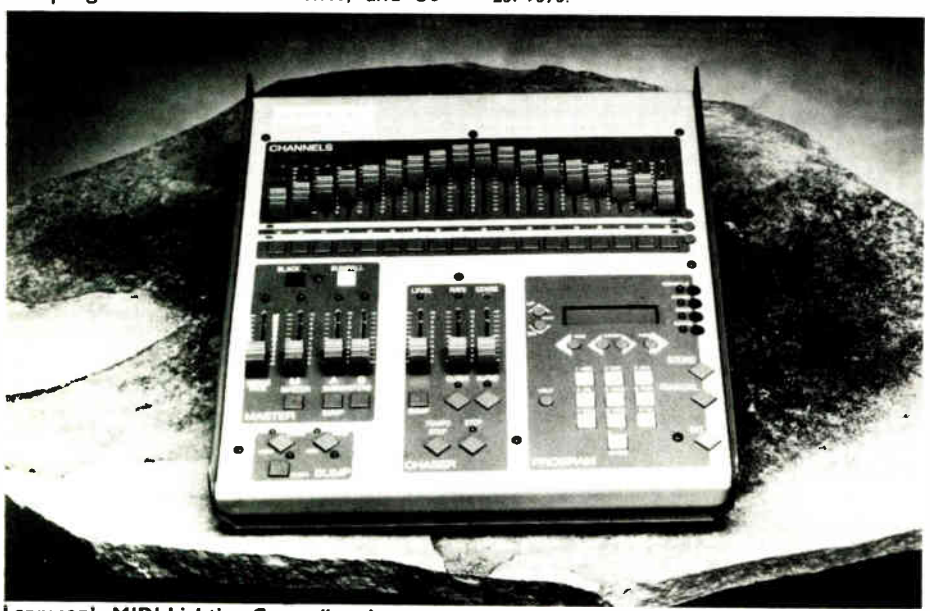


Studio Electronics' MIDIMoog modification turns the classic Minimoog into a rackmount MIDI synth module.

Lucky Lights

Leprecon Pro Lighting now offers a fully MIDI-compatible lighting controller with preset memory for $899. The LD850 has MIDI programmable dimming, 54 control preset channels, 100 programmable scenes, 50 programmable chase scenes, and 50 song capability. The unit features an alphanumeric keypad, 32-character LCD display, and a built-in softpatch to 108 dimmer channels, with optional analog outputs.

MORE FROM Leprecon Pro Lighting Equipment, 10087 Industrial Dr, Hamburg, MI 48139. Tel: (313) 231-9373.



Leprecon's MIDI Lighting Controller gives you extensive programmable control over 108 dimmer channels.

Akai Onslaught

Though Akai wasn't present at NAMM to show any new products, they obviously had some waiting in the wings – as their slew of new product announcements obviously attests to. Leading the list is the MX76, a new master MIDI keyboard. The new unit is similar to its predecessor, the MX73, with a few additions, including 76 weighted keys, a 320-character display, 64 bank memory, up to four splits assignable to any of five different velocity sensing curves, and a host of switches and sliders for easier programming. Ports include two MIDI Outs and one MIDI In with merging capabilities. The unit is priced at $2699. If you'd also like a sequencer thrown in with the package, Akai is offering the MWS76 MIDI Work Station, which is basically the MX76 and their ASQ10 sequencer combined into one unit.

A new trigger-to-MIDI interface, the ME35T, has also been released. Based on the ASK90 trigger update for the S900, the unit will accept eight trigger inputs (via ¼" jacks) from electronic drum pads, microphones, drum bugs, tape and other sources and convert them into MIDI notes for use with samplers, synths, sequencers, and the like. The ME35T lists for $499. While we're talking about drums, Akai has also released the XE8, an eight-voice drum expander which plays 16-bit samples via plug-in one megabyte memory cards. Sounds can be reversed and their tuning and decay can be altered. The one space rack unit also has eight individual outs.

Finally, S900 owners will be glad to hear of the long-awaited IB101/A and IB101/S hard disk interfaces. The interfaces allow you to directly hook up either an Atari or a Supra hard disk to your S900 and permit complete memory loads in eight seconds.

MORE FROM Akai Professional, PO Box 2344, Fort Worth, TX 76113. Tel: (817) 336-5114.

SMPTE Maaahvelous

The latest in JL Cooper's line of synchronizing products is the PPS100, a SMPTE-to-MIDI synchronizer and SMPTE event generator in a single rack space unit. The synchronizer features conversion to MIDI w/Song Position Pointer, DIN sync, Direct Time Lock, and PPQN sync, and allows for programmable tempo changes. It also reads and writes all SMPTE formats and generates MIDI Time Code (MTC). The SMPTE event generator will output any type of MIDI message at user-programmed SMPTE times. Possible applications include the ability to fire sound effects via MIDI note commands at the appropriate SMPTE time.

The events can be programmed into the PPS100 in real time, or individually from the front panel. An optional software package for the Mac and the ST will permit you to enter events in a cue sheet-style

format. Connections on the unit include two MIDI Ins, two MIDI Outs, two +5V pulse outputs, and two relay contact closures. The pulse and relay contacts can also be turned on and off at programmed SMPTE times. Finally, the PPS100 also has an LCD display, and a battery backup.

The PPS100 lists for $595.

MORE FROM JL Cooper Electronics, 1931 Pontius Ave, West Los Angeles, CA 90025. Tel: (213) 473-8771.

MAKING CONNECTIONS

Kawai now offers a 4-In, 8-Out MIDI patchbay. The MAV8 is a single rack space unit with front panel sliders for quick views of MIDI configurations. Each of the eight outputs can be driven by any of the four inputs, or it can be disconnected. One pair of MIDI In/Out jacks is located on the front panel for easy access. The rest, naturally, are in the back. The unit retails for $149.

MORE FROM Kawai America Corporation, 2055 E. University Dr, PO Box 9045, Compton, CA 90224.

BIGFOOT FOUND

MIDI Bigfoot is a real-time MIDI processor from MusicSoft that is intended to enhance the use of multiple MIDI keyboards and effects during live performance situations. The floor unit features twelve (somewhat closely-spaced) footswitches that allow up to three effects or synths or anything else with MIDI to play along with you, or be disengaged at the tap of the foot. The switches are "intelligent" in that they will operate as momentary switches if they are held for one second or longer, or simply on/off switches if they are tapped quickly.

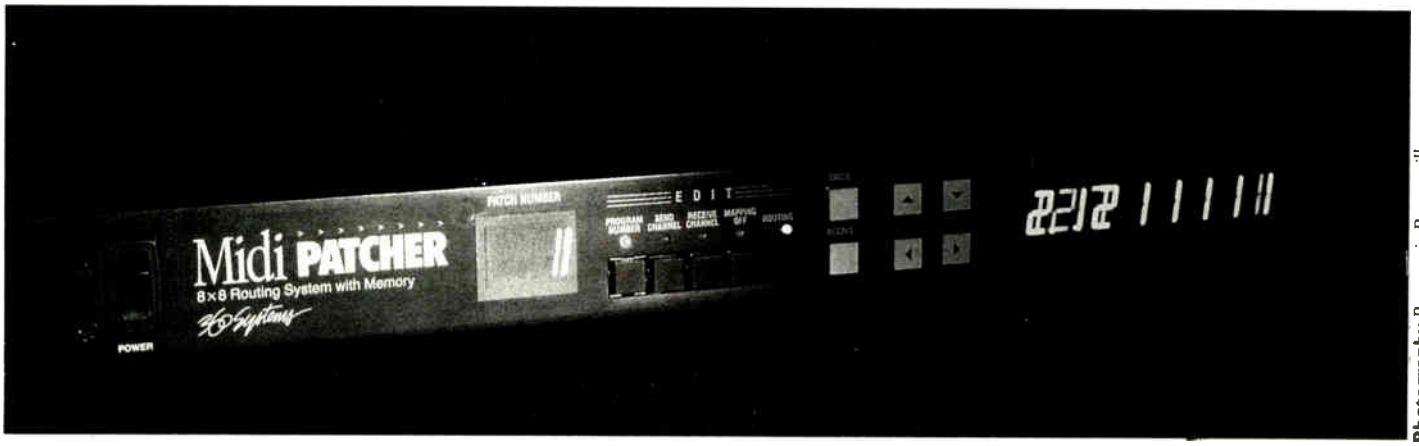
In addition to simply turning additional synths on or off, the MIDI Bigfoot permits you to add some MIDI-based effects. On the first input, called ACC1, transpose up and down, pitch-bend, crossfade, and an alternating function between the lead and accompanying voice are controlled by Bigfoot. On the second input, ACC2, is a control for sustain, on a first-on/first-off basis, so that the last notes are the ones sustained. The third accompanying voice is called "echo," and triggers a voice on a separate MIDI channel. The echo can be synchronized with external clocks via MIDI, or MIDI Bigfoot can be used to send sync messages over MIDI, with an adjustable tempo controlled by the "slow" and "fast" switches onboard. Once again, the echo switch is intelligent, like the sustain.

An onboard programmer allows for the setting of the effects' parameters. The setups are assignable to patches which are also selectable at a toe tap.

The suggested list price is $495.

MORE FROM MusicSoft, 1560 Meadowbrook, Altadena, CA 91001. Tel: (818) 794-4098.

360 Systems Midi Patcher



Photography Rosemarie Rounseville

An inexpensive, new rackmount MIDI switcher. *Review by Chris Many.*

IF YOU HAVE more than one synth or MIDI device in your setup, it's becoming increasingly attractive to add a MIDI routing device to your rack. As time goes on, prices tend to drop, with more and more features being added. A prime example of this is the latest piece of gear from 360 Systems.

The new Midi Patcher (360 put out a different product with the same name a little over two years ago) is an 8X8 MIDI switch box in a single-space, rackmounted unit, with memory to store up to 99 configurations. Although the Midi Patcher will not take the place of a "mapper" or other MIDI controller, it certainly will improve your control over routing MIDI Ins and Outs.

The unit itself is laid out simply. All MIDI cable connections are on the back, with ports for eight Ins and eight Outs. The front panel is all buttons and large LED readouts, making it very easy to read (or see from across a stage if being used live). There is a panel to the right that clearly notates which input is being routed to which output, allowing you to see all eight routings at a glance. You will need to know which synths or devices you've patched into what In/Out port, but that's expected.

Setting up the Midi Patcher to control your system is a snap – just plug the MIDI cables into the respective ports on the back, and by using the cursor keys on the front, assign any variety of inputs to outputs. The whole approach is very visual, with the cursor buttons controlling left/right, increase/decrease of information to be entered. If all you want to use the Midi Patcher for is routing synth connections, you're set to go at this stage. It would have been a nice touch to have added some form of merge function, with at least a couple of the inputs, but as it is, it's strictly one input to control a variety of outputs, not vice versa. Merging of two or more MIDI Ins is becoming quite commonplace on units such as these, so it was a bit disappointing to see it omitted here.

There is a solution, however, for those who may want to switch controllers for different synths or change routings for other reasons. By storing a particular configuration at a program location (1-99), you can reprogram your routing to suit your needs. At any time, you can reselect the original setup by pressing a few buttons, or call up any of 99 programs you've stored. It is a two-step method for changing programs, but you can do it from your synth keyboard, providing it is sending out patch change information on a channel you select on the Midi Patcher.

One minor annoyance I came across when using the Midi Patcher to switch configurations is that you have to step individually through each number (that is, if you don't use external program changes). So it can be a pain to reach say, 66, especially when you've already had to punch up a double key sequence to activate the program change. But again, this is a small criticism for a very handy feature. And once you've got your keyboard controllers' patch numbers set up to correspond to the Midi Patcher's changes, it becomes an integral part of patch recall, as well as synth controller selection.

Speaking of which, the Midi Patcher not only allows you to store MIDI routings, but up to 16 synth patch changes as well. You select the MIDI channel for the synth you want to affect, and the patch number you want to change to, using specific feature buttons on the front panel. You can hear the patch changes as you cycle through them, making it simple to program changes. In this way you can set up your synths to boot to different patches and different MIDI channels – regardless of different patch configurations (Roland, Yamaha, E-mu, etc) – at the touch of a button. The best part is that all of this data is stored in non-volatile memory internal to the Midi Patcher, meaning you've got up to 99 preprogrammed synth setups and synth combinations at your disposal. This can really come in handy in a live show, although it will take a fair degree of planning and organization to set it up properly. I would have liked to have seen some of the MIDI processing capabilities found on the MX8 incorporated into the Midi Patcher, but I guess you can only expect so much for a limited amount of money.

A few other functions round off 360's new tool. It has an All Notes Off button, and the ability to disable the patch change programming, thus enabling you to change routing without sending the patch changes. Also, you can save the Midi Patcher's setup using MIDI System Exclusive messages. Backing up your configuration is a must, especially if you've slaved over setting up your changes for a live performance situation. One generic patch librarian program I know of that already supports the Midi Patcher is Sys/Ex from SSL Productions. The program is currently available for the Commodore 64/128, Apple II, Atari ST and the IBM PC and compatibles.

360's Midi Patcher is an easy-to-learn, easy-to-use, 8X8 routing system that will give anyone a quick upgrade to a multi synth/MIDI device setup. If you're in the market for a low cost, high performance rackmount MIDI switcher, you should check this one out. ■

PRICE $329

MORE FROM 360 Systems, 18740 Oxnard Street, Tarzana, CA 91356. Tel: (818) 342-3127.

SSL Productions can be reached at PO Box 55187, Sherman Oaks, CA 91403. Tel: (818) 783-1578.

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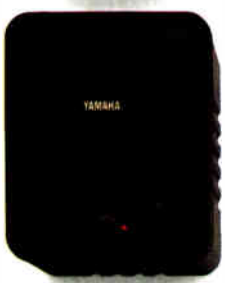

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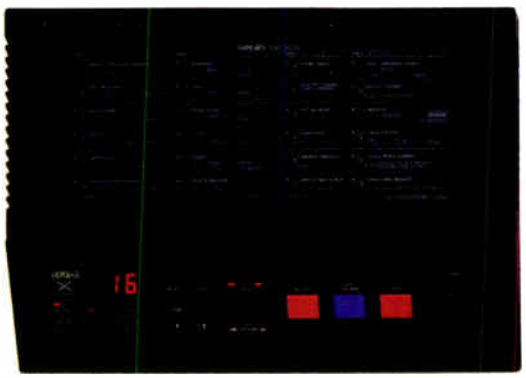

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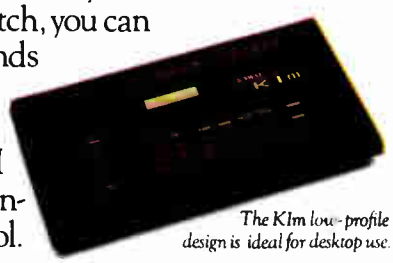

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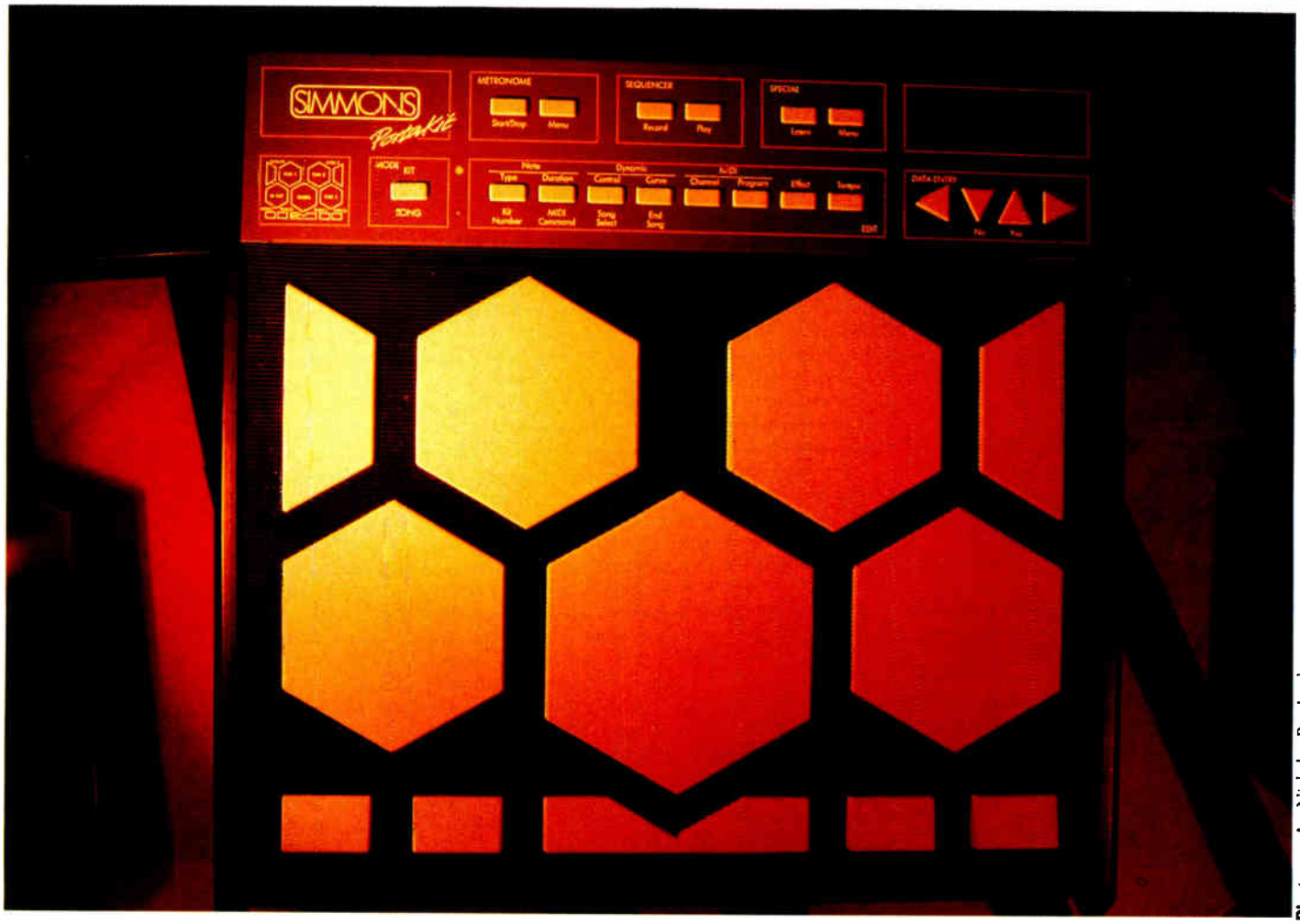
Simmons Portakit



Photography *Nicholas Rowland*

From the state-of-the-art SDX, Simmons has turned their atttention to the more immediate needs of the drummer, percussionist and keyboard player. *Review by Nicholas Rowland.*

AS THE DUST began to settle following the arrival of the SDX in all its 16-bit, zone-sensitive glory, a few of us were beginning to wonder where that left Simmons in relation to the Common Musician.

However, there's been no need to speculate for long, as Simmons has already started to advertise their future intentions: a son of SDX christened the DrumStation; and the Trixer, a sound-source/effects-box/mixer, to be used in conjunction with acoustic drums. Now, while I have a sneaking suspicion that you shouldn't start camping outside your dealer's doors just yet, their third post-SDX product – the Portakit – is most definitely rolling off the production lines as I speak (the review model was number 0006, so by my reckoning there must be at *least* five others . . .).

Billed as "A Good Idea Got Better" (no, I couldn't work out the grammatical logic of that one either), the Portakit is a trigger-to-MIDI converter with 12 built-in pads along the lines of the Roland Octapad. Although it may sound a little melodramatic, perhaps "MIDI percussion control station" might be a more apt title, since the Portakit is a bit more complex than your usual interface between Things Clobbered and Machines MIDI'd.

For example, you can use one of the pads to generate MIDI effects like Pitch Bend, Aftertouch, and various Control Changes such as Portamento, Balance and Pan, with the amount of effect proportional to the pressure exerted on the pad. In case you're not quite sure what effect this has, think of it as having a pitch-bend and modulation wheel as per a keyboard – it certainly makes for interesting exploitation of both percussive and melodic sounds.

Probably the most exciting feature is the on-board eight-note (no, not eight *track*; Simmons limits the number of notes on at any given time) polyphonic sequencer, allowing you to record and play back 12 sequences of up to 240 bars in length while playing further rhythms over the top.

The Portakit both reads and generates MIDI clock information and MIDI Stop, Start and Continue commands can be sent at the touch of a footswitch, thereby making it ideal for live control of sequencers and drum machines. Also useful for live work is the fact that the 50 Kit or Patch memories can be plopped into 20 programmable Songs and then recalled in order.

Add to all this two MIDI outs (one of them switchable to Thru) and as you can see, MIDI percussion control station is not so OTT (Over The Top) after all.

Construction

ON THE SUBJECT of live work, the Portakit certainly feels as though it's been built with the rigors of Life on the Road in mind. Indeed, both in terms of con- ►

► struction and design, it forestalls any criticism Simmons may have received in the past for not paying due attention to these aspects. A handle on the back panel justifies the "Porta" bit of the name, and a clamp is available for mounting the unit on a special stand.

The 12 gray pad areas are surrounded by ribbed black rubber, so if you miss, you're not going to cause much undue damage to your sticks or hands. All the control buttons are made of the same rubber as the pads. This makes them as virtually indestructable as the rest of it, but it does mean that the old fingers get a bit sore with the extra force needed to press them to get a result (try programming the Portakit for any length of time and you'll see what I mean). A "beep" sounds whenever these buttons are pressed, which I found extremely useful, though it can be disabled.

The rather unconventional layout and different shapes of the different playing surfaces (apart from the obvious connotations of hexagonals) is explained by a graphic on the control panel which reveals that the 12 pads are distributed in the time-honoured tradition of the real live drum kit . . . more or less. Clearly, Simmons is still trying their best to make drummers feel at home.

Around the larger central Snare pad are clustered four slightly smaller ones labeled Hi-hat, Tom 1, Tom 2 and Tom 3. The long oblong one below the snare is the Rim and to each side of this are two small Percussion pads. Finally, up in the left- and right-hand corners of the playing area are two half-hexes - Cym FX and Cym 2, respectively. In reality, any pad can trigger whatever sound you want, the labels being there for convenient referral when programming. However, in a couple of cases, there is a deeper logic.

For example, if you plug Simmons' optional hi-hat pedal (code-named SFPI) into the back panel, the hi-hat pad becomes capable of sending out two completely different sets of MIDI information according to whether the pedal is open or closed. But in this case, I have to say that by following convention and positioning the hi-hat pad to the left of the snare, Simmons has slipped up quite badly - because both pads are at the same height (unlike their counterparts would be on an acoustic kit), it's actually extremely difficult to play them as hi-hat and snare in the usual cross-handed manner.

The Cym FX pad also serves a dual purpose, acting both as a normal pad and as the MIDI performance control generator referred to above. These performance effects can also be applied by a footpedal (which disables the pad), thereby leaving both hands free for playing, in which case that particular pad becomes disabled.

In yet another mode, this pad can act as "damper," sending MIDI Note Off information when touched to bring all sounds currently playing to an abrupt halt. Quite useful for choking cymbals or lengthy synth sounds.

I know the digital drummer isn't supposed to worry about these things, but as regards playability, the pads are extremely good, with a fast stick response. Being slightly spongy, stick noise is kept to a minimum.

A choice of ten dynamic curves is programmable for each pad, thereby allowing you to tailor them both to your playing style and the sound in use. Minimum Dynamic (the minimum level produced by even the lightest stroke) can also be programmed per pad on a scale of 0-99.

The back panel houses six further inputs for external trigger sources, be they pads, drum bugs, mics or tape. One labeled Bass can be used in addition to the 12 onboard playing surfaces, while the other five (Percussion 1-4 and Cym 2) disable the equivalent playing surfaces.

Whatever the type of external trigger, the Portakit has a unique facility called "Learn" which allows it to quickly adapt to the trigger source and produce a clean MIDI trigger. It does this by remembering the envelope shape of the incoming signal through a process akin to sampling. Providing that subsequent hits roughly ►

correspond to the stored envelope profile, the Portakit will produce the appropriate MIDI trigger. It may sound convoluted, but it works extremely well, and is particularly useful when triggering from tape, a notoriously difficult exercise in balancing levels.

Programming

GLOBAL PARAMETERS programmable for each of the 50 Kit memories include MIDI program change numbers (16 available per Kit, one per channel), MIDI effect on/off, type (what function the Cym/FX pad is to serve), and Kit tempo (40-240bpm). The latter is important not only when using the Portakit to control external devices through generating a MIDI clock, but because it also has a profound effect on the length of notes and the timing of echoes.

There are six programmable parameters per pad, per Kit: Note Type, Number and Duration, Dynamic Control and Curve, and (as you would expect) MIDI Channel. Editing each is a matter of hitting the appropriate programming button, hitting the relevant pad (quicker than cycling around the pad types with the left/right arrow keys), and then altering values with the up/down arrow keys.

Note Type is the most interesting option, offering Single, Echo or Chord options. The range of MIDI note numbers covers 0-127 (C2-G8). Echo gives you up to 15 programmable repeats, with the rate set by Note Duration. Chords can be major, minor, major 7th or minor 7th with the selected note acting as the root.

To make assigning notes easier, the Portakit can learn them direct from the sound source itself. Providing the instrument generates MIDI note information, the current pad's MIDI note and channel number will automatically change to match any information it receives while in Note Type edit mode.

The length of single notes and chords (the time between the sending of Note On and Off information) is determined by Note Duration and is expressed in terms of the Portakit's internal clock. This has a resolution of 96 ppqn and each Duration increment (0-255, programmable) is worth two pulses. Hence, a value of 24 will give you an eighth note, a value of 48 a quarter note, 96 a half note and so on. Obviously though, the exact length of the note will vary with the tempo of the Kit. Simmons quotes the maximum length possible as 25 seconds – great for setting up a primeval drone over which to improvise with more percussive voices.

With echoed notes, the programmed duration time determines the space between repeats. Since different repeat spacings values can be programmed per pad, you can set up some extremely interesting rhythmic textures – for example, running triplets across straight fours. When Dynamic Control is activated, repeats will die away at a rate determined by the strength of the initial force. On single notes and chords the length will vary according to how hard the pad is hit.

As you can imagine, there's quite a lot you can do with all this, particularly when building up combined melodic and percussive Kits. The ability to create full chords from just a root note is especially useful if, like me, your musical knowledge doesn't extend much beyond finding middle C on the piano. Simmons has discovered that if you make the melodic side of things easy to access, then people are more likely to use it.

Echo is perhaps the most exciting device from a rhythmist's point of view. Indeed, Simmons is one of the few companies who have tried to encourage the use of this seriously neglected tool. For the stand-up percussionist in particular, it means you can set up bass drum pulses and then do the business over the top.

As much as I like the Portakit's functions, however, I can't help feeling that certain features are missing. Like the ability to layer just two or three percussion sounds and then control them dynamically, with say a harder hit giving you either a completely different sound or a combined one. Yes, you can layer percussion sounds with the chord function, providing you do your homework and assign the right MIDI numbers to the source, but an extra ►

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► function specifically dedicated to this would have been welcome.

Songs and Sequences

THE PORTAKIT'S 20-SONG memory gives you the ability to organize and recall the Kit patches in a sequence of events at the same time sending out MIDI Start, Stop, Continue and Song Select information. This gives you the ability to remotely select different songs on, say, a sequencer, then set it going and play along with a combination of different types of Kit. Each Song can be up to 20 events long, and like Kits and indeed Sequences, they can be given an eight-character name.

The only problem here is that changing to a new patch cuts off all information from the previous one. So if you have an echoed note or a long chord still playing, it will be mercilessly chopped off by the patch change. Let's say it doesn't make for smooth transitions.

Now the fun part: the Portakit's sequencing capabilities. As blabbed earlier, these are the facts so far: 12 sequences, eight-note polyphonic, all up to 240 bars long, providing that the total of 10,000 MIDI events is not exceeded. (A special utility function allows you to keep an eye on the percentage of remaining memory at all times). Since the Portakit happily stores all controller and patch change information as part of the sequence on complex pieces, that memory tends to get eaten up faster than you think.

All input is in real time, with as many overdubs as you wish within the eight-note limit. Recording a new sequence allows you to define time signature, bar count and tempo. The metronome menu allows you to adjust the accompanying click to suit. Through this menu you can also select quantize values for the sequencer with a choice of 1/4, 1/6, 1/8, 1/12, 1/16, 1/24, 1/32 or Off. Note that unless quantize is set to Off, any MIDI effects are quantized too.

Once a recording pass has been made, the sequencer automatically jumps to Play to enable you to hear what you've recorded. By pressing Record again you jump back into Overdub mode.

However, at this point you can change the way the first track is played back, either by changing the tempo, or by switching it from single playback to Loop. In this case, the track will loop continuously until the Stop button is pressed or it clocks up 240 bars. Basically this allows you to set up a fairly basic one- or two-bar rhythm – a bass and snare beat for example – then overdub something like a longer, more expressive hi-hat part over the top.

Once you've decided to accept the overdub (you can abort it if you wish and start again with the original sequence), this overwrites the first track and replaces the old bar count. For example, if you loop a two-bar track and play a six-bar overdub, you've got a six-bar phrase which can be further looped during the next, say, 18-bar overdub. Finished Sequences can be looped in playback too.

By anybody's standards these sequencer facilities are fairly limited. For example, if you make a mistake during a long overdub, you've got to go back and do the whole thing again. Or you've got to wait for the whole thing to play through before adding just a couple of cymbal crashes, or whatever, just at the end. It's also pretty frustrating if at some point you've created a section which, if taken in isolation and perhaps looped at a slightly different point, would make an extremely interesting rhythm in its own right.

That said, there's no doubt that as a musical sketch pad or just as a convenient way of remembering what you've played, at a rehearsal for example, it's an extremely handy facility to have available. And, should you want to get down to some fine editing, you've always got the option of dumping the whole thing to a more powerful sequencer. This is best done using the Portakit's MIDI System Exclusive implementation. You can also save and indeed load Kit and Song data this way, either to any device which supports MIDI system exclusive transfers or to other Portakits, if you happen to have a few more lying 'round the house.

Verdict

DESPITE THE CRITICISMS, I have to conclude that the Portakit is the sort of instrument that my house was made to have lying 'round. Simmons' forte has always been in taking fairly tried and trusted technology and putting it together in a way which somehow allows you to approach the problem from a different angle.

Inevitably the Portakit will be competing most directly with the new Roland Octapad, since they fall into roughly the same price category (the recently announced Drum Kat may also be a contender here). Keyboard players seeking an alternative to accessing their existing equipment via a keyboard may prefer the Octapad's more comprehensive note layering and what might appear to be a more logical pad layout. But, to my mind, the Portakit scores on three important points – its obvious capability to take hard knocks; its ability to generate MIDI control information; and the sequencer. OK, it doesn't cover every base, but it's an instrument which is great fun to sit down and mess about with on rainy Sunday afternoons. And quite frankly, that's something I plan on doing quite often. ■

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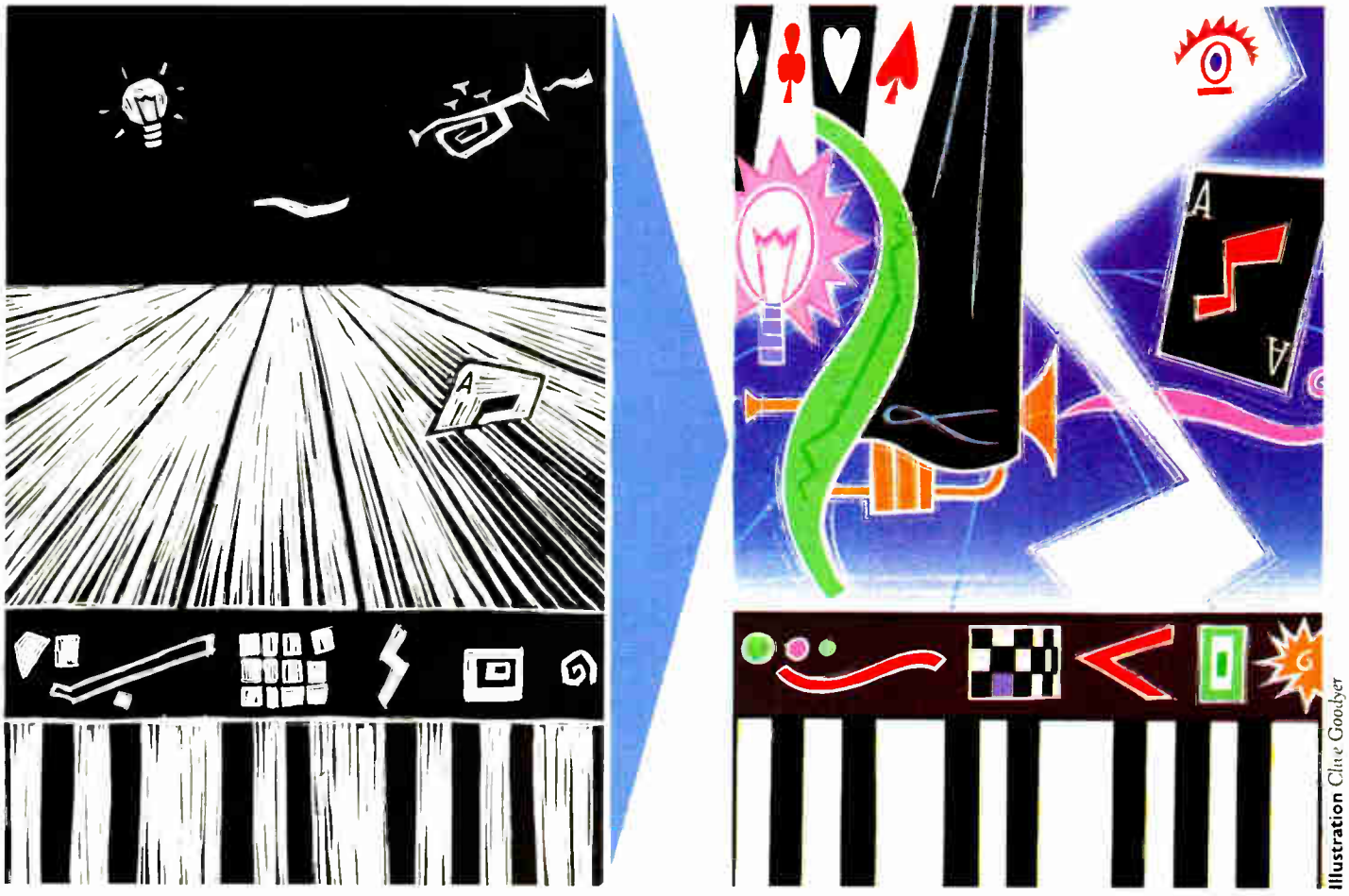


Illustration Clive Goodyer

rehumanize YOUR SYNTH

Here's a random bunch of tricks to add some extra snap and naturalness to your patches. *Text by Chris Meyer.*

BEFORE AND AFTER being a user, I spent a few years in the actual design of synthesizers and samplers. The process of spending a year designing and living with a sampler followed by designing a new synthesizer proved to be a real education in what makes synths sounds so, well, *synthetic*. The big culprits are the lack of detail (particularly in the attacks of sounds), and the lack of evolution in the sounds after they hit the "sustain" point. Here are a few tricks I've developed over the past few years to combat these problems. They won't cover all the sounds you would ever want to go for – only about three or four classes of tricks are covered – but maybe they'll add some details to your own programs that will make them a bit more lively.

Complex Attacks

THE WAVEFORMS, FILTERS, and synthesis methods of our machines give them the ability to sound different than natural instruments. The envelopes, on the other hand, give synths the ability to sound *like* natural instruments. I have a few percussive tricks I use to add some natural complexity to ordinary envelopes.

I like to introduce a strong pluck or click at the starts of my sounds – both for synths and samplers. If it doesn't exist in a natural sample, I sometimes purposely clip just the first few cycles of a wave to create it. You can't direct a synthesizer to temporarily clip, however, so you have to make it "break down" in another way. The most common way is to make the envelopes move so fast that they produce a click by themselves, regardless of what's being fed through them. When doing this, the envelope becomes a one-cycle wave of its own, with its pitch determined by its speed.

For example, if the envelope can move up and down within 5msec, it will produce one cycle of a spike waveform at 200Hz (see Figure 1). Admittedly, this is a pretty low fundamental frequency, but a spike has *lots* of harmonics, and will end up sounding pretty bright. This spike can fill the role of a key click or hammer strike. It's actually better than a sample, in that its pitch stays constant across the keyboard, because the rates of the envelope stays constant

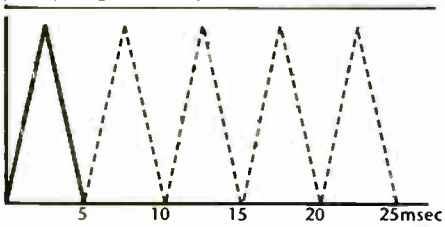


Figure 1. A fast envelope acts as a single cycle of a continuous, spikey waveform.

(unless, of course, you have keyboard tracking on the rate). If it was a sample it would change pitch along with the sound itself, which is an aural clue that something's being merely transposed as opposed to *played*.

The sound will vary depending on the hardware inside your synthesizer, what's being jerked around (including how fast it can follow), and the exact way in which it is being jerked. At the worst, everybody will be too slow to make a click; at best, you'll get some interesting stutters out of whatever element the envelope is jerking (such as the filter or timbre) along with the envelope's own little performance.

- **Clicks**

The easiest click to introduce (which can be produced with the simplest envelopes) is the organ click. You know – the sound of ancient Hammonds spitting at you, either thanks to the percussion drawbars or the key contacts being just plain dirty. Grab ahold of the envelopes

Figure 2. An organ click envelope.

and set the attack and decay rates to their quickest, with the attack level set to max (the only place it can be on most synths) and the sustain fairly low (see Figure 2). This introduces our click. You can either do this with all the envelopes at hand, or set just the amplifier envelope this way, and let the filter (or timbre, or whatever) envelope react slower to keep timbral evolution.

A more complex version of this click uses multi-segment envelopes, and can be routed to the filter, amplifier, or whatever you so desire. Set the first point on the envelope to maximum level, the second to minimum level, and the third to whatever intermediate value is appropriate for the rest of the patch to continue from (see Figure 3). If your synth requires that the

Figure 3. A more complex click.

first point always start at zero, then use an extra point to get up to maximum as quickly as possible. Set the rate from the first to the second point at or near its fastest; the rate from the second to third can be the same or slightly slower (slowing down this rate lowers the pitch of the click). You may have to experiment with slowing both rates down, because sometimes envelopes can react faster than what they're driving (and therefore be ignored if they try to move too fast).

There's usually two things happening at once with this trick: one, you'll get a click from the envelope opening as fast as it can; two, you'll get a choking or gulping sound

"You can't direct a synthesizer to temporarily clip, so you have to make it 'break down' to produce a click in another way."

(depending on the envelope's rate) as the item being enveloped gets pulled down quickly to its minimum value and is allowed to more slowly recover.

Introducing a click with these methods works in almost any form of synthesis, and at any point in the voice. Using these types of envelopes on the modulator of an FM pair, in particular, gives a short, complex attack burst that sounds "dirtier" (and therefore, to my ears, more realistic) than typical FM bell attacks. Using it for pulse width modulation or even to bend the pitch works too – remember, the objective here is to make a quick attack as complex as possible.

- **Blips**

That complex click mentioned above is a variation on faking horn blips at the attacks of sounds. A horn blip is an effect in which the signal rises quickly from zero to full amplitude, falls fairly quickly, and rises back up near full again (see Figure 4). Changing the rates changes the feel of the blip. If you have enough envelope stages, you can

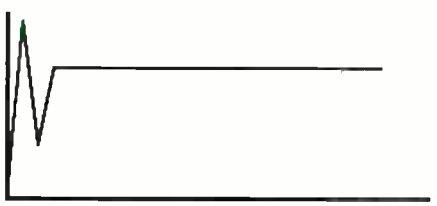


Figure 4. The classic horn blip.

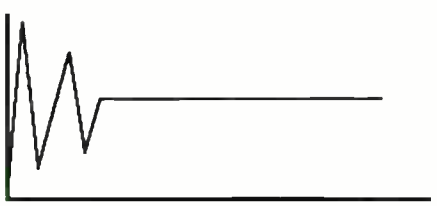


Figure 5. A triple-tongued horn blip.

introduce two of these quick peak/valleys, giving a triple-tongue effect that would make any horn player jealous (see Figure 5). Use the triple-tongue sparingly; I've found that the ear seems to catch on that this is outside the realm of natural possibility, and gets tired and annoyed with it very quickly. Just introducing it every now and then makes it seem like the occasional impressive trick. Routing velocity to a couple of the rates or amplitudes of either the normal or triple-tongue blip also makes for very expressive playing.

- **Plucks**

A variation on the attack click or blip is to turn it into a pluck. The pluck is again two sounds – the initial noisy attack of a plectrum or fingernail hitting a string, followed shortly by the twang of the string actually being released. The reason most synthesized plucks sound thin is that they only recreate one of these events, and the ear notices something is missing.

Set up a pair of clicks for the VCF and VCA (or whatever two elements of the sound producing signal chain you so choose), and delay one very slightly past the other. If your synthesizer allows, simply set the delay at the envelope. If you don't have a delay function but have multiple segment envelopes, use a couple of segments to fake the delay. This is done by defining the first two points to have a level of zero, and treating the rate between them as your delay. Then have the third point rise quickly to the attack peak, and proceed from there (see Figure 6). In a

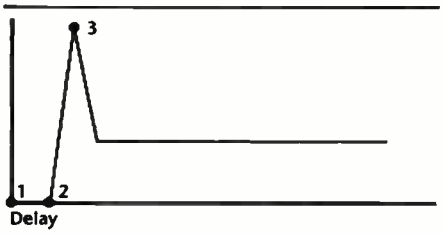


Figure 6. Faking a delayed envelope with multiple segments.

typical analog or wavetable synth voice, have the filter delayed after the amplifier. The amp should click on its own (again, the amp may respond too sluggishly in some synths to simulate this), and should be open in time for the filter or timbre click to get through.

Routing velocity to the delay adds a unique expressiveness, in that it simulates how hard the string is being dug into (thus resulting in a longer delay from the pick engaging the string, stretching it, and finally releasing it). Having velocity routed to the filter or timbre envelope amount (and allowing it to be up somewhat on its own) allows variances between a click and a bright pluck.

Building a good envelope takes time. Cheat. Use it again. If you have created the ultimate horn blip envelope on your wavetable synth, copy it to another patch, and try different waves. Once I found a good horn blip in a Prophet VS factory patch, I shamelessly copied it and plugged in other horn-like waveforms to create a

fuller family of wind instruments (I even copied samples of real wind instruments and used those – for more details, see *Using the Sample Dump Standard, Part II*, MT April '87).

Ebbs and Flows

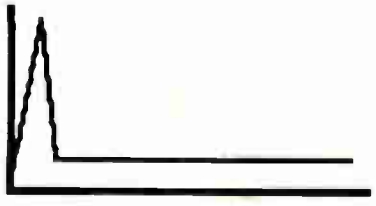
LET'S SLOW THINGS things down a bit and talk about adding evolution to sounds with slow envelopes. Time for a little life story: it was one of the goals in my life to own an Oberheim Xpander (tells you how a synthesist thinks). I like analog, and consider this beast to be the epitome of analog synths. Unfortunately, I got mine *after* I had a sampler and the aforementioned Prophet VS. If a sampler has a more than one-cycle loop, there is evolution and motion to the sound (even while the key is held), thanks to the ebb and flow of the natural sound. The Prophet VS has looping envelopes (those being a fairly rare breed, whose bloodlines include the Kurzweil K150 and Buchla 400), which help simulate this effect. Anyway, I got my Xpander home, hit a big note (as opposed to a chord – I can only play monophonically – bass player/lead synth mentality), held it, and . . . the sound stopped. Not "stopped," as in shut off, but stopped, as in stopped evolving. All the envelopes hit their sustain stage and held the fort. Boring.

There's a few ways around that.

- **Swells**

More and more synths are growing extra envelopes, including ones that can be routed to anything. Others allow at least, say, the filter envelope to also be routed elsewhere. What you need to do is use these extra "gifts" to help make your sounds more interesting. First, create your sound as normal. Then take one of these extra envelopes, and set it for a very long, slow, slight attack and decay. Patch it to something that changes the timbre – pulse width modulation, filter cutoff or Q, *something*. After the majority of the elements have done their attack gymnastics, there will still be some subtle evolution to the sound. Believe me, this makes all the difference in the world – the sound doesn't just die and say "Hi! I was just a fake synth patch all along . . ."

For synths without spare envelopes, set the envelope on some portion of the sound to act slowly. Many digital synths these days have multiple oscillators per voice, and some are invariably reserved for



the bulk of the sound while others add higher harmonics or color. For example, with a CZ family synth, take the line that is mixed in the back of the sound, and have it change level or timbre very slowly while the other holds. In an FM synth, take the level on the modulator that is furthest away from the output stage (and is therefore least audible) and have it go through some slow evolution.

Another tangent to the slow evolution trick is to simulate an organ swell. There are two ways to do this, depending on the type of envelopes your synthesizer has. If you can set the attack level to something other than max, bring it down to something like 80% of full excursion. Then have it slowly rise the rest of the way to the next stage, and then decay or hold (see Figure 7). If your envelopes have an extra decay stage (like the Korgs), go through the normal rise to max, drop to a medium level, and then let the extra stage rise very slowly just a few percent to the actual hold level. I'll use this effect on the amplitude more often than the timbre, just to make it more subtle and more like the volume pedal on an organ (or a wind player adjusting his or her breath).

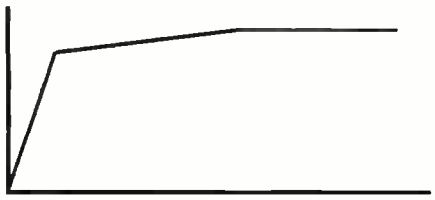


Figure 7. An organ swell.

An overall "swell" trick (no pun intended) to add complexity to a sound is to have things proceed at different rates. If you use the envelope swell or slow decay tricks above and are using more than one envelope to pull them off, make sure that they are proceeding at different rates, and (preferably) that one is going up while the other is going down. This produces a crossfade type of sound that seems to be particularly pleasing (and interesting) to the ear.

- **LFO Tricks**

A variation on the slow evolution idea is to take advantage of delayed vibrato and LFOs. Having a little vibrato or warble to the filter come in slowly (at about the time the envelopes are hitting their sustain stages) keeps a sound alive. I know we're talking about synths here, but this technique works well on samplers too – a little wobble coming in just as the sampler is hitting that static one-cycle loop does just the trick. Alas, delayed LFOs are all too rare, but if you have them, exploit them.

If your synth has more than one LFO, set them to different rates. This is particularly effective if they are modulating the same thing, such as the filter, timbre, or the pitch of two oscillators. Multiple LFO rates will make the vibrato sound more ragged, random, and "human" than the machine-perfect (and machine-boring) "wahwahwah" we've all heard and turned our head away from. A trick on the Kawai KI (and, I imagine, other synths) is to use one oscillator tuned to a very low fixed pitch to modulate the amplitude of another; this also produces a more complex vibrato than a typical wah.

Another LFO trick comes up if your synth allows you to synchronize the LFO to the start of the sound. This means that it will always go through the same gyration when the key is hit, which makes it almost like another envelope (particularly if you can fade it out, as opposed to fade it up). The old Oberheim SEM (Synthesizer Expander Module, which was covered in last month's installment of the *Classic Synths* series) has simple three-stage envelopes, but it can also be modified to sync the LFO – yielding some more complex attacks (I let the envelope click, while the sine wave adds the slower and continuous evolution that is as repeatable as an envelope – see Figure 8.)

The Overall Strategy

APPEARANCES ASIDE, THERE'S a method behind the madness of presenting the two seemingly unrelated classes of tricks above. First, a sound should be initially interesting to catch a listener's attention on its attack, and then get out of the way to let new notes be articulated without competition. However, when a held note is featured naked, it should have something *subtle* going on so as not to bore the listener. It goes without saying that additional performance parameters (such as pressure and mod wheel) should always be programmed for when the player (that's you) feels like interjecting some life into the performance.

Uh, you *do* try to put some life into your machines, don't you? ■

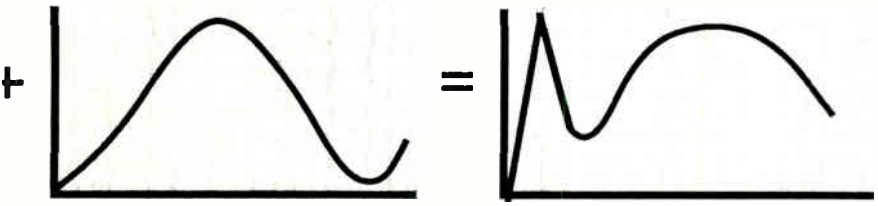


Figure 8. Combining synchronized LFOs with an envelope.

a different THIRD WAVE

From video in a corporate boardroom to the demolished stage of an industrial music concert all the way to modern Venezuelan folk tunes on Ralph Records, Frank Harris' output defines what a modern musician should be all about. *Interview by Rick Davies.*

THINK OF THE term "industrial music." Depending on whether you're wearing a tie right now, this might evoke images of IBM and CitiCorp training films, or it might remind you of the grating sounds of bands such as Throbbing Gristle, Cabaret Voltaire, and Rhythm and Noise. In both cases you are describing the work of Frank Harris.

Based in San Francisco, Harris is known for his Synclavier productions for the aforementioned IBM symposiums and CitiCorp in-house films, as well as for his programming and producing with Rhythm and Noise. More recently, Harris is gaining well-deserved recognition for his own recordings with Venezuelan singer Maria Marquez and his productions for Ralph Records (vinyl home of The Residents and other musical fringe elements).

His first major US airtime break came in 1987 with the release of *Potatoes*, a folk compilation album released by Ralph. Harris' arrangement of 'Canto del Pilon' (featuring vocals by Maria) proved to be one of the album's most striking tracks. Opening with a simple vocal arrangement, 'Canto del Pilon' blossoms into a colorful synthesis of two women exchanging gossip while mashing corn in a small South American town. The sound of corn being mashed in a mortar with a pestle (sampled, of course) keeps the beat throughout.

Harris' first EP release, *In a Minor Mode*, is quite different from the odd and angular sounds often associated with Ralph. It shifts between pop, jazz, and folk music forms without any noticeable discontinuities, clearly indicating his strong (and diverse) sense of musicality. As he describes it himself:

"Folk music is just one area that I've dabbled in. I like to wear a lot of different hats. I like rap, pop, classical, scary music. I don't really have a niche that I hang out in."

Even as we sleep, Ralph Records is establishing a new label – Elemental Music. One of the first releases to come out on Elemental is a rap song for children entitled 'Don't Talk to Strangers,' along with a follow-up to *Potatoes* entitled *Beets* (a new jazz compilation featuring such names as Anthony Braxton, Winston Tong and Fred Frith). Both of these releases feature Frank Harris prominently as musician and producer.

While *Potatoes* was a success for Ralph, and 'Canto del Pilon' received substantial airplay on alternative radio stations around the US, this was actually the song's second lease on life. 'Canto Del Pilon' was released as a single in 1985, although it went virtually unnoticed in the US.

"The single somehow found its way to other countries," recalls Harris. "It found its way to Europe, and they really liked it. I got requests to license it, even though we didn't spend any time trying to promote it.

"It found its way to Venezuela, and actually got on the charts there. A lot of people thought 'What are you doing to our folk music?' At the same time, because of the synthesized sounds, a whole wealth of people were saying, 'Far out, man. No one has been doing this with our folk music.' So it was controversial yet popular.

"My parents spent a lot of time in Latin America when they were younger, and they picked up some records. So, I got saturated with Latin music at a very early age. It must have gotten under my skin somehow. The way that the whole culture celebrates music intrigues me, and brings me into the music. It's important for me to convey warmth in my music ultimately.

"I like the harmonic progressions that exist in Latin music, especially in Brazilian music. It's a rich harmonic structure – the chords are very jazz-like, and very supportive of the melodic line."

HARRIS RUNS THIRD Wave Productions in San Francisco, where he does his work producing and scoring for training films and symposiums, as well as his own records. Starting out, as so many people have done, with a Teac four-track, Harris found out early on how to build up his business:

"I did a documentary score that got played on PBS way back when I was in high school. I actually made some money on that project. I had a four-track, and I borrowed some money to buy an eight-track because I had this project hanging on it. When the money came in, I paid it back. So maybe that was the hook."

Hook, line, and sinker – Harris' discovery of the commercial opportunities outside of record producing gave him the encouragement to take on more challenging commitments.

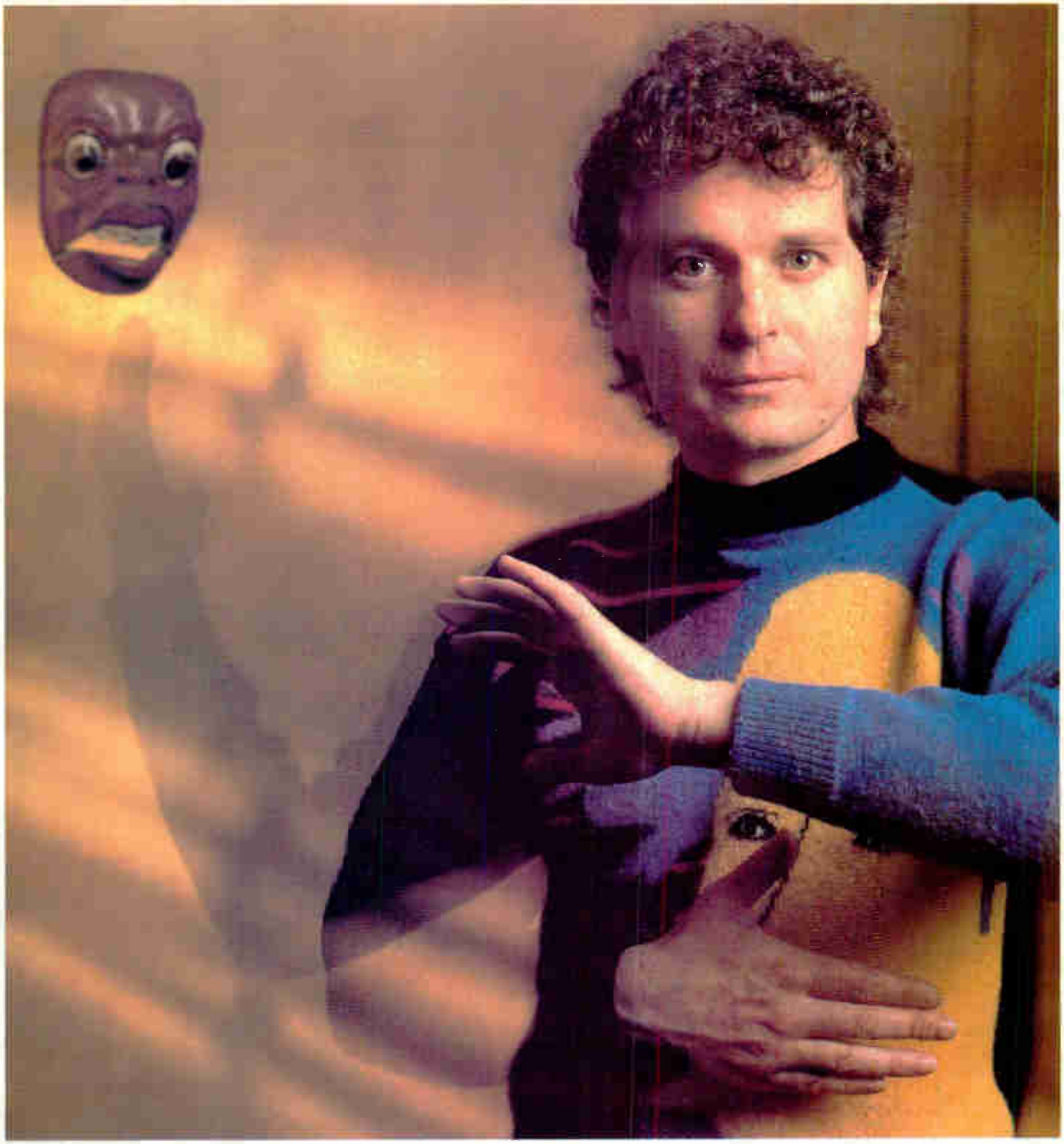
"I started playing around in clubs, and it was very hard to make a living. I saw an advert for a Synclavier, read their marketing hype about this digital synthesizer that had a 16-track memory recorder and thought, 'Wow, what I could do with that . . .' I knew that I would be happy as a clam if I had an instrument that powerful. I knew I had the musicianship to incorporate all the sounds that were now available with new technology.

"I decided that I'd put together a business prospectus. I got some investors, spent about a year preparing my strategy and then started Third Wave Productions, which was basically centered around the Synclavier.

"I wasn't heavily into synthesis until just before I got the Synclavier. It isn't as though I had one of the first Minimoogs, or worked with one of the first Moog modular synthesizers, or anything like that. I was busy studying classical music and recording acoustic instruments then. I just knew, after my multitrack experience, that a synthesizer like the Synclavier could be the answer to a lot of my problems. So I really became a synthesist by working with the Synclavier.

"I have the 190th Synclavier ever made – I got in sort of at the ground floor, programming the FM when the software wasn't really very powerful. There wasn't much real-time control at all, but of course this was before the DX7 or any other FM synthesis was out. It was so hip because the sound was so different."

Eventually, Harris met up with another Synclavier-based composer in San Francisco, Naut Humon, the driving force behind Rhythm and Noise. As part of the San Francisco industrial music scene, Rhythm and Noise gained notoriety for their startling electronic sound collages and live multi-media performances. (*Indeed, both MT's editor and technical editor will never forget their recent attendance of an LA performance of Rhythm and Noise that Harris did the programming for, where primal drumming, destruction of metal objects, screaming synth samples, and oddly soothing passages simply overloaded the senses.*) Harris programmed the Synclavier and engineered with Naut on



Photography Christine Alicino

their two albums, *Contents Under Pressure*, and *Chasms Accord*, and eventually the two of them decided to pool their musical resources and share a studio.

"We hooked up because I had a bunch of equipment, he had a bunch of equipment, and we thought it would be cool to combine our forces. We share a sound library and get access to a lot of interesting sounds. We decided that since we can only work 12 hours a day anyway, we could split up the clock into 12 hours and 12 hours."

As hinted earlier, aside from Rhythm and Noise's output and folk music, Harris does a lot of composing to picture. In doing so, he has developed sync alternatives to the Synclavier SMPTE option. In particular, he enjoys the Synclavier's Beat Sync method, which is similar to basic tape sync, but allows real-time keyboard control over the memory recorder's playback.

"I have run SMPTE, but using an Emulator. I run sync into the Emulator II and then that advances the Synclavier over MIDI. So I compose everything on the Synclavier's recorder, and then select the start time.

"There are a lot of neat things you can do with the Synclavier's Beat Sync option. It advances the memory recorder, according to what the current click rate happens to be. You can control the speed at which it is progressed in real time, by playing the keyboard. In fact, one of the pieces on my demo, the 'Gamelan' piece, was done that way. It was very tonal, with a certain number of sounds in it, simple chords and good voice leading. Then I changed the octave ratio and transposition of all the tracks to different settings and controlled the memory recorder in real time through Beat Sync. Sometimes the memory recorder would advance a great distance with one keystroke, and other times it wouldn't. Sometimes not all the notes would play because it wouldn't get far enough into the sequence, and then it would ▶

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Once again, it's easy to see when it comes to innovation, there's nothing new about the name Yamaha.

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get more complicated with the transposition and octave ratio changes. It got very far out, but it was all based on a very simple but well-orchestrated voice-leading piece.

"Then, of course, you have the Synclavier's on-board sequencer. Once you have one timbre, you can combine it with others. Even if there are four or eight voices in that one sound, you can duplicate and change it many times and get a gigantic sound."

Harris focuses much of his energy on creating a human feel in his recordings.

"There are a lot of different things I do to add the human element. I work with the timing and then the dynamics. Other weird things I change are the portamento rate and FM ratio, which can really change the sound of the tone, depending on how you hit the keyboard. I go in there and get that down so that it's just right, and a lot of people are really fooled by it.

"With drums, for example, I'll get three or four samples of the same drum which are virtually identical, but that are different enough to create the natural variations that a live drummer would make. He always hits the drum with a slightly different velocity, with a little different pacing, and so forth. And if you can get enough variation in your samples, and if the computer is powerful enough, you can start to emulate a real live performance, which is what I'm interested in doing as much as possible. We have Roland Octapads that we use, but there's still a certain static quality to samples no matter what you do. It's always the same sound unless you have so much memory that you can store several different kits with subtle variations on the sound. You can still tell it's sampling, but I go in there and try to devise ways to give it a different quality. It's always a tradeoff, a lot of people are satisfied with the same sound, especially in pop music."

HARRIS HAS DEVELOPED several methods for composing on the Synclavier. Unlike the traditional approach of sketching out a tune and then tightening up the timing, he does the exact opposite.

"A lot of times, after I build the form of a piece on the piano, I will put pointers or landmarks in the Synclavier to mark the changes of the tune. In other words, when there's a change, I will perform certain sounds to mark that change. Then I'll quantize performances just to get the form down of all the parts. Once I have that down, I perform each instrument's part all over again to create the feel. In other words, for speed's sake and accuracy, I use the computer power of being able to play things perfectly in time, and then go back from there and create the human element afterwards.

Don't get the impression that Harris thinks one person and a computer screen can replace live musicians, however: "Actually,

nothing is more rewarding than working with a great musician. And that's why I like to work with sax players and vocalists. It takes so long to perform into the Synclavier so that it sounds like an incredible jazz drummer, but if you have a great drummer in the studio you can nail it in one take. The Synclavier and computers are never going to replace live players."

Sometimes simply sequencing musical passages takes Harris only part-way there. He uses the Synclavier's sampling facilities to cut and splice long samples into new shapes. The *Beets* title cut once again reveals Harris' Latin influences. It opens with an exuberant percussion riff, the product of Harris' digital fidgeting.

"I like to sample segments of live performances and string them together to make a complete composition. On *Beets* the sticks were a live performance. I varied the sampled performance in many different ways in order to create that sort of live feel."

And then there's the crossover between 'The Sound of Music' and 'The Music of Sound' . . .

"Usually if I'm working on a big score, there are other people doing sound effects. But a lot of the music I do is sound effects – samples manipulated certain ways. It really is a fine line because you can use two samples of metal sliding across a concrete floor and though it's really a sound effect, it's music too.

"A lot of the samples that I use are done right in the studio –intersecting percussion, sounds from the Middle East. Scraping a little plastic top on a mirror. A lot of really delicate sounds become big played at different keys."

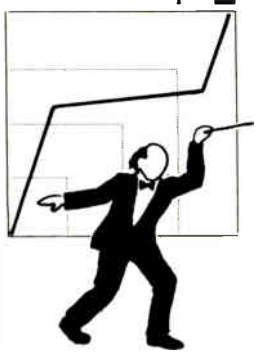
UNFORTUNATELY, MOST OF the world will never hear some of Harris' older compositions such as 'Spanish Moss' and 'Blood Red Beasts' simply because these are cuts that never hit vinyl. In addition, most of Third Wave's activities have kept Harris the Musician in the background. Now, he figures the dues have been paid, and the time is right to step into the limelight.

"Now I have sort of taken the route of making it as an artist rather than making it as a production house. I spend a lot of time developing music of my own in the popular genre, producing other vocalists, and looking for talent. In addition to recording the title cut on *Beets*, I'm doing the synthesizer programming and engineering on the Fred Frith contribution, and also producing and co-writing a song for The Artist Unknown.

"The old pieces that never got released are all part of trying to get one's self out there. I have a tremendous wealth of material that I've worked on for years that has had no avenue to get out there. It frustrates me sometimes, but I think things are moving in a direction that will allow me to put some of these things out. Every time I do something new, I grow so much from it. Every time I do a weird, far-out piece, or experiment in the studio, and something near comes of it, I incorporate all that knowledge into another project that *might* get out there." Let's hope some of that growth and knowlege gets to a point where it reaches our ears. ■

It Don't Mean A Thing If It Ain't Got That Time Distortion.

Time Distortion Map 1



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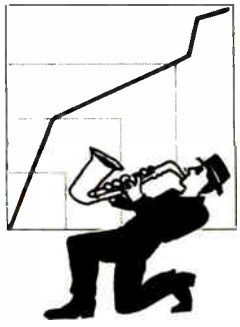

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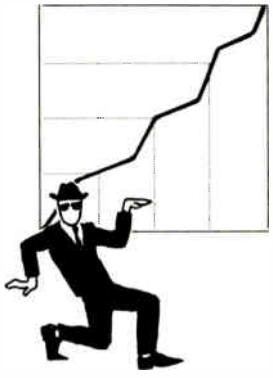

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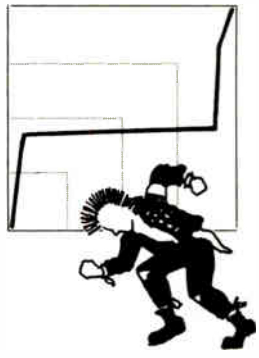

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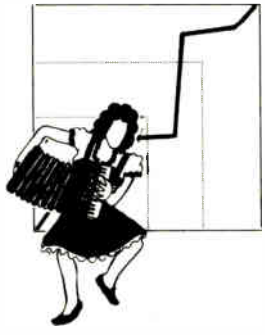
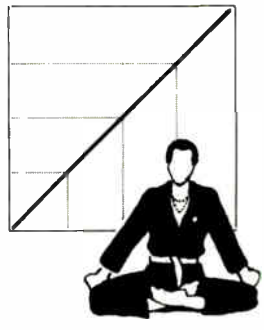


Time Distortion Map 6



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perspectives

THE STATE OF MIDI SOFTWARE

. . . and about the manufacturer's responsibility . . . *Opinions by Marc Costa.*

MUSICIANS ARE ENTERING a world new to them: the Computer World. For the most part, they need to be guided a bit. True, they are vulnerable, but they are learning quickly. MIDI has been around long enough now for a few points to be brought out in the open. Therefore, we need to look at some responsibility that has been neglected by software manufacturers.

Advertising is a great place to start. How many times have we seen advertising for some amazing new piece of software that pulls the "you'll never need anything else" lie? Then, upon calling the number, we find out that the software won't even be shipping for another three weeks (and in the software world, especially MIDI software, three weeks means two months, etc). This has to stop! Advertise when you are willing to bet your next two years worth of income that the product *will* be ready to ship when the advertising hits the streets.

I know advertising has a purpose, and honest advertising is rare, but don't lead the musician on. For example, if a program is predominantly a "graphic notation program" instead of a "MIDI notation program," say so! This could answer a few questions for most users, including ones like: "Will I have complete control of MIDI data?" "Will it transcribe?" "Will it do things that I want it to do?" If you fear losing sales because of your honesty, then figure out why and take the time to correct it (or add the needed features) – *now*; not in the future release (or you might never get there).

Does *this* word sound vaguely familiar: documentation (*da-cue-men-tae-shun*)? For the most part, the documentation in the MIDI part of the software world needs help. In some cases it would be easier to operate a nuclear power plant with instructions written in Russian than to decipher the user's manual. It is hard enough for most of the users to get their computer to behave . . . Let's talk about some key elements in a nutshell:

How about a well-thought-out Table of Contents? I can tell you that every time I pick up a new manual in this industry, the Table of Contents looks like fifty-two card pick-up. Make the Table of Contents useful. Label the areas well; have related items in the same chapter; put logical flow to it.

The body of most manuals also needs some help. In the business world you will find the first item labeled "Hardware Requirements," immediately followed by "Installation." In the music world, the users, if they are lucky, might find out how to install this stuff on their computer by the time they get to the index.

Next, we ought to find a tutorial. I have had the privilege of seeing one or two companies provide this in this industry, how about everyone else? Just because some people use a mouse doesn't mean they don't want some help. And keep things together – menu by menu. Put the "File" section first; then follow it up with everything in menu order or in order of use. The most important thing to remember is you are not talking to the programmer in this manual – you are talking to the *user*. Give the software and manual to the secretaries in your company: if they can get through the product and understand how to use it, you have a winner.

> ***"In some cases it would be easier to operate a nuclear power plant with instructions written in Russian, than to decipher the user's manuals for some music software packages."***

And then there's support. Ah, such a misused term in this business. This responsibility, in my eyes, extends from the manufacturer all the way back to the dealer (and for the record, I work for one). You *do* have the ability of picking your dealers. Don't choose one that says "Yeah, I'll give you support" (without answering or returning users' calls) or "No one can support you except for the company."

When the company hires a support specialist, it should make sure that s/he knows the product *before* s/he is turned loose on the general public. For the most part, a support specialist should be given two to four weeks to settle into the product, and then turned loose in a supervised condition. Bad support is like having no support. If you can't support your product, then get out of the business!

Finally, there's standing behind what you sell. If a software product is sold, the person that buys it has the right to say, "It does not fit my needs. I want to return it." Whether the dealer gives credit or money back is his business. But if the dealer declines and the user has to go to the manufacturer, the manufacturer should allow the user credit (based upon the retail price) for the software towards another product (and/or hit the dealer over the head for the customer). If the product has defects (otherwise known as bugs) and they cannot be fixed to the customer's satisfaction, it is time to cough up the cash. If the company doesn't refund, you can be sure that that customer will be the first person to stand up and say, "Don't buy that stuff, the company stinks."

Dear Users – Stand up for your rights, demand the proper support, advertising, documentation, and backing from these companies. They owe it to you.

Dear Manufacturers – Wake up and smell the coffee, get off your high horse, we brought you into this world, we can take you out. Produce quality products, let the products be beta tested on the outside, and use at least 20 test sites. Take the time to get the documentation right. Stand behind your product and don't give the user the tour of the office via telephone. Remember, there is an old saying that what goes around comes around . . . ■

Marc Costa is a keyboard player by troit and music software consultont ond programmer by profession. He recently moved to the Nashville, TN orea.

Something in the electronic music industry you'd like to comment on in 1000 words or less? If so, send your musings to: *Perspectives, Music Technology, 22024 Lassen St., Suite 118, Chatsworth, CA 91311.* Please include a daytime telephone number with your submission. We pay $100 for every Perspective published. Please note: The opinions expressed in Perspectives are those of the author; they do not necessarily represent those of the editorial staff or the publishers.

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READERS' TAPES

Subjects of this month's channeling: the possible return of guitars and a new type of musicianship.

Reviews by Yung Dragen.

TWO SEED THOUGHTS for meditation this month: one, are guitars making a comeback after the past several years of keyboards being *the* goof-around instrument; and two, have the multifarious timbres of synthesizers brought a replacement for "traditional" musical knowledge?

What brings up the second is *Nuclear Winter* by **XYL**. Chuck van Zyl, who is XYL in magnetic life, states: "At the time of

XYL – Nuclear Winter

Nuclear Winter's realization, I had no musical knowledge at all. It sounds like 'music,' but I was going strictly by the seat of my pants, guessing at what to do next." He describes his work as "dark age" music, which is pretty much on the mark – it's a cross between Berlin School (with a heavier reliance on drones, and syncopated parts replacing patience-numbing four-note sequences) and floating music (but Chuck's analog synth patches are a lot darker and more "frozen," relying particularly on the Xpander). It's kind of like a cross between early Klaus Schulze and Wendy Carlos' 'Sonic Seasonings.' There are four selections, with a running time of just over a half hour; all are strong and pass by in a hurry. Special mention goes to 'Testament of Youth,' which was printed at *average* levels of up to +8dB and includes the narration, "Your children are not dead. They are still alive. They are waiting for the world to deserve them."

Chuck says most of his music is improvised live; the same goes for **Thom Brennan** and his tape, *Mountains*. Thom employed a Matrix 12, OB8, DX5, QX7 sequencer, and ESQ1 to create his mental travelogs (the synths were treated, mixed and mastered to two-track at Steve Roach's Time Room). Back when I was actually looking for "new age" tapes, this is what I hoped to find: relaxing, detailed, organic, non-trite audio settings of sequencers and washes to let my brain leave my head and which I could settle into. A good reference here is the work of Richard Burmer. Again, there are no four-note trances – the title song in particular has the majestic rhythm of a pilgrimage viewed from afar. The only weak spot is the second half of the 28-minute title track, where Thom has some indecision on how to fade out the main theme halfway through (doing so by closing down a filter is cool, but it lingers a bit too long) and ends up bringing it back at a faster pace for a reprise at the end.

A leap out of the electronic and into the acoustic lands us in the lap of the "internationally unknown" **Mark Lemaire** and his cassette album, *Leftover Dreams*. Mark is primarily an acoustic guitarist and vocalist, with considerable chops at both as well as recording engineering. *Leftover Dreams* was recorded "mostly in the dead of night in a studio where I worked." Considerable care was taken to make this sound as clean and clear as possible. "Production was kept bare-bones to draw attention to the song, the words, the playing." Spiritual reference here is Michael Hedges (if he had grown up in the Deep South and had concentrated a little more on his voice instead of his guitar technique as he was growing up). The lyrics are good and down-homey, touching on friends, girlfriends, and being alone. Backing sounds include fiddle, dobro, string machine, "percussion and funny noises," and other more normal instruments. Fun and relaxing. Not for AC/DC fans.

The tape that brought up the first seed thought for meditation was **Pattie Vail's** *Mystery Date*. One side is kick-ass female rock 'n' roll (imagine if Joan Jett had had a pleasant childhood); the other consists of multitracked acoustic guitar works. Most of the rock pieces were performed by "writing all the keyboard, drum, and bass parts into a Macintosh, and assigning MIDI out to an Emax, Mirage, and Korg Poly 800. Then I did the guitars and vocals live. This is my first go at this one gal type of band thing. I usually just play lead guitar for others." The point I want to put forth here is not only do more people seem to be going back to playing guitar; samplers, sequencers, and MIDI allow guitarists to have a whole backing band at home and then concentrate on their guitar playing (hey, I'm a bassist – ever try to write or compose songs solo on a bass?).

Pattie still has a little way to go with production and vocal techniques. The instrumental lines are an odd mix of the heavily reverbed (voice, kick, some guitar lines) and the dry (lead guitar, snare). The massive

Pattie Vail

echo, reverb, and low mix level on the voice was particularly annoying – I think Ms. Vail has a good rocking voice in there; too bad it was obscured. She needs a little more vocal coaxing – too many notes started or stayed off key. The first acoustic number also suffers from too much reverb; the rest are relaxing

and provide some pleasant fun. And by the way, I'm in love; she's got to be the cutest person to submit a tape yet. More power to the home rock 'n' roller.

A steady stream of Contemporary Christian tapes are starting to trickle in. *City of Peace* by **VRTP** (Various Really Talented Persons) "is a concept album centering on a religious theme (New Jerusalem), but we have tried very hard to avoid beating the listener over the head with any kind of 'message.'" This tape seems to be mainly the

Kevin Leonard

collaboration of lyricist J. Scott Bronson and the brothers Card (Arlen and Russel). The Cards handle the production, composition and arrangement, with a long list of performers (Arlen also plays the electronic keys) pitching in as well. Most cuts are of a progressive-tinged "adult rock" style, occasionally getting a little rough, occasionally getting a little laidback (including some nice sax work). There are a couple of ballads and one choral number. Sound quality tends to be rather high, but there's an occasional lack of attentiveness in the mix (snare off to one side, hi-hat dead center). Unfortunately for those looking for a little VHI style rock *without* an overt religious content, the theme isn't as well hidden as the Cards may have hoped.

And by the way, who said progressive rock was dead? Or to put it a bit more generally, does any philosophy or art form ever actually go away? (No, just fewer of the faithful dare show their faces in public). **Kevin Leonard** sent along a compilation tape of his band North Star (which has released two cassettes – 'Triskelion' and 'Feel the Cold') and his solo efforts (of which he has also released two cassettes – 'Escape' and 'Crystal Influence'). Instrumentation fits the late-'70s style, including a Korg CX3 organ (used all over North Star's material), OBXa, Arp Pro Soloist, Minimoog, Juno 106, and a D6 clavinet. Kevin also plays bass and programs a Yamaha RX21 on his own material.

North Star is cut from the same prayer cloth as Camel, with slight anthemic influences (Le Orme, early Saga) and a theatrical vocalist. The problem with the production is that nothing is willing to come forward and grab my throat (with the possible exception of the vocalist) – the bass is nice but behaved, the drums are too dry (particularly the kick – anybody remember the cardboard drum sound of old Sensations Fix?), and the synth leads are weak (but then again, I never liked Arps). Kevin's solo material is jazzy, progressive, light, instrumental keyboard rock that is tamer than North Star, but pleasant. I enjoyed hearing the old classical chord progressions and time signatures again; I kept my headphones on just in case people might discover that I really am a hippy at heart despite my current charter-Republican-short haircut. It was nice to go back in time.

Be good; in the meantime, we'll see what tapes we can tune in and channel with next month . . . ■

Contact Addresses:
Chuck van Zyl, 322 Margate Road, Upper Darby, PA 19082 (tape costs $5).
Thomas Brennan, 23256 Hatteras Street, Woodland Hills, CA 91367 (tape costs $6).
Mark Lemaire, 3255 Kempton Avenue, Oakland, CA 94611 (tape costs $7).
Pattie Vail, PO Box 9301, Seattle, WA 98109.
VRTP c/o City of Peace Productions, 1999 North University Avenue, #5, Provo, UT 84604 (tape costs $7.98).
Kevin Leonard, 403 North Monroe Street, Media, PA 19063.

Send your demo-tape, a biography, equipment and recording details, and lots and lots of play money to: *Readers' Tapes, Music Technology, 22024 Lassen Street, Suite 118, Chatsworth, CA 91311.* Every tape gets reviewed, but we are backlogged.

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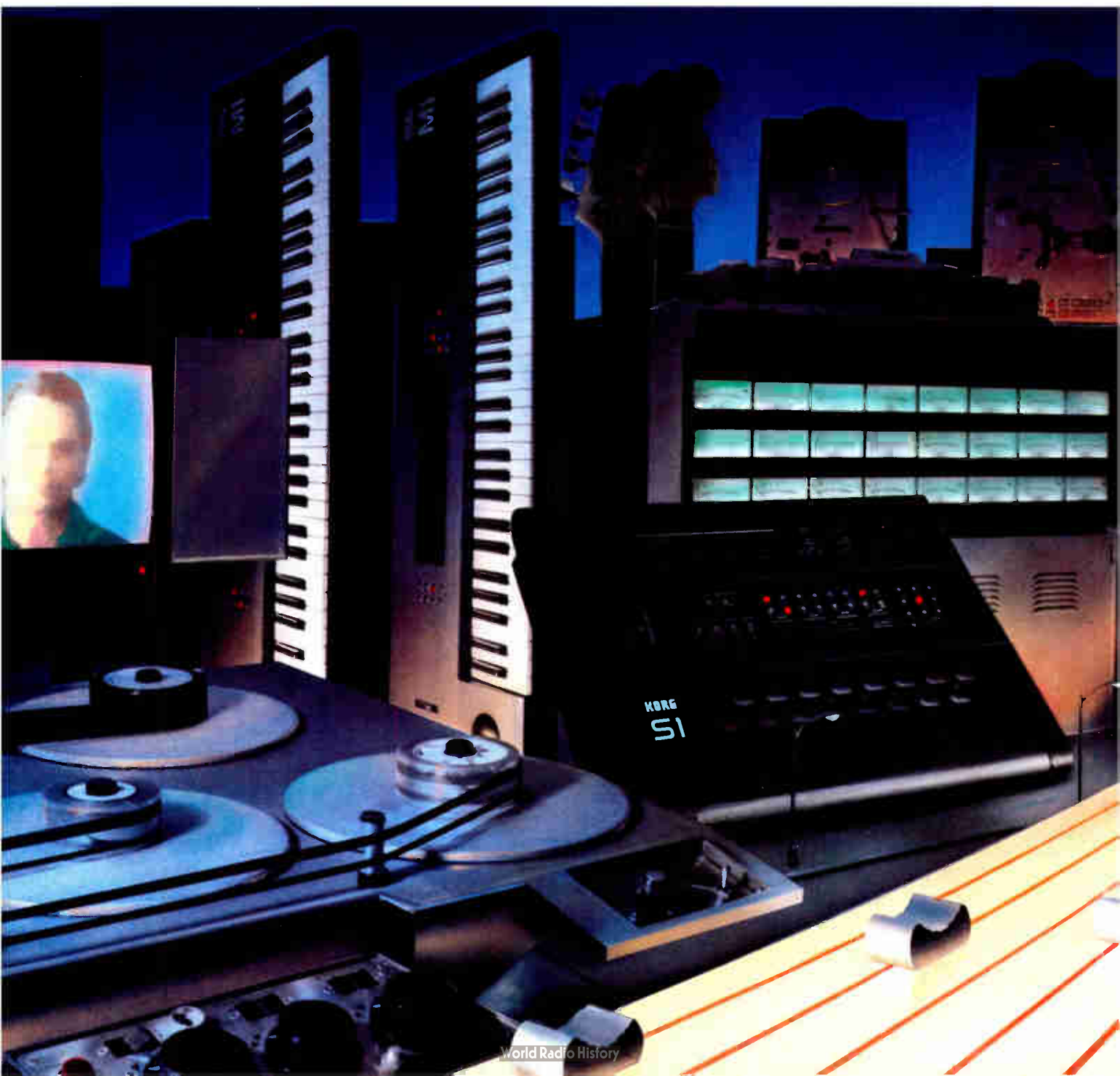

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Roland D20

Multitimbral LA Synthesizer and Sequencer

Photography *Rose Rounseville*

Synth, sequencer, drum machine, reverb and disk drive – this new wonder from Roland has it all in one box. All that's left is to deliver them in spades . . . *Review by Bob O'Donnell.*

IF YOU THINK about it, it seems obvious. Roland couldn't let the newest trend to hit musical instrument technology (the "workstation") go by without offering their own variation on the theme. And so, after a several month wait, the company's first complete MIDI studio in a box, the D20, has finally made its way onto the store shelves and into our offices. Sporting the justly praised L/A (Linear Arithmetic) sound, the D20 looks to be a hit among those looking for an "all-in-one machine" on a budget.

Square One

FROM AN APPEARANCE standpoint, the D20 looks a bit like a scaled-down D50

with a few extra buttons. The instrument features a 61-key velocity-sensitive keyboard, but unfortunately neither it nor the D10 (its closely-related sibling) has aftertouch. In fact, like the related rackmount D110 (see MT August '88 for review), neither instrument responds to aftertouch over MIDI – a rather curious oversight in this day and age.

Moving to the back panel, you'll find a headphone jack, the standard MIDI connectors, a slot for a memory card, three footswitch jacks (hold, start/stop, and punch in/out) and stereo outputs. User interface is through a 2X16 backlit LCD and there's also a disk drive for backing up data. I really hope other synth manufacturers start picking up on this trend – it was nice on the Yamaha DX7II and the Ensoniq SQ80 and it's nice to have it here too.

If you feel you don't need the disk drive or onboard sequencer, Roland is also offering the D10, which is otherwise identical to the D20.

Sound *"You can hear the occasional bit of quantization noise on Patches and Timbres using the sampled Partials, but the sound quality is a huge improvement over the MT32."*

Operation

THOUGH IT TAKES a bit of time to figure out the D20's organization, once you do it makes sense. Basically, there are two main modes of operation which affect the entire instrument – Performance mode and Multitimbral mode – and three different submodes which correspond to the various "parts" of the D20 – ie. the synth, the drum machine, and the sequencer. Each of these parts has its own dedicated mode button and can be thought of as an animal unto itself, but they're really designed to work together in various combinations. Also, the functions of each of these parts will vary according to whether the D20 is in Performance mode and geared for live performance, or in Multitimbral mode and geared for sequencing.

A good deal of the action revolves around the synth portion of the instrument, so I'll start there. In Performance mode, the D20 acts as a conventional synthesizer. You choose from any of the 128 available Patches (including splits and layers) and you play. If you want to add a bit of rhythmic excitement you can enter the Rhythm mode, start playing back any of the 64 available one-bar drum patterns (32 preset and 32 programmable), and then play the synth along with them. You can't change synth patches once you start playing a drum pattern, though – you have to stop the pattern, enter the Synth mode, change patches, re-enter the Rhythm mode and then start the pattern again. On the positive side, once these one-bar patterns have been assembled into a Rhythm Track (the equivalent of a song in drum machine lingo) in the sequencer, you can also play along with that by simply hitting the Start button – but again, you can't change patches.

The Multitimbral mode of the synth is for use with the onboard (or an external) sequencer – though you can enter the Rhythm mode and play along with drum patterns or the Rhythm Track. Here you select Timbres (which are different than Patches) for each of the eight available tracks, and assign them MIDI channels, volume levels and panning positions. The D20's keyboard is independent of the sound generator in this mode, so you have to make sure that the internal transmission and reception channels are aligned. To best take advantage of this situation, Roland has included the ability to have the D20's keyboard send on two MIDI channels at once.

The Rhythm mode is used for recording and editing individual drum patterns. You use the keyboard to play the various drum sounds (with velocity) or you can connect an external drum machine to transfer patterns into the D20. In addition, you can determine which key triggers which sound by creating a Rhythm Setup (like that found on the MT32). Each key in a Rhythm Setup can have reverb turned on or off and can have independent levels and panning positions. To alter this setup you have to change and write each key one at a time – not exactly the quickest way of working. If you prefer, you can also play or sequence the drum sounds manually in either mode by selecting the Manual Drums option.

Finally, the Sequencer mode is (as you would expect) where the actual recording and editing of sequences occurs. Only one long sequence is available in memory at once, though the maximum note limit is a hefty 16,000 notes. Most sequences will probably be recorded in Multitimbral mode, but you can enter the Sequencer mode from within Performance mode. The problem is you have to use the same Patch on all eight tracks if you do (though if you use a split patch you could record two different sounds). As a consequence, you can only record eight-part multitimbral sequences using Timbres; you can't use the generally more complex-sounding Patches, which is a drag.

Timbres? Patches? It's time to explain the . . .

Chain of Command

LIKE THE D50, MT32 and other L/A synths, the D20 has a voice architecture that's deep (see the sidebar for a bit more of the nitty-gritty). The most basic element on the D20 is a *Partial*, which can function as a single oscillator analog synth or a PCM sample playback device. The combination of four Partials is called a *Tone*. Tones, in turn, are combined with other global parameters (Key Shift, Fine Tune, Bender Range – with a two-octave range, Assign mode, and Reverb Switch) to produce either *Timbres* or *Patches* (depending on whether the instrument is in Multitimbral mode or Performance mode). In addition, Patches can be named (Timbres share the name of the Tone used to create it), a balance between two tones can be set, and an overall patch level can be programmed. Timbres can only use one Tone, but Patches can use one or two – depending on whether or not the Patch is in *Whole*, *Dual*, or *Split* mode. It's a difficult system to figure out at first, but there is actually a certain logic to it.

One point that can be confusing, though, is that some Tones use less than four Partials to produce a sound. What's occurring in those cases is that individual Partials were turned off during the programming process by using the Partial Mute function. This is important to know, because the polyphony of the D20 varies according to how many Partials are being used in various Patches. A one-Partial Patch can play with 32-note polyphony, while a four-Partial Patch can only play eight notes at once (in other words, the D20 has 32 oscillators). Rhythm tones used in drum patterns count against these 32 available Partials.

In terms of memory capabilities, the D20 can store up to 255 different Tones: 128 preset synth Tones are divided into banks "a" and "b," 63 preset rhythm Tones are stored in bank "r," and 64 user-programmable synth Tones can be stored in bank "i." In addition, the D20 has memory for 128 Timbres in Multitimbral mode and 128 Patches in Performance mode. Finally, up to 85 different Tones (from the bank of rhythm Tones or any of the synth Tones) can be spread across the keyboard in the one available Rhythm Setup. With a memory card plugged in you have access to another 64 programmable

Organization *"The immediacy offered by the D20's layout seems to encourage musical ideas – I found myself having a great time jamming with the built-in drum machine and sequencer."*

L/A Synthesis, D20 Style

ONE OF THE reasons behind the success of the L/A sound is that it combines two popular technologies into one: subtractive synthesis and sampling. The different Partials in the D20 voice can either play a square or sawtooth wave, like an analog synth, or one of 256 different 16-bit PCM samples (that's 156 more than on the D50), like a sampler. The PCM sounds available on the D20 include two groups of 30 drum samples (one of which is affected by master tuning and the other of which is not), 43 one-shot attack samples, 38 looped samples, 17 one-shot decay sounds, 64 effect loops of the same sound repeated, and 34 jam loops of combined sounds.

With the exception of the larger number and higher quality of the PCM sounds, the voice structure of the D20 is identical to the MT32. What this means is that Synth Partials each have a resonant filter and a corresponding five-stage envelope, an amplifier, and an LFO to shape the wave. PCM Partials, as they are referred to, only have the amplifier and LFO. In addition, each type of Partial has five-stage pitch and amplitude envelopes. All the envelopes can be affected by Keyboard Follow Curves and velocity and the Synth Partials can also make use of pulse width modulation.

Partials are combined into groups of two via one of 13 different Structures. The Structures determine what type of Partials are being used in a Tone, if the two Partials should be mixed together or ring modulated, and what outputs they should be sent to.

In comparing the instrument to the rest of the L/A family, the D20 is multitimbral (itself a big improvement over its dad, the D50) with dynamic allocation, but it is limited to stereo outputs (the D110 has six outputs). This puts it in the middle of the road in terms of suitability for sequencing applications – you can get a lot of sounds out at once, but you have to mix (and process) them onboard. ■

Tones, 128 Patches, 128 Timbres and one more Rhythm Setup. A memory card can also hold 32 one-bar rhythm patterns and one Rhythm Track.

As far as editing voices is concerned, the D20 is a bit slow to work with because of the small display. On the other hand, it does have some improvements over previous L/A synths. Specifically, when you want to edit a Tone, you can see and manipulate parameters for all four Partials at once. Prior to this, only the PG1000 programmer for the D50 gave you this ability. Another nice touch is that Roland has managed to streamline the process of reaching various parameters. Once you've gotten to the Page that you want to begin editing from with the Cursor and Display buttons, you use the bank select buttons to jump from subpage to subpage. It's pretty intuitive, so it makes finding your way around the machine much easier. If you ever do get lost, the handy Exit button will take you out of whatever you got yourself into.

The actual output of all these parameters – the D20's sound – is quite good. You can hear the occasional bit of quantization noise on Patches and Timbres using the sampled Partials, but the sound quality is a huge improvement over the MT32. As with most Roland instruments, the company obviously spent a great deal of time preparing the new factory Patches, and it shows – almost all are very good (lots of bright percussive sounds, warm pads and intriguing combination patches). The 63 drum sounds are also very clean and very good sounding – they remind me of the TR505 and 626 drum machines. As with the MT32, eight different effects are available: Small Room, Medium Room, Medium Hall, Large Hall, Plate and three different Delays, the last of which includes stereo panning. Overall, I don't think the D20 has quite the realism or variety of the (more expensive) M1 I reviewed two months ago, but if you like the D50, you'll definitely love the characteristic L/A sound found on the D20.

Sequencing

THE D20'S SEQUENCER is not going to be a replacement for your external hardware or software sequencer. It's a pretty simple affair, though it does have a few great features. The basic concept seems to be a sketchpad, for getting down your ideas quickly. Taken in that light, it is fairly successful, but limitations in its design do become apparent rather soon – for example, the sequencer only supports real-time recording; step entry or step editing is not an option. Similarly, both the drum machine and sequencer can sync to an external MIDI clock, but they don't respond to MIDI Song Position Pointers.

On the other hand, the sequencer can record velocity, hold pedal, pitch-bend and modulation, program changes, volume and panning data. In addition, it permits you to start recording (or re-recording) from any bar within the sequence, has punch in/out capabilities, and allows you to overdub additional note and controller data on pre-recorded tracks. One very cool function permits you to add just panning and

volume data as an overdub to existing tracks – just the thing to add some spice (or a mix) to your sequences. If you don't like what you've done, the D20 gives you the option of erasing just the panning and volume control messages or just the program changes. You can also quantize a track as fine as 32nd notes (the resolution is 96 clocks per quarter when the quantization is turned off), but any changes you make are permanent. One oversight that ought to be mentioned is that the sequencer has no cut, copy or paste type editing functions.

Once you've created the one possible sequence you can store in memory, you've got to remember to save it before you turn the D20 off –the sequencer does *not* have battery backed-up memory. Rhythm Tracks created with the sequencer (a list of what Rhythm Patterns to play back in what order) *are* kept, and you can store them along with the rest of the sequence onto disk.

If you want to use the D20 for live performance, you'll have to load a new sequence for every tune – no matter how long or short it is. Thankfully, the load time doesn't seem to be too bad – about 15-20 seconds for a typical song – but it can still get to be a pain. If you want to save all your patches and rhythm patterns with the sequence you can use the Save All function, which takes up a lot more disk space and takes much longer to load (over a minute).

Speaking of the disk drive, the one found on the D20 permits you to store up to 35,000 notes of sequencer data, or nine banks of patches, or 20 groups of 32 rhythm patterns and one rhythm track on a double-density disk. Though it's a decent amount of storage capacity, it's really not that great compared to many software packages or Roland's own MC500 MkII hardware sequencer, which can store well over 100,000 notes per disk. Also, the D20's disk drive can also only store its own internal memory – you can't save any other instruments' SysEx data along with your sequences.

Although I have quibbles with its lack of features, *operation* of the D20's sequencer is fairly straightahead and includes some well-thought-out options. For example, you can create a Rhythm Track from the existing Rhythm patterns (as previously mentioned), or you can record a manual drum part in real time on Track 8. A click metronome (with an optional count-in) is available for recording the other synth tracks and Roland has thoughtfully provided independent control over its volume. As for recording, normally you can only record one track at a time, but the D20 does have a great external record function that lets you dump sequences from external sequencers on up to eight MIDI channels at once. I found that I could also use this mode to record MIDI guitar data being sent on six different channels – a well-appreciated touch.

Roland's documentation mentions that you can use the D20's sequencer to control external MIDI synths – and you can – but the implementation of this control is limited. To send MIDI data from one of the D20's tracks you have to mute its internal sound by turning the track off. This means that you can't layer the D20's sounds with other synths. To record a track for an external synth you need to set the D20's transmit upper and lower channels to match that instrument, and then select a blank Timbre (a Roland representative suggests using the 64th Rhythm Tone – which is Off – to create one) on the D20 itself. You could use a normal Timbre, but you'll end up wasting some of the D20's polyphony if you do.

Conclusion

DESPITE SOME ANNOYING oversights, I think Roland has a real winner in the D20. It sounds good and it offers all the essential tools for producing a complete piece of music in one box. It doesn't have the depth of features that some of its more expensive competitors have (particularly in the sequencer), but it does have a few very hip functions that set it above the crowd. To be honest, I'm a bit surprised by the lack of aftertouch and the lack of step-time entry in the sequencer. Roland has covered so many other nice details throughout the instrument that I can't quite figure out why they overlooked these fairly basic features.

Working with the D20 is fun, though occasionally frustrating. Each section of the instrument generally functions as you would expect it to – which is great – but you may find yourself running into some dead ends, particularly if you want the D20 to act as the control center for your MIDI studio. On the other hand, the immediacy offered by the D20's layout seems to encourage musical ideas – I found myself having a great time jamming with the built-in drum machine and sequencer.

The bottom line is that with all the essential hardware goodies included on-board, the D20 represents a good value for the buck. If you're just getting started with synths and MIDI, or if you're looking for a single piece on which to work, the D20 is an excellent way to go. ■

Sequencer *"The sequencer only supports real-time recording; step entry or step editing is not an option."*

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re-introducing ANDY SUMMERS

New perspectives are a return to the past as ex-Police guitarist Andy Summers transcends the pop world pressure.

Interview by John Diliberto.

ANDY SUMMERS TALKS like a man who's just gotten a reprieve. For the former Police guitarist, the demise of that group a few years ago has freed him to do the kind of music he's always wanted to do – the kind of music he was doing before The Police sentenced him to several years of chart-topping records, sellout concerts and a real rarity, both critical and popular acclaim.

According to Summers, that wasn't really the music he had inside him. Those sounds can be heard on his newest album, *Mysterious Barricades*. An all-instrumental recording, Summers tracks through 13 tone poems that can best be described as ambient. Sparse guitar arpeggios are set against deep reverbs and delays with washes of synthesizer from David Hentschel.

"This album is not so much a guitar showcase album," admits Summers. "I didn't really feel like I was in the right spot to do that at that time, and it had to be reasonably simple because it was done in about five days."

Released on the Private Music label, there are some who might think Summers has gone New Age. "A lot of people think that, because of this record," he says with a sigh. "But no, I'm not. I'm an improviser. I didn't *even* do a 'new age' record. I just did some *music*."

However, for fans who know him only from The Police, it's definitely a departure. "I suppose some people would consider it a departure," he sighs again, and I know he's been asked this question a hundred times since the album's release. "I don't really see it as a departure. For me it's more like getting back to what I'm really all about."

Sweltering in the New York City heat of July, Summers is a little testy. A veteran guitarist for some 35 years, the blonde musician appears to have another 10 years to go before he looks his age of 45. Retreating to his air-conditioned hotel room, he immediately picks up a blue custom Fender Telecaster and begins picking.

Mysterious Barricades is in part a reaction to the failure of XYZ, his first post-Police album which sank without a trace in 1987. "It was a bad experience for me," Summers laments. "The record didn't get served at all. And one of the ways for me to exorcise that whole thing was to go into the studio immediately and do another record, a strong piece of work that I felt very good about and which was coming from a purer place. Now I see this as a new step in my career and probably the line that I will continue until I shuffle off."

Summers believes that the introspective moods and atmospheres of *Mysterious Barricades* are an accurate reflection of his own state of mind at the time of recording. "As I said, it comes from a pure place. There was no thinking, 'Am I gonna get this on the radio? Is this commercial?' I wasn't even thinking in those terms. I wanted to have an overall coherency and sustain an overall mood. But I was feeling introspective, thinking about what I was doing with my life, and I felt like I'd made a slightly false move. It was time to get back on the right track. And outside of the music itself, that's what the album was about."

SUMMERS HAS NEVER been one to flash his guitar prowess. Although he claims jazz is his primary early influence, you'll find little high-speed playing in his music, especially on *Mysterious Barricades*. "I've got a lot of chops which will be revealed shortly," he asserts. "but I've always been drawn to a dark sound on guitar. We all play with sustain these days; that's become a permanent part of the guitar. Unless, of course, you're warped enough to want to play in a 1940 bebop style," he grins. "Now I think I'm at a point where I'm ready to unleash that kind of stuff as well."

"That kind of stuff," however, is clearly leashed, bound and gagged on *Mysterious Barricades*, an album more closely aligned with the ambient music works of Brian Eno. "Ambient music has definitely played a big part in forming my musicial tastes," says Summers. "There's no question that the early works of Brian Eno and Harold Budd influenced me, as have people like Philip Glass and Steve Reich and Terry Riley. And Indian music and Balinese music, Wagner, Mahler – it's all been around in me since I was a teenager."

While most fans think that Andy Summers sprang full bore from the guns of The Police, all blonde, cute and cuddly, he'd already been making his mark in British progressive rock. His roots stretch as deep as the famous Majestic Hotel in Bournemouth, England where he held the same guitar seat in the house band that would later be occupied by Robert Fripp. There was nothing progressive about the Majestic Hotel's mix of polkas and oldies, but it wasn't long before Summers, then spelling his name Somers, was playing in British blues groups like Alexis Korner's Blues Incorporated.

American audiences first got to hear him when he toured with The Soft Machine, a vanguard group with Robert Wyatt, Mike Ratledge and Kevin Ayers that combined minimalism and jazz improvisation with rock instrumentation and Dada. The Soft Machine opened for Jimi Hendrix on his 1968 North American tour and the experience was eye-opening.

"We used to play an almost completely instrumental set, with very mantra-like things," laughs Summers. "I remember seeing America in the very late 1960s and being booed off many a place because what we were doing was much too far out for the American audiences at that time. Very hostile reactions. People used to hiss at us on the street in Columbus, Ohio. We walked down the street with purple clothes and long hair."

Like any guitarist with a brain from that era, Summers was in awe of Hendrix. "I remember being in a Hollywood studio with him and I played lead and he played bass," Summers recalls. "He was recording and

Photography *Peter Figen*

► Mitch (Mitchell) was on drums, and we played until I finally gave him the guitar back."

Summers snorts in laughter and humility. "I said, 'Maybe I should play bass now.' He was fantastic. It was thrilling to watch him play, standing that close with a cigarette hanging out of his mouth. He had about eight Marshalls cranked up and it was deafening; but, man, he was making that thing talk."

From The Soft Machine, Summers joined Eric Burdon and the New Animals, recording on *Love Is . . .* and gigged with several other artists before packing off to the University of California at Northridge and San Fernando State College, where he continued ingesting the music of 20th century avant-garde composers like Olivier Messiaen.

He returned to England in 1973 to play with Tim Rose, Kevin Coyne and Kevin Ayers, but the first inkling of his current direction could be heard on a series of records with German composer Eberhard Schoener. Schoener, an orchestral conductor, had one of the first modular Moogs in Germany. They met while Schoener was conducting one of the symphonic monstrosities that Deep Purple keyboardist Jon Lord kept trying to foist on an ill-informed classical rock audience.

"He made one with a rock group and a hundred-piece Hungarian Orchestra called 'Sarabande.' I was the guitarist and Eberhard

Schoener was the conductor, and that's when we struck up our relationship," recalls Summers fondly. "He invited me back to Munich several times to play on different projects. At one point I'd also gotten into The Police. I had one last commitment to Eberhard, and I actually managed to get Sting and Stewart on it and then we continued with him after that. We had a couple of tours with him until we actually got too big to do any more with him. But my memories of Eberhard are good ones. I used to stay in his apartment in Munich and we used to sleep on the floor; and we had great laughs because he's a great man and a wonderful raconteur and did crazy stuff like bring whole Balinese troupes to Germany years before anyone else was doing it."

Summers recorded several albums with Schoener, including a wonderfully subtle record for synthesizers, orchestra, monks and guitar called *Trance-Formation*. Some of the other, more pop-oriented material was recently re-issued as *Video-Magic*.

Summers both submerged and incorporated these influences in The Police. He knew this was his shot at the top of the heap. "I guess I always had the ambition to succeed in the rock big-time," he confesses. "I suppose anyone who plays the electric guitar does. Yet at the same time, I'm drawn towards stuff that's only for the fringe. It was a wonderful position to be in, but I felt that I should exist out in the fringe, not right in the middle where we were for a while. Not that I want to descend into obscurity. That's silly as well."

Even though The Police occupied the center frame of pop music from the 1979 hit 'Roxanne' through the mid-1980s, they managed to infuse their music with elements of reggae, African music, classical tonalities and a live improvisational sense that was rare in rock at the time. "We were able to project a lot of things into our music that I think normally groups as popular as that don't get to play," he concurs. "We had ethnic things and lots of avant-garde things, especially live. We would get quite abstract, yet the kids would carry on screaming and jumping about – and all the while we were on Planet X. It was fabulous."

"The new album comes from a pure place. There was no thinking 'Am I gonna get this on the radio? Is this commercial?' I wasn't even thinking in those terms."

With a deft combination of delays and choruses, he could create sinewy leads or choppy rhythms, all set against the high relief of The Police's open-air sound. Though he uses guitar synthesizers, he's developed a style based on outboard processing that will extend his timbral and rhythmic pallette, while making use of his own characteristic way of phrasing. "I'm more interested in effects and looping than actual synthesis," he explains. "I've got a Lexicon PCM 42, 70, Yamaha digital delay lines and I just got the new Eventide Ultra-Harmonizer 3000. That's like golddust. It does sampling and you can also tune to it and tune scales inside it which can be really interesting. I've also got some new TC effects and chorus."

Summers lives on a beachfront house in Santa Monica now, with his studio overlooking the Pacific Ocean. Although *Mysterious Barricades* was recorded in Devo's studios, Summers is now fully equipped for any other project he might want to take on, especially films, following the success of his *Down & Out in Beverly Hills* soundtrack. He looks out at the ocean across a Soundcraft 600 mixing console, with an Otari MTR90 24-track tape recorder and his older Otari four-track. He uses Q-Lock for synchronization and a Macintosh II for sequencing. In addition to the synthesizers and about 50 guitars, he occasionally sits at an 1895 Steinway grand piano.

When we talked, he was considering a solo tour in the fall (*which he has since agreed to do – Ed.*), opening for Tangerine Dream and trying to figure out how to perform his atmospheric solo music live, since it relies ►

more on multiple textures than solo leads. "I know certain things I can do with it," he reveals. "With the digital delay lines I can create loops, hold them and play over them, which is very effective, a very beautiful chorused echo sound which makes beautiful rhythms. It's like playing an electronic raga. I think I found a way to have three tape loops (digital) going simultaneously which I create at the time. So the main core of what I expect to do will be improvised each night. I'll just go out and choose a mode. Maybe I'll formalize it as I go along, but that's what's in my mind. I actually will improvise."

Of course, the problem is that *Mysterious Barricades* is not the kind of music that lends itself to 3000-5000 seat halls. These shadowy tone poems, which sound intimate on record, would be like a whisper in a factory if played in concert. "Since I have this album I should do something from it, but it's not really a performance-oriented album," he agrees. "But what I think I can do is go back and take 24 tracks and re-mix them without the guitar and edit longer solo sections in and open them up a bit and play with them on stage. I'm gonna take my life in my hands. I want to live dangerously."

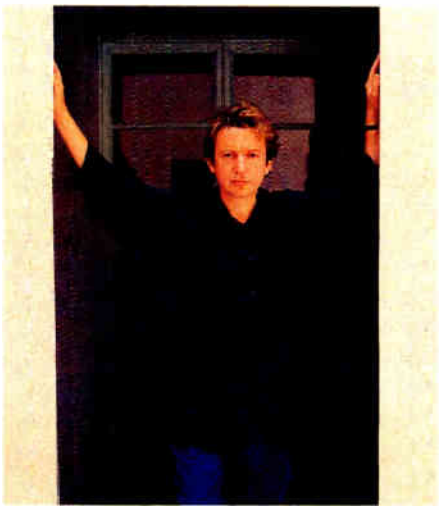
The title, *Mysterious Barricades*, conjures up Summers' classical training, as well as the mood he wants to convey to listeners. The title is taken from a Couperin harpsichord work adapted for classical guitar. "It's a piece I played several years ago," recalls Summers. "However, I felt quite fine about using it as a title for the album and making up my own piece for it. And it's got that word 'mysterious,' which gives you a feeling about the album before you ever put it on. You're entering into something. It gives you a clue on your attitude for listening to the record."

Most of the songs were developed in his then-rudimentary home studio in a very rapid succession. "I sat at home in my studio and sketched out the ideas over three or four days into a tape recorder, so I had most of it before we started," he says, adding that all the pieces were written on guitar, many on acoustic. That accounts for the very simple guitar arpeggios that serve as the melodies for almost all the tracks.

Summers avoided doing a lot of sequencing, even in places that might have seemed obvious, like the guitar arpeggio that runs all the way through 'The Emperor's Last Straw.' "I tried to play the whole way through, that was the first way I did it," explains Summers. "At one point I wanted to get it really accurate so I tried sampling it and putting it through that way, but it didn't sound as good. So I tried cheating on it, but the original way I played it, the one on the record, definitely has the best feel."

Other tracks are more clearly designed for spontaneous, real-time playing. 'When That Day Comes' reflects Summers' jazz roots more than anything else on the album, with its smooth, rounded tone and flowing, free melody. "I did it about three times," he says. "It's more like performing a classical piece where you want the nuances just right."

Summers uses very little guitar-synthesizer on *Mysterious Barricades*, leaving all of the synthesized sounds to David Hentschel. Although he's played with most of the guitar synthesizers out there, he is forever unhappy



with them. "I've got the Stepp sitting there rather idly at the moment," he laments. "I just had a real bash on the (Roland GR) 303 last weekend."

THE BASH WAS a recording session in Marin County with drummer Michael Shrieve, trumpeter Mark Isham and guitarist David Torn, that had him charged to stretch out more. Summers has a lot in common with David Torn. Both musicians have crafted a fluid, shifting textural sound using extensive outboard processing and MIDI controls. "We were so close in so many aspects it was amazing," Summers exclaims. "We made a very textural meeting. We should really make a record together, because we fit perfectly together."

He's also using a Steinberger guitar, which Torn swears by. "David showed me a few tricks. He's a real fanatic about it," recalls Summers. "He showed me how to get the tremolo arm in the right position. I had it caught up in the Trans-Trem bed and he showed me how you could unscrew it and have it hanging down."

Torn and Summers have both had frustrating experiences with guitar synthesizers as well. Summers has been using one since the Roland GR303, and both he and Robert Fripp did some beautifully intertwined work on their two albums of duets, *I Advance Masked* and *Beweitched*. But Summers still finds guitar synths expressively limited. "What's disheartening is that you wind up sounding like a cheap keyboard player instead of someone with a new instrument," he says. "You don't seem to acquire enough characteristic of the guitar in it. I get these things and play them to trigger keyboard sounds. They seem to actually reduce the keyboard sound, and you end up sounding like a wimpy keyboard player, rather than having a strong new expressive voice. So in the end, I decided that I can play this just as well on a keyboard. So what's the point?"

Even the Stepp was a disappointment to him. "I've tried the DX7II and D50 with the Stepp," he says. "I was disappointed with it and abandoned it and went on to playing the keyboards a bit more."

I suggested that since the various synthesizer technologies don't have the same intrinsic differences as say, a violin and a drum, that they will always share the same characteristics, whether keyboard or guitar triggered. "Except for the 303, where you could really wail like a fuzz box and tune it in fifths," he counters. "You could get great big washes. I've used it in the past more as a soloing instrument, notably on the records with Robert Fripp. There was one called 'Still Point,' a brilliant solo, I must say," he laughs.

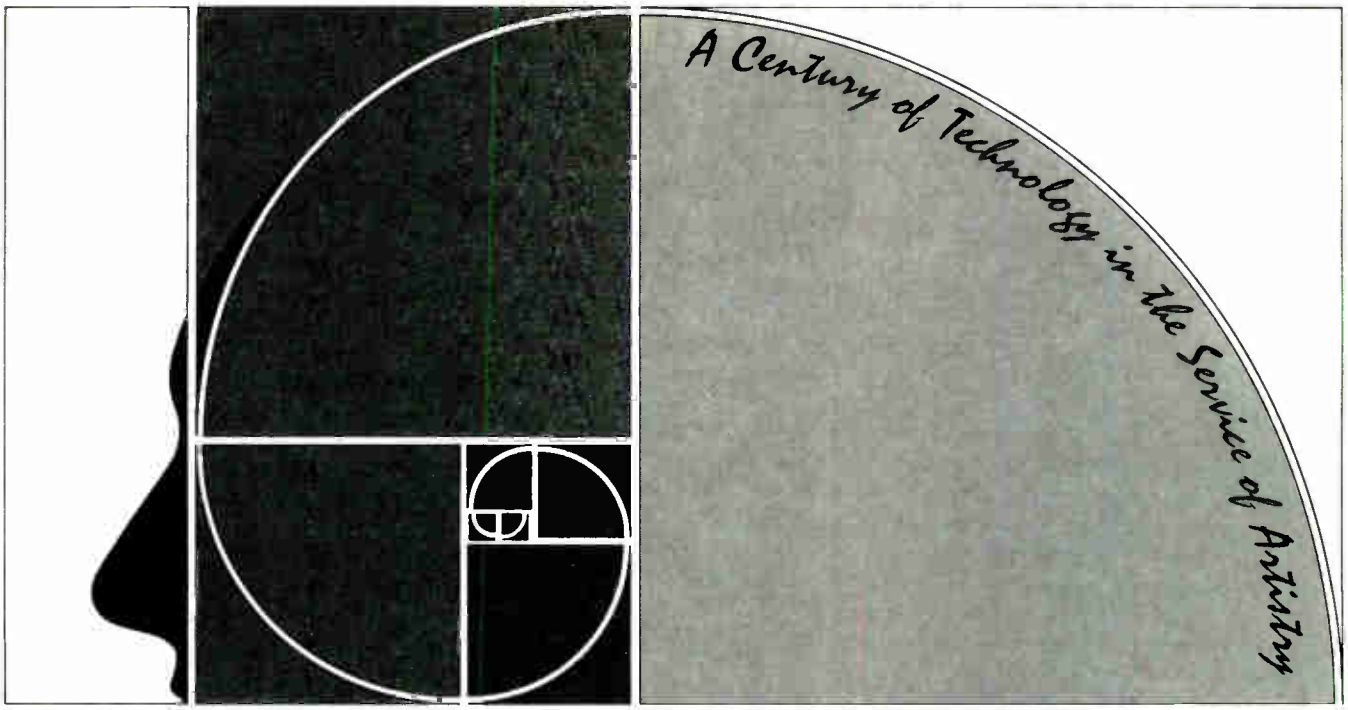
"I was using the 303 on that record with Torn and tuning it in octaves. You can really bend and fly on that one, but you can't with the more recent ones. You have to play them very accurately and quite slowly. I've tried them all. I've had a Stepp, the (Roland GR) 707. I haven't tried the new Yamaha yet – I was talking with David about this – but they're almost always a disappointment. It's a shame."

What he does embrace from synthesizer technology are MIDI controls, with a Yamaha MIDI control station to trigger his effects. "I'm trying to weave them all together, experimenting with the different chains."

"You don't seem to acquire enough characteristic of the guitar in guitar synths. You wind up sounding like a cheap keyboard player rather than someone with a new instrument."

Despite his reservations about guitar synthesizers, his new personal studio is cluttered with electronic keyboards: Emulator III, Roland D50, Roland D20 Piano unit, Prophet 5, Roland JP8, Minimoog, Yamaha DX7II and DX7. "When synthesizers were coming out, I wasn't wildly interested," he explains. "Now I'm more interested than I've ever been, but I'm a guitar player first and foremost and that's what I really like to do."

Andy Summers doesn't rule out making pop music in the future, especially if it's on someone else's record. But for now, he's content playing an old Stratocaster guitar and working up his live music and his next album. And if someone from the audience shouts out for some old Police material, they'll have to settle for their records and their memory. "Maybe I can play the guitar lick from 'Every Breath You Take,' he laughs, "but that's as far as you get." ■



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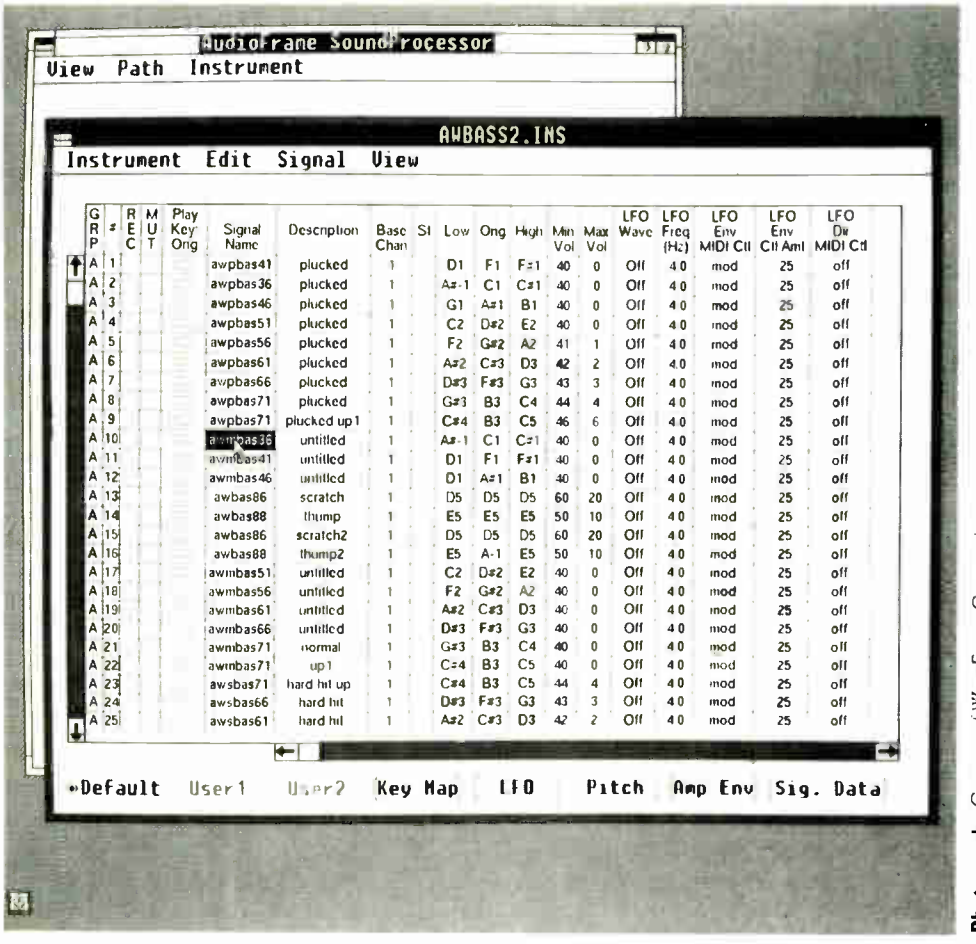
FUTURE POSSIBLE

THE AUDIOFRAME EXPLAINED

part two: the present

In this installment, the hardware and software options currently available for WaveFrame's AudioFrame are examined. *Text by Chris Meyer.*



Photography *Courtesy of WaveFrame Corporation*

Setting up an instrument's parameters inside the SoundProcessor.

LAST MONTH, THE hardware foundation of the AudioFrame was discussed. That foundation will be what WaveFrame builds on for the next few years with software options and hardware cards. As an employee of WaveFrame half-seriously quipped to me at a trade show last fall: "We did 24 months of development in the last 18. Now, we have to do another 24 in the next 12." This article will be a survey of what that last 18 months bought them; the next installments will look at some of what they have in store for the next 12.

Most of the product descriptions are lifted from their current description and price sheets; many were verified with hands-on demonstrations in their offices in Boulder this past June.

Hardware

A FEW DETAILS of the AudioFrame's hardware got discussed last month along with describing the architecture – the Digital Audio Rack (or "DAR," which holds the Digital Audio Buss, power supply, and ten card slots in a 19" rack – there's also an expansion rack available, and up to four may be linked), the control computer (a 20MHz 80386-based MS-DOS machine running Windows), and the Studio Control Processor (Mr. Communications for the DAR – it contains the LAN connection to the control computer along with the SMPTE, VITC, MIDI, house sync, digital buss word clock, and metronome inputs and outputs). A DAR (and therefore, AudioFrame system) is configured by combining the following pieces:

- **16-Voice Digital Sampling Synthesizer**

Also discussed in detail last month, this is currently the main sound-producing element inside the AudioFrame. It takes sampled sounds in either its own two megabytes of RAM or connected expansion modules (see below) and places them on the desired channels of the Digital Audio Buss (DAB) at the pitch and "velocity" requested by up to two of the internal 32 virtual MIDI cables (what velocity maps to is discussed later under

the heading "SoundProcessor"). Features include sixteen voices, 44.1kHz sample rate, 16-bit quantization, and five octaves of transposition either way with 512-point sample interpolation and curve fitting. Stereo is phase locked regardless of transposition or the position of Mars. Up to eight sounds may be layered per key inside a module and a sound can be mapped to as fine an area as just one key. A total of eight Sampling Synthesizer cards may be placed in a single system (yielding 128 voices).

- **Memory Expansion Modules**

The memory that can be accessed by a Sampling Synthesizer card can be expanded in 6, 14, or 28 megabyte increments, yielding a total recording time of 93, 187, or 355 seconds. Multiple cards may be stacked to extend the memory up to 32 megabytes per Sampling Synthesizer. Memory is dynamic; it is lost when powered down and needs to be reloaded.

- **Input/Output**

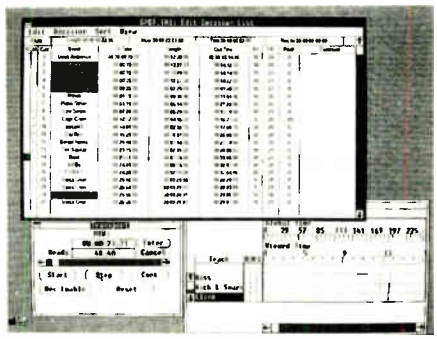
Three cards are currently available for getting the analog world in and out of the DAR's digital one - two input, eight input, and eight output. As mentioned last month, the inputs actually use 18-bit linear converters (and the DAB is 24 bits wide), even though the spec sheet only claims 16-bit conversion. WaveFrame's reasoning is that in reality they're getting a clean 15+ bits, and that's all they're going to claim (the *best* a 16-bit converter can get is 15½ bits); "gold card" versions are being designed to get closer to 18 bits. The output card includes dithering, which can be switched on or off. All have −10 or +4dB connections, configurable as balanced or unbalanced lines.

WaveFrame is also working on digital I/O cards for AES/EBU connections. As discussed in the second installment of our *Digital Audio* series last month, the AES/EBU standard doesn't currently have a clean way of declaring who's the sync master on the system - if one wants to run multiple digital audio feeds, they had better find a way to get them all synchronized - unless you're dealing with the AudioFrame. Following a philosophy that one shouldn't have to deal with additional considerations to make an AudioFrame work in their system, WaveFrame is designing an eight-channel card that can take unsynchronized feeds (that can even be running at different sample rates) and will internally - through a *lot* of processing power - match them up with its own DAB. Impressive.

- **DSP Module**

This is the one card that lifts the AudioFrame out of the league of other systems and makes it more than "just a sampler." Horsepower comes in the form of four Motorola 56001 digital signal processing chips per module, yielding a combined speed of 82 MIPS (million instructions per second). This is the popular new chip that's appearing on the likes of DSP cards from Digidesign and Southworth Systems (these cards, however, just use one apiece). Onboard memory is 750Kbytes (expandable to 2.25Mbytes); audio data resolution is 24 bits; arithmetic precision is 56 bits. Each card also has four WaveFrame-format digital I/O ports, with each providing five channels of audio. These are used for interconnecting multiple DSP Modules (even across racks).

I have seen demonstrations of two applications running on the DSP card: a



An unflurled EDL (Edit Decision List) inside the EventProcessor.

16×2 digital mixer with stereo reverb, four-band EQ per channel, and four aux busses all running at 24-bit resolution (mixing applications for the AudioFrame will be discussed in detail next month), and a synthesis application that physically models a clarinet with real-time control (which will be covered *two* months from now). The mixer software, which can be automated by their EventProcessor software (see below), is shipping now; the modeling synthesizer should be in beta test by now. The DSP Module is configured by whatever software is downloaded into it, and future plans already include a modular mixer, more synthesis algorithms, and dynamic filters for processing the Sampling Synthesizer's output.

- **SoundStore**

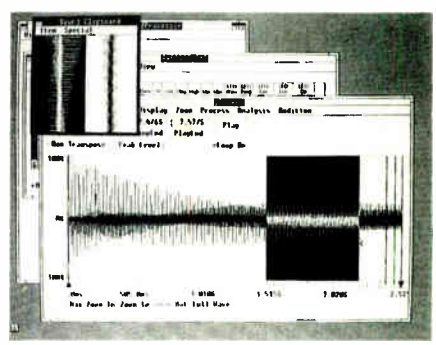
Originally, the AudioFrame's control computer held all of the samples, which then had to be downloaded to the DAR upon power-up via the token ring connection. This took time (ie. several minutes to load the 16 megabyte demonstration unit I had some time with). Now, the DAR keeps all sounds onboard. The Sampling Synthesizer has a SCSI port that connects to 90, 150, or 300 megabyte hard disks (which may be chained, for more memory). A 240 megabyte tape streamer is included for backup, and WaveFrame ships their sound libraries on tape. Sixteen megabytes can get loaded from hard disk to RAM in under 20 seconds. The hard disks and tape streamer are shock mounted, and are rated at Mean Time Between Failures from 20,000 (tape) to 40,000 (90 meg disk) hours - reliability that's going to be needed. SoundStore also comes with a user-adjustable associative database program for locating sounds by description (ie. "rocks," "big," and "short" for finding a brief avalanche).

Software

IT'S HARD TO separate hardware from software on today's digital, heavily-programmable machines. Most of the software modules listed below are permanently married to a given piece of hardware. As mentioned last month, all software is kept inside the control computer, and is downloaded to each card automatically upon power-up. All operate under Microsoft's Windows (see Micro Review April '88), which is a mixed blessing - its Mac-like interface is nice, but when I saw it in action it didn't seem to handle multitasking well (too many things on the screen slowed down the execution of applications). WaveFrame has been working with Microsoft to clear up problems, and has changed their memory allocation schemes to make Windows swap out their applications less often. They claim to have bought a 10× speed increase over the last two months.

- **SoundProcessor**

This is the main piece of software for sampling, editing samples, and setting up their playback parameters. Sounds may also be triggered via audio input for replacing existing tracks, and their control (threshold parameters and the order of up to four



Editing windows inside the SoundProcessor.

sounds to be fired) is set up inside this application. This AudioTrigger function, when active, locks out the rest of the AudioFrame's normal operation to ensure minimal delays (1.2 milliseconds max claimed).

Sampling can be mono or stereo. Sampling can be initiated by the user, by a threshold (level or SMPTE time - nice touch, that last bit), or can continuously loop, filling up memory until the user says "stop." Editing is visual, and includes ▶

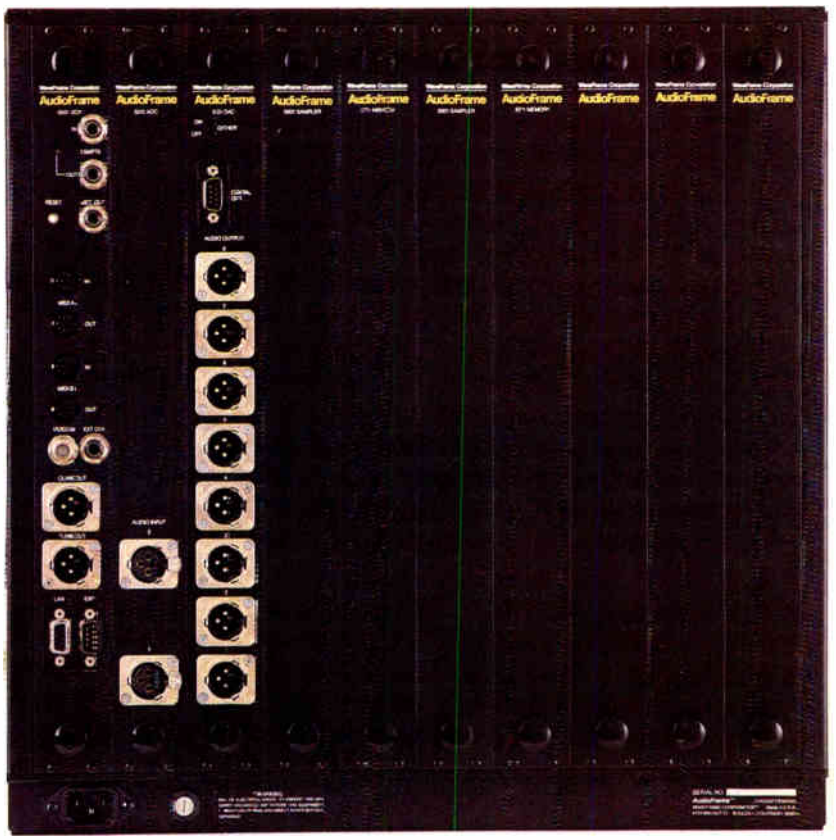
looping, crossfading (which sounded exceptionally smooth, by the way), truncating, cutting, copying, and pasting. Edits can easily be undone. Copied or cut portions of sounds can be kept in a clipboard for moving to other sounds. The Sound Processor's autolooping function works better than any I've seen or used – instead of using autocorrelation, the software looks at *patterns* of zero-crossings, and tries to find identical patterns at the two loop points to match up. The software then comes up with several candidates, which the user can preview. (For more on looping techniques, refer to *The Art of Looping* series, September to November '87). Lest you think I was thrilled overall with this portion of the program, the state I saw it in was considerably less refined than, say, Sound Designer or Alchemy (harder to get around, fewer zoom options, etc), was slow to redraw, and crashed a lot. As of the middle of August, WaveFrame said they had spent the last six weeks concentrating on enhancing, improving, and debugging the software to the point where they feel it's quicker to use and well-bulletproofed.

The amplitude and pitch of sounds may be controlled with multistage envelopes, velocity, and flexible LFOs. The LFOs were so smooth that I thought I was listening to an analog synth – no stepping was heard. The old user interface forced the operator to open a window, type in a value, and close the window for each parameter; the new interface (heavily designed by former Utopia keyboardist Roger Powell) is more like a spreadsheet with "gestural" editing – clicking with a mouse at the top of a parameter's space increments it; clicking at the bottom decrements it. Graphic envelope editing will be implemented soon. There are no envelopable filters – just a fixed cutoff software function that smooths out some of the high end. The spreadsheet has so many parameters that it goes on for several horizontal screens (yet was quick to get around on, with the help of markers). However, many common parameters that we would all expect (such as delay, keyboard tracking of the high-cut function, sync'd LFOs) were missing. In WaveFrame's favor, they reacted well to my nitpicking – all suggestions were taken anywhere from well to enthusiastically. Preset editing and keyboard placement were also a breeze.

- **EventProcessor**

Yes, the AudioFrame comes with a sequencer – but it is at such an admittedly primitive form that the person at WaveFrame demonstrating the system to me didn't even want to go into it beyond playing back a demo tune he had done. Now, "primitive" in this day and age still isn't all that bad – multiple tracks can be started at different times, and there was some degree of editing – but the basic

feeling(s) seemed to be that: one, it was just a sketchpad for now; two, owners have their own favorite external sequencer; three, they would produce a better one later when the schedules called for it; and four, Texture (written by Roger Powell, and considered one of the first really creative, professional sequencers to appear on the MIDI market) would be ported over soon (I've already seen a brochure).



The back panel of a typical AudioFrame system.

The EDL (Edit Decision List) portion of the EventProcessor for placing sound effects is considerably further along (and is quite workable). It has good links to the available sounds (an advantage on an integrated system) and allows you to audition the sounds being used, but it still isn't as advanced as, say, Digidesign's Q-Sheet (reviewed January of this year). Addressing the Audio for Video market has taken a back seat for now at WaveFrame until a number of current projects get finished and they can deal with the market as thoroughly as they would prefer.

- **MIDICAD**

Along with the DSP card, this was one of the features that impressed me the most about the AudioFrame. Here, a user can design and name knobs, faders, and buttons, and assign them to controllers on one of the 32 virtual MIDI cables inside the system. These controls can be manipulated by the mouse, subgrouped (with ratiometric scaling – in other words, the master controls the percentage level of everybody, as opposed to the clumsier technique of just adding to or subtracting from its value), and can be memorized by the internal EventProcessor. They can also be sent out over a physical MIDI jack, or be controlled by MIDI coming in. Now, all of this can be performed by Digidesign's Q-Sheet, but when married to the rest of the functions of the AudioFrame, I start to get excited. For example, the DSP Module is shipped with MIDICAD and a screen that controls the 16×2 mixer. That control is also very smooth – positions of controls are updated 1000 times a second, and moves are smoothed beyond first-order precision. (I tried without success to pry the algorithm out of WaveFrame's chief engineer John Melanson, who just gave an embarrassed smile and commented, "Really, it's so easy, we're surprised no one else has done it.")

Currently, the MIDICAD function for the 16×2 mixer is the only one available and the ability for the user to create his or her own controls has been turned off ("users could box themselves into a place they couldn't get out of"). WaveFrame has plans to make many more presets available in the future, however, along with a version users can edit.

Manuals

DOCUMENTATION IS ALWAYS one of the scariest things about any product. Manuals translated from another language often leave one scratching one's head in confusion (and are even occasionally *wrong*); those written by engineers tend to assume too much previous knowledge; others are non-existent.

Manuals are another feature that is evolving in the AudioFrame system. When I visited in June, I asked for a set; I was given a "System Overview" (which tells how to hook the system up, and goes over the user interface conventions in the most general of terms) and was told that they were being completely rewritten, and I would get a set when they were available. I'm writing this installment in the middle of August, and all I have is a new System Overview manual and one for the DSP Module and MIDICAD (written in the context of running DSProcessor). To this point, AudioFrame owners have been working from a "beta" manual. Specifics of the machine have changed considerable since that was written, but the concepts are pretty much the same.

The manuals I do have are quite simply excellent. I've never read anything that's lead me by the hand so well. Again, this is another aspect of the AudioFrame that ain't up to full snuff now, but I like the trend that I see.

End of the Day . . .

"IS THE AUDIOFRAME just an expensive sampler with no filters and a fair-to-middlin' sequencer thrown in?" Earlier this year, I would have replied "Yes, but so are the Fairlight and Synclavier, aren't they?" Not exactly a fair assessment – all three are brutally powerful – but they're also brutally expensive; especially if you compare them to other currently available products that cost far less because of the manufacturers' willingness to give up a CRT, massive storage, and a bit of sound quality for now.

However, some new developments in the AudioFrame – namely, MIDICAD, Texture, and the DSP Module – point out a bit of growth for this system that shows a future, for me, beyond just being a rich musician's dumb playtoy.

In the next two installments, I'll be looking at some of those future developments – the AudioFrame as a digital mixing console, as a sound modeling synthesizer, and (WaveFrame's own development schedules willing) as a hard disk recorder. How many pennies have *you* saved up? ■

Imagine an artist painting with an infinite palette. That's, in effect, what CASIO's VZ-1 can do for you, the musical artist. Giving you the freedom to play with sounds so rich, so full, they have to be heard.

The CASIO VZ-1 is a 61 key, 16-note polyphonic digital synthesizer that puts all the tools for complex sound construction at your fingertips. It gives you outstanding performance versatility, through initial touch, and user-definable routing for after touch, two control wheels, and optional foot pedal. Its 16-note, 8-part multi-timbral MIDI implementation allows extensive individual control of each sound.

The VZ-1 uses a whole new technology called iPD (interactive Phase Distortion) instead of sampled wave forms, or PCM partials. An open system of 8 multi-waveform oscillators interact in a variety of ways—mix, ring, phase, and external phase modulation. The result: sounds that are rich, full, and unique.

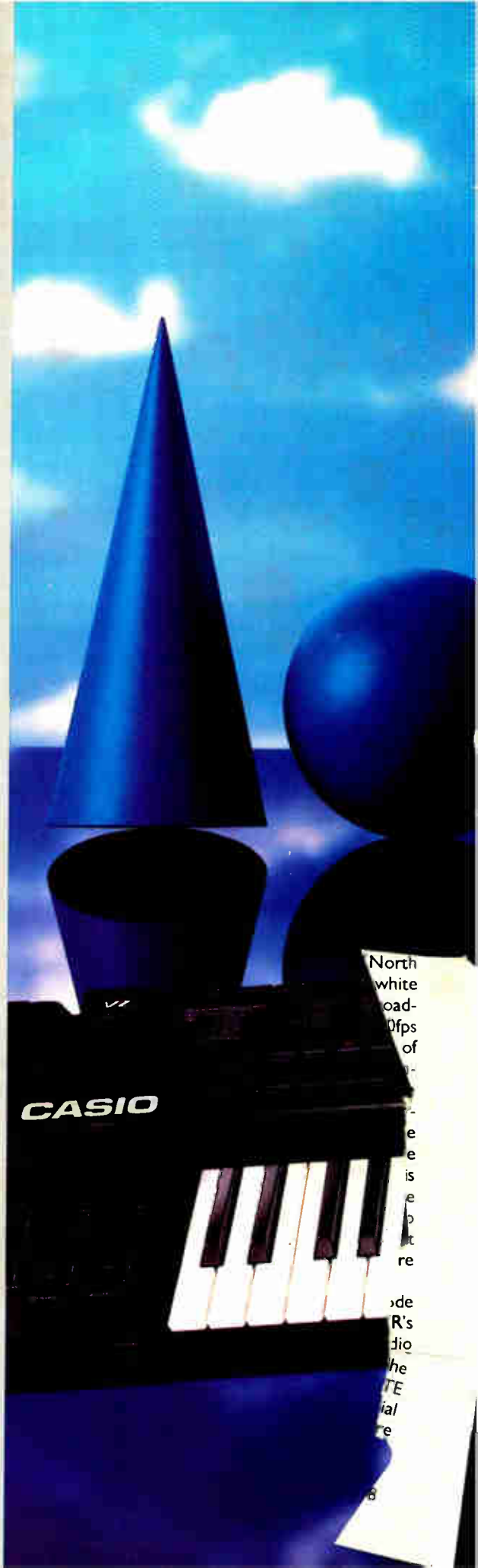
One of the VZ-1's strongest features is its Combination Mode, which lets you combine up to 4 different sounds in a variety of split and layer configurations, including multiple velocity split and positional cross-fade capability. You'll swear you're playing a MIDI stack instead of a single keyboard. As a MIDI master keyboard, the VZ-1 can be split into 4 "zones," with separate send and receive channels for each note range.

The VZ-10M is a 2 rack-space version of the VZ-1.

The VZ-1 comes complete with 64 sounds and 64 Operation Memories, plus a free ROM card (RC-100) with an additional 128 of each, for a total of 384 timbres out of the box. Optional ROM cards with additional sounds are also available. And with an optional RAM card (RA-500), you can store up to 64 sounds and 64 Operation Memories of your own.

And finally, to enable you to effectively manage all of its programming power, the VZ-1 has a wide, backlit LCD graphic display, making editing quick and intuitive under any lighting conditions.

If you want the artistic freedom to create a bigger soundscape, escape to a better instrument—a CASIO VZ-1. Now playing at your authorized CASIO Professional Musical Products dealer.



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Casio Canada Ltd., 2100 Ellesmere Road, Suite 240, Scarborough, Ontario M1H3B7

surviving a SYNCing ship . . .

If you've ever wondered about the connection between MIDI and SMPTE and how everything syncs together, look no further. We present the most comprehensive survey on earth of SMPTE-to-MIDI converters. *Text by Jeff Burger.*

TECHNOLOGY HAS A habit of moving right along, and we sometimes find ourselves simultaneously dealing with several technologies of different vintage to fulfill a task. Such is the case when synchronizing MIDI devices like sequencers and drum machines to tape through the use of SMPTE.

To set the scene, the basic need for tape sync stems from a desire to maximize the mileage we get from a fixed number of synthesizers and drum machines as well as the need to synchronize sequencers with recorded acoustic instruments. Regardless of the type of tape sync used, the basic principle involves laying a sync signal on multitrack ta
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being every 96th note in 4/4 time). The original MIDI spec simply supported MIDI Clock along with Start, Stop and Continue commands which do just what they sound like they do. If you want to start from an arbitrary point in the middle, there was the Song Position Pointer. This correlates the current position of the sequence to the number of 16th notes which have passed since the beginning of a piece. Using this framework, MIDI masters and slaves can accurately start and sync up from the closest 16th note at any position within a song.

The hitch in this scheme doesn't become apparent until we try to sync MIDI

were handled in the film medium by sprocket holes. Videotape has no such holes (no doubt you've noticed that audio tape doesn't either), so in 1969 SMPTE formed a committee that developed a standard timecode that has been accepted throughout the industry. Location is specified in terms of hours:minutes:seconds:frames. For example, a SMPTE reading of 1:02:35:04 refers to a position of 1 hour, 2 minutes, 35 seconds and 4 frames.

The concept of frames merits further investigation. There are a total of four different SMPTE rates that correspond to the different visual standards around the world. Film is universally played back at a rate of 24fps (frames per second). The broadcasting

track audio machine unless a special center track is provided. The outside track is used in the case of a multitrack machine (track 8 on an eight-track, for example) with the adjacent track being left blank as a buffer from crosstalk problems. Recording levels are typically 0 VU on VTR's and −3 to −10 VU on semi-pro audio decks. If you expect to use SMPTE constantly, it's probably a good idea to stripe an entire roll of tape before you start working.

SMPTE-To-MIDI Converter Features

THE BOTTOM LINE is that MIDI isn't really compatible with tape and SMPTE is not read by more than a few MIDI sequencers and drum machines. The answer to this potential problem is yet another hybrid "kluge" of two technologies – the SMPTE-to-MIDI converter.

The best way to analyze and compare the various converters on the market is to first define categories and features. The first category is stand-alone units. These boxes basically convert incoming SMPTE into MIDI Sync or MIDI timecode (more on MTC momentarily) separately from any other MIDI device. The converter's MIDI In signal is merged with the newly-converted MIDI Sync and presented at the MIDI Out, which is then connected to a sequencer or drum machine that can read MIDI Sync through its own interface. A second category includes units which require and operate in conjunction with a personal computer. Many of these units also double as a MIDI interface for the computer. In either case the receiving sequencer or drum machine is driven in external sync mode.

In stand-alone boxes, you may want to consider the importance of an alpha-numeric display for determining SMPTE position, bars/beats, tempo, etc. If the converter plugs directly into the computer, SMPTE display and parameter setup invariably comes up on the computer monitor, either directly in a compatible sequencer or in the form of a window or pull-down desk accessory.

Let's look at the actual connections for a moment. The stand-alone variety has at least one MIDI Out which is routed to the MIDI In on the sequencer. Since this ties up the sequencer's input, MIDI Ins are provided on the converters to accommodate input devices such as keyboards. That signal is echoed at the converter's MIDI Out port along with the MIDI timing information. In the computer interface variety, the MIDI jacks act as Ins and Outs for the computer. In both categories it is often common to have several inputs which can be merged together. Multiple outputs are also common, supplying the function of a built-in MIDI Thru box. In the case of the converter/interface combo, these multiple MIDI Outs are often independently addressable.

A handful of devices and programs now read MIDI timecode (MTC). This is the MIDI Manufacturers Association's attempt to integrate an absolute-time base similar to SMPTE into the MIDI spec. Considering our earlier discussion of MIDI Song Pointer, MIDI only deals with time as being relative to the beginning of a song. MTC integrates real-time information into the MIDI stream in the SMPTE-like format of hours:minutes:seconds:frames. Being a part of MIDI, however, this information still cannot be written to tape directly. Converters that support MTC therefore translate SMPTE information to MTC information, instead of, or in conjunction with, MIDI Sync. If both MTC and MIDI Sync are supported, MTC is usually available on a separate jack.

While we're discussing inputs and outputs, some converters supply Click In and/or Click Out. Click In allows the system to receive tempo information from a click track, metronome, human-controlled input or just about anything else that generates a regular electronic spike. Click Out is a simple metronome signal that can be routed to a mixer. Various other features catering to the integration of older technologies are found on different manufacturers' SMPTE/MIDI converters, such as drum machine DIN sync and FSK tape sync. Some of the FSK sync methods now incorporate a technique of encoding Song Pointer information on the tape. Please note that most of these formats are proprietary to each manufacturer.

The word "offset" has two different meanings in the SMPTE world. The first is the relationship of a sequencer start time to 00:00:00:00. For example, let's say that a film passage you're scoring begins at 01:25:34:07. It might be more comfortable for you to think of your music as beginning at 00:00:00:00. To accomplish this, you would program an offset of 01:25:34:07 into your converter. This is more often referred to simply as the start time. The more common usage of offset is to slide the basic start time forward or backward by small increments (called sub-frames) to accommodate feel and synthesizer programs with long attacks. While many video synchronizers and editors use divisions as fine as 1/100th of a frame, most SMPTE/MIDI devices treat a sub-frame as 1/80th of a frame, which correlates to the fact that a SMPTE data word is 80 bits long.

Most converters not only read SMPTE, but write it as well. While most of them can only generate timecode starting at 00:00:00:00, some manufacturers provide the ability to start striping the tape beginning at any user-specified point. This can come in quite handy if you're given a videotape that begins at some other time▶

► than 00:00:00:00 and you wish to transfer your sequenced masterpiece to two-track with matching timecode.

Speaking of matching timecode, it is verböten to copy timecode directly from one tape machine to another because of signal degradation. Some devices "reshape" or "recondition" timecode, but if there was an error in reading, that error gets passed along. The solution is called "regeneration" – the converter generates fresh SMPTE (with a bit of a flywheel, to cover the occasional dropout) for the new tape that matches the timecode it reads from the master. Not all converters support this feature.

SMPTE/MIDI boxes typically allow the programming of tempo and meter. More advanced products support tempo maps which can dictate changing tempos over the course of the composition. Meter changes are often supported with tempo mapping. Computer-based units sometimes allow the tempo map to be dictated by the sequencing software. In this case the converter uses these guidelines to generate the MIDI Sync information that it feeds back to the computer. A few advanced units can actually calculate the best tempo to use given SMPTE "hit" points (see *Picture Scoring*, MT January '88 for more on using SMPTE in the scoring process).

Stand-Alone Hardware

NOW THAT WE'RE familiar with the terminology and options, let's take a look at the various manufacturer's SMPTE-to-MIDI converters. Due to space limitations, we'll cover the basics and unique features of each and let the comparison chart provide the specifics. We'll start with stand-alone boxes that don't require a computer.

The first SMPTE/MIDI box commonly available in this country (the **Friend Chip SRC** from Germany was first, but was rare) was the **Roland SBX80** and, as such, it became sort of an industry standard. Though now out of production, it is known as a reliable workhorse (as well as being a bit tedious).

The **Fostex 4050** not only performs most SMPTE/MIDI functions, but also serves as a transport control for Fostex tape machines. As a consequence, one box can start and stop your sequencer *and* multitrack deck. The transport functions include record-channel select, programmable punch-in/out with rehearse, 100-point autolocate and adjustable pre-roll. All cue information can be logged and viewed in real time, relative time or measure/beat.

The **Yamaha MSSI** is similar to the Fostex 4050 in operation and features, excluding the transport functions. The MSSI can hold and store 10 banks (songs) of tempo maps via cartridge, tape or system exclusive. In addition, a MIDI event editor allows recording and playback of MIDI program changes and control changes for devices such as the DMP7 mixer. Another unique feature is the ability to change the total time of a piece and have the MSSI calculate a new tempo.

The **Garfield Time Commander** (reviewed in MT October '87) combines SMPTE/MTC conversion with a whole slew of other synchronization and conversion functions. Like the company's Dr. Click products, the Time Commander can convert just about any type of click or sync code to just about any other kind, but its biggest selling point is creating a MIDI clock output which can follow live performers. It does have the facility to store one tempo map, but there's no battery backed-up memory to recall it once the machine is turned off.

Entertainment Laboratory's SMPTE City (distributed by the Imagine Music Group), a single-space rack-mount unit with an LED display (thank you), incorpor-

	Stand Alone/Accessory/ Interface	# MIDI Inputs	# MIDI Outputs	Merge Inputs	Display	30 fps	30 fps drop-frame	25 fps	24 fps	Stripe Offset	Regenerate SMPTE	Tempo Map	Save
Roland SBX80	S	1	2	N/A	Y	R/W	N	R/W	N	Y	N	Y	Y
Fostex 4050	S	1	2	N/A	Y	R/W	R/W	R/W	R/W	Y	N	Y	Y
Yamaha MSSI	S	1	2	N/A	Y	R/W	R/W	R/W	R/W	Y	N	Y	Y
SMPTE City	S	1	1	N/A	Y	R/W	R/W	R/W	R/W	N	N	Y	N
Tascam MIDiizer	S	1	3	N/A	Y	R/W	R/W	R/W	R/W	Y	Y	Y	Y
Southworth Jambox/2	S	2	1	Y	N	R/W	★	★	★	N	Y	Y	Y
Southworth Jambox/4+	1	4	4	Y	★	R/W	R/W	R/W	R/W	Y	Y	Y	Y
Opcode Timecode Machine	S	1	1	N/A	N	R/★W	R/★W	R/★W	R/★W	★	Y	N	N
JL Cooper PPS-1	S	1	2	N/A	N	R/W	R	R	R	N	N	N	N/A
JL Cooper PPS-100	S	2	2	N	Y	R/W	R/W	R/W	R/W	Y	N	Y	Y
Sonus SMX-2000	S/I	2	1	Y	N	R/W	R/W	R/W	R/W	★	Y	★	N
Dr.T's Phantom	A	0	1	N/A	★	R/W	R/W	R/W	R/W	N	N	★	★
Passport (IBM/PC) MIDI Transport	I	1	3	N/A	★	R/W	R/W	R/W	R/W	Y	Y	★	★
Passport (Mac) MIDI Transport	I	2	4	N	★	R/W	R/W	R/W	R/W	Y	Y	★	★
Steinberg Time-Lock	A	0	0	N/A	N	R/W	R/W	R/W	R/W	★	N	★	★
Steinberg SMP24	I	2	4	Y	Y	R/W	R/W	R/W	R/W	Y	N	★	Y
Hybrid Arts SMPTE Mate ST	A	0	0	N/A	★	R/W	R/W	R/W	R/W	Y	Y	★	★
Peavey/AMR Sync Controller	S	0	1	N	Y	R/W	R/W	R/W	R/W	Y	Y	N	N
Adams-Smith Zeta Three	S	1	2	Y	Y	R/W	R/W	R/W	R/W	Y	Y	Y	Y
Garfield Time Commander	S	1	2	Y	N	R/W	R/W	R/W	R/W	Y	Y	★	★
Synhance MTSI	S	2	3	Y	N	N	N	N	N	N	N	N	N

)I Converters

(PTE/MIDI Mode)	po Map	lculate Tempo	Click In	Click Out	PPQ In	PPQ Out	FSK (I=Intelligent)	Meter	Meter Map	MTC	Direct Time Lock	Tap Tempo	MIDI Sync In	Lock on the Fly	Interface With	Price
			Y	Y	N	Y	Y	Y	Y	N	N	Y	Y	N	____	$1395
			N	Y	N	N	N	Y	Y	N	N	N	N	Y	____	$1300
			Y	Y	N	N	N	Y	Y	N	N	Y	N	Y	____	$1195
			N	N	N	N	N	Y	Y	N	N	N	N	Y	____	$425
			Y	Y	N	Y	N	Y	Y	Y	N	Y	Y	Y	____	$1999
			Y	Y	N	N	N	N	N	Y	Y	Y	Y	N	____	$269
			Y	Y	N	Y	N	Y	Y	Y	Y	Y	Y	N	Macintosh	$459
			N	N	N	N	N	N	N	Y	Y	N	N	N	____	$300
			Y	Y	N	N	Y(I)	N	N	Y	Y	N	Y	N	____	$199
			N	Y	N	Y	Y(I)	Y	Y	Y	Y	Y	Y	Y	____	$595
			N	N	Y	Y	Y(I)	★	N	Y	Y	N	Y	N	Atari ST (Optional)	$399
			N	N	Y	N	Y(I)	★	★	N	N	N	N	N	Atari ST	$249
			N	N	Y	Y	Y(I)	Y	Y	Y	N	N	Y	Y	Atari ST/ PC Compatibles	$395
			N	N	N	N	Y(I)	★	★	Y	Y	N	Y	Y	Macintosh	$495
			N	N	N	Y	N	★	★	N	N	N	N	N	Atari ST	$375
			Y	Y	Y	Y	Y	Y	★	Y	N	Y	Y	Y	Atari ST	$295
			Y	Y	Y	Y	N	★	★	N	N	N	★	★	Atari ST	$575
			N	Y	Y	N	Y	N	N	N	N	N	N	Y	____	$999
			Y	Y	N	N	N	Y	Y	Y	N	Y	Y	Y	____	$3000
			Y	Y	Y	Y	Y	Y	Y	Y	★	Y	Y	Y	____	$900
			N	N	N	N	Y(I)	Y	Y	N	Y	N	Y	N	____	$229

★ = with computer/software

ates a decidedly musical approach to the SMPTE/MIDI arena. For example, while passages can be given minor offsets with a resolution of SMPTE bits (80ths of a frame), the pre-roll and post-roll functions allow the cue to be shifted forward and backward in 16th-note increments relative to the cue's tempo. (This is often a musical desire of film composers; however, it normally takes some math to perform the function using SMPTE numbers.)

SMPTE City has two operating modes. In song mode, operation is similar to most boxes and includes meter programming and tempo mapping. Multiple start and stop points can be entered to make your sequencer "lay out" for a given period and allow the starting of older MIDI devices that support MIDI Sync but not Song Pointer. The more sophisticated Cue mode allows the film composer to program multiple music cues that each have SMPTE start and end points, tempo, offset, pre-roll/post-roll and bar at which the sequencer is to begin playing.

The **Sync Controller** from **Peavey Audio Media Research (AMR)** works in a similar way to the Fostex 4050. It functions as a remote for the AMR 4/S four-track cassette recorder as well as one additional machine, and does all the standard SMPTE/MIDI conversions that have been discussed. Offsets can be set on the fly, if desired, and the machine can remember up to 99 cue points for looping, punch in/out, etc.

As of press time, the **Tascam MIDiiZER** (MTS 1000) was slated for October release. Like the Fostex 4050 and Sync Controller, it acts as a central control for both tape machine transports and SMPTE/MIDI conversion and also provides control over record-ready functions. The unit can serve as a 20-point autolocator for a master and a slave sync-ready machine using serial connections. (An optional box can convert to parallel format and provide four switch closure connections as well for things like CD players.) The unit can display in both SMPTE and measure/beat formats and has some special features like song chaining, firing program changes and remapping tempo to accommodate squeezing and expanding sections.

The **Zeta Three** from **Adams Smith** takes a similar approach to the MIDiiZer, in that it permits you to control two tape transports as well as MIDI sequencers all from the same source. All transports (over 60 different types of ATRs and VTRs are supported) can be controlled via the front panel of the single-space rack unit, by an optional remote control, or by a computer through the RS422 interface. It reads and writes all types of SMPTE, is accurate to 1/100th of a frame, incorporates a 20-character display, does MIDI merging, allows you to work with tempo maps and has many other interesting functions.

Southworth's **Jambox/2** is a stand-alone unit with two merged MIDI Ins and a single MIDI Out. MTC is available as well as Direct Time Lock, a mode that allows Mark of the Unicorn's Performer 2.3 to lock directly to each SMPTE frame. Other impressive features include Click In and internal tempo maps. These maps can be entered via Click In, MIDI Sync In or the front-panel Tap button. Tempo maps can also be saved and retrieved to external devices using System Exclusive messages or by simply placing the data tones on tape as with SMPTE. While no display is present, 12 status LED's provide a reasonable amount of feedback.

Opcode's Timecode Machine takes a completely different approach by being a no-frills SMPTE/MTC converter. No buttons, no switches, no muss, no fuss. It reads SMPTE and turns it into MIDI Time Code, period. (The Timecode Machine can also write all SMPTE formats given the complimentary Macintosh software utility.) ►

►It's up to the receiving device to specify start points, tempos, meters and the like.

JL Cooper's PPSI (Poor Person's SMPTE) has two different modes, only one of which is SMPTE related. It is both a SMPTE-to-MTC converter and a sync box using proprietary FSK. Like Opcode's Timecode Machine, it is pretty straightforward because it performs no tempo-related calculations. At the time of writing, Cooper was planning the imminent release of the **PPS100**, a full-blown SMPTE/MIDI box. One of the unique features is SMPTE event generation and switch closures for triggering non-MIDI devices and controlling tape transports. (See this month's *NewsDesk* for more details.)

Synhance's **MTSI** (reviewed in MT July '87) doesn't actually use SMPTE, but it has an intelligent FSK sync similar to that found on Cooper's PPSI. In addition, it includes some MIDI merging functions which permit you to overdub onto your sequencer while syncing to tape.

The **Sonus SMX2000** has a slightly different architecture than most other machines in that it has two mergeable MIDI Ins, each with its own MIDI Thru. A set of DIP switches controls SMPTE format and optional channelization of the first MIDI In. The SMX2000 can read and write SMPTE and intelligent FSK with song pointer, transmit MTC and send and receive PPQ sync (it can also cut down on some studio time by outputting MTC while striping). While most functions are accessible from the front panel, connection to a personal computer's MIDI interface allows options like reading and writing SMPTE beginning at any point.

Computer-Assisted Converters

SMPTE DEVICES THAT plug directly into the computer are further subdivided into two categories – SMPTE boxes which work in conjunction with separate MIDI ports and units that function as both SMPTE and MIDI interfaces. The advantage to the first type is that, in many cases, better resolution is available due to the fact that no conversion to MIDI timing is required. Conversely, the units that combine interfaces often supply a myriad of extra MIDI connections or even busses.

Dr. T's has introduced **The Phantom**, a hardware/software combo that works in conjunction with their KCS 1.6 or Level II sequencer on the Atari ST. The hardware is a simple cable that attaches to the Atari's serial port and terminates in sync in, sync out and auxiliary MIDI Out connections. The software window allows any of the 16 channels and MIDI Clock to be assigned to either the Atari's MIDI Out or the Phantom's. The manufacturer says that the Phantom can be used with non-Dr. T's software with Song Pointer resolution (as opposed to SMPTE bit-level resolution with KCS). The Phantom will stripe and read all SMPTE formats as well a proprietary FSK encoded with Song Pointer information. It can also read PPQ drum sync. Most timing-related functions such as tempo/meter mapping and MIDI Sync are handled thru KCS.

Southworth's **Jambox/4+** is a single rack-space unit that works in conjunction with the Macintosh, acting as both a SMPTE converter and a four In/four Out MIDI interface. A serial cable connects the Jambox/4+ to the computer's phone or printer port. The device is completely under software control through a Mac desk accessory that can be installed as a pull-down menu in applications such as sequencers. The software provides for tempo/meter maps, merging of the MIDI Ins, rechannelizing, channel muting and selective data filtering. These features eliminate the need for some other "little black boxes" in complex MIDI setups. The SMPTE display comes up in most popular sequencers, such as MIDIPaint and Performer.

Passport offers their **MIDI Transport** in two flavors – one for the Atari ST and IBM PC compatibles and another for the Mac. Both units communicate with the home computer via RS232 serial connections and double as a MIDI interface (or as additional MIDI busses in the case of the Atari's built-in MIDI ports). MTC is supported along with a variable rate intelligent FSK with song pointer (compatible with that laid down by JL Cooper's PPSI). Both versions are supplied with appropriate software to facilitate striping tape.

The Atari/PC version of MIDI Transport offers one MIDI In and three MIDI Outs. The Mac version adds several nice touches. First, the modem and printer ports can be accessed simultaneously with separate cables, allowing for two independent 16-channel MIDI busses (given the appropriate software support at the application level). The modem side has one MIDI In and three MIDI Outs, while the printer portion has one MIDI In and one MIDI Out. The second touch is a switchable serial Thru on each port for modems and printers, preventing the hassle of plugging and unplugging them to accommodate SMPTE/MIDI.

Steinberg offers two SMPTE devices that operate in conjunction with their Pro24 sequencer on the Atari. **Time-Lock** is a small box that plugs into the ST's pointer and joystick ports and provides basic SMPTE read/write functions, as well as PPQ Out for non-MIDI drum machines. The **SMP 24** is a single rack-space unit that connects to the Atari ST's printer port via a standard Centronics cable. Jacks include two mergeable MIDI Ins and four MIDI Outs that Pro24 can treat discretely for a total of 64 channels. The SMP 24 can also

synchronize to external click, footswitch tap, FSK and MIDI Sync as well as driving PPQ Out. Of additional interest, the SMP 24 also doubles as a MIDI event processor/mapper for virtually all types of MIDI data. The SMPTE and processor/mapper modes are not only mutually exclusive, however, but the latter even uses different connections (the Atari's MIDI ports).

SMPTEMate ST from **Hybrid Arts** works in conjunction with their SMPTE-Track software to provide most advanced SMPTE/MIDI features. The unit plugs directly into the computer and offers only sync functions (all MIDI functions are handled through the Atari's ports). In addition to the SMPTE In/Out jacks, the Aux In and Out jacks offer the option of sending and receiving FSK, Roland sync, PPQ, click and the proprietary HybriSync (essentially SMPTE without time-stamping).

Out of Time

WOW! AS YOU can see, there are quite a few of these little puppies out there in the trenches. The field of SMPTE-to-MIDI conversion is unfortunately not limited even to the myriad topics we've covered here, but we hope these guidelines will get you started! ■

MORE FROM :

Adams-Smith, 34 Tower St, Hudson, MA 01749. Tel: (617) 562-3801.

J.L. Cooper Electronics, 1931 Pontius Ave. Los Angeles, CA 90025. Tel: (213) 473-8771.

Dr. T's Music Software, Inc, 220 Boylston St #306. Chestnut Hill, MA 02161. Tel: (617) 244-6954.

Entertainment Laboratories (dist. by Imagine Music Group), 751 A South Kellog Ave, Santa Barbara, CA 93117. Tel: (805) 683-3340.

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Garfield Electronics, P.O. Box 1941, Burbank, CA 91507. Tel: (213) 434-6643.

Hybrid Arts, Inc, 11920 West Olympic Blvd, Los Angeles, CA 90064. Tel: (213) 826-3777.

Opcode Systems, 1024 Hamilton Court, Menlo Park, CA 94025. Tel: (415) 321-8977.

Passport Designs, Inc, 625 Miramontes St, Half Moon Bay, CA 94019. Tel: (415) 726-0280.

Peavey Electronics, 711 A Street, Meridian, MS 39301. Tel: (601) 483-5365.

Roland Corp., 7200 Dominion Circle, Los Angeles, CA 90040. Tel: (213) 685-5141.

Sonus Corp, 21430 Strathern #H, Canoga Park, CA 91304. Tel: (818) 702-0992.

Southworth Music Systems, 91 Ann Lee Rd, Harvard, MA 01451. Tel: (617) 772-9471.

Steinberg/Jones, 17700 Raymer St. Suite 1001, Northridge, CA 91325. Tel: (818) 993-4091.

SynHance MIDI Peripherals (Harmony Systems, Inc.), 4405 International Blvd. Suite B-113, Norcross, GA 30093. Tel: (404) 662-8788.

Tascam/TEAC Corp. of America, 7733 Telegraph Rd, Montebello, CA 90640. Tel: (213) 726-0303.

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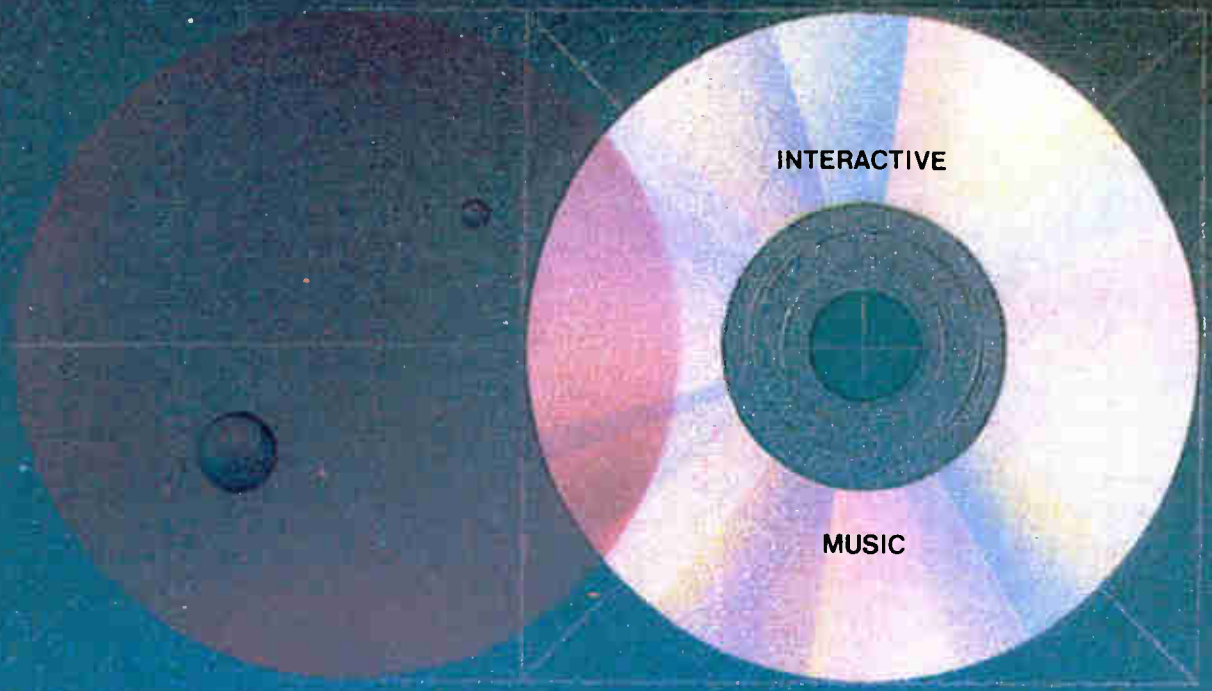

Illustration Rick Lipkin

INTERACTIVE MUSIC

New forms of media, such as CD-I and CD+MIDI, are offering revolutionary methods for presenting music that may force composers to think about their work in a new way. What follows is a look at how these developments could affect the future of music. *Text by Bob O'Donnell.*

I'VE BEEN GIVING a lot of thought lately to how all the hi-tech musical equipment we're always writing about is really affecting music. Obviously synths, samplers, sequencers and the like have had a tremendous impact on how music is composed and produced – the content of all the artist interviews we print every month and your own MIDI studio stand as a testament to that. The question is, how much have they affected the actual output of composers and players who use the equipment? Yes, the sounds are different, the notes are more precise and the speed at which musicians are able to work has been greatly increased, but has any really new music come out of the developments? Is there anything being created now that wasn't being done prior to the development and commercialization of synthesizers, sequencers, drum machines and other MIDI equipment?

At the same time, I've also been wondering about the impact that new technical developments revolving around the CD, such as Compact Disc-Interactive and Compact Discs encoded with MIDI, will have. Here, it seems, the possibilities for creating entirely new genres of music are ripe – as is the potential to completely redefine the listening process. By forcing composers to rethink their conceptual notions of music, and by giving listeners the option to involve themselves with music, such as deciding how a piece should proceed over time, these new "media" could add a new dimension to music – interactivity. (Actually, prior to the development of recording, when the only way to hear a new piece was to play the sheet music, all music was interactive. Technology moved us away from that point in history and now, interestingly enough, it's moving us toward a similar point again.)

Interactivity

RIGHT NOW, INTERACTIVITY is a buzzword in the computer world. Interactive products like Apple's Hypercard and other hypertext programs are causing people to reconsider how large amounts of

information should be presented, stored and retrieved. Hypertext is defined as inter-related text information which you can read or access in any order; it need not be from beginning to end. Systems which use hypertext allow you to quickly find stored information in a way similar to how your mind works intuitively, by association. For example, have you taken a look at the sidebar that accompanies this article? It's relationship with this article is a basic type of hypertext.

A hypertext program like Hypercard doesn't create anything new, but it allows you to browse through the information that you're interested in and ignore that which you're not interested in. Depending on the specific application, it also allows you to go as deep into a topic as you want. Finally, and perhaps most significantly, it gives you the control over when and in what order you want to get to that information – which is why it's referred to as interactive.

Now here's where the new versions of CDs come into play. In theory, both CD+MIDI and CD-I discs will offer you the option, as a listener, to involve yourself with how the "musical information" on the CDs is presented. In the case of CD+MIDI, it may only be choosing which timbres are being played by the synth you've got hooked up to the MIDI ports on your fancy new multi-purpose CD player, but the possibilities for CD+MIDI and CD-I especially go way beyond that. Imagine, for example, having control over whether or not a particular musical line is played throughout a piece of music as well as determining which of your connected MIDI synths will act as the sound source for it. The possibilities are truly staggering.

In fact, I really believe that within a few years, CD-I and other hypertext developments could change the way we as a society think about information (musical or otherwise) and its presentation. That may sound boring and irrelevant right now, but what it means to me (though I admit to being a bit zealous on this topic) is that the much hallowed Age of Information is about to mature.

Where We're At

OK, ENOUGH SOCIOLOGICAL theory – back to music. Before I can really start predicting where I think music may be going, I need to try and put the whole march of music technology into perspective and see exactly where we are. First, despite the current bit of backlash against sequencing and the overuse of MIDI equipment, the tools that you and I work with to create our music have had a profound impact on how music in every possible genre is composed and recorded. The quality of instruments has improved immensely over the last few years, as has the degree of control offered by sequencers and other processing devices, and musicians can now only afford to ignore the technology at their own risk.

On the other hand, it seems to me that despite the many creative possibilities offered by features like real-time system exclusive control, most people are using their instruments in the simplest of applications. In the case of synths and samplers, many musicians are buying new instruments just to get the latest new sound. Developments in MIDI software seem to be a bit more encouraging; some fascinating new programs have been produced which are giving people a chance to view the music-making process from a new perspective (see the *Algorithmic Composition* article in the *Computer Notes* section of this issue for some examples). There's still a great deal of work to be done, however, and I think only a dedicated few have investigated these kind of products.

The bottom line seems to be that most people are satisfied to use the new gear to make the composing and recording of existing styles of music easier. Now that is important and revolutionary in its own way, but it's time to move beyond these basic applications. By really looking forward, we can start planning how the music itself can undergo a revolutionary change. The instruments and software packages themselves don't have the inherent capabilities to produce a new type of music; they're only tools. But what the gear *can* do is inspire us to think in different directions – that's the real beauty of sophisticated new instruments and software.

New Notions of Music

THE ONLY WAY new genres of music are going to be developed is if people start thinking about music in a new way. To begin with, we need to throw aside old linear notions of how music should proceed and think about music as malleable, evolving material. A piece of music need not be a fixed entity, it can change and be transformed on different listenings. Over the last few decades, composers such as John Cage and Karlheinz Stockhausen have recognized this possibility and have incorporated elements of chance and personal decision into their compositions, so that each time the pieces are performed, they are different. In these cases, the performers are the ones who have had the control over how a piece of music can evolve over time. With the CD-I and CD+MIDI formats, the listener could have that control. (The actual type of musical material which could be adjusted varies with the two formats. See the accompanying sidebar for more details). Now I admit that the concept sounds a bit far-fetched at first, but as with other developments in the arts, what begins in the avant-garde often becomes part of the mainstream.

To offer the listener that kind of control, however, there needs to be a way to store, retrieve and process the various musical options. Because CDs store all the music as digital audio (numbers), the answer is simple – just think of the musical composition as a type of program that contains numerical data. Remember also that data can be manipulated in a variety of ways given the proper tools and context. If you work with MIDI at all this analogy shouldn't be difficult to comprehend, because that's exactly what MIDI does and what MIDI's for; it quantifies musical performance into a language of computer data that can be transmitted to and understood by a variety of different types of products. With sequencers you can record that information for future use, and with notation programs you can translate that data into a form that is intuitive and readable by most musicians.

"Imagine a form of music where you could have control over a piece's instrumentation, structure, etc. Both CD-I discs and CD+MIDI discs will give you that kind of power."

Up until recently, most of the manipulations of this musical "data" that we have been able to engage in, such as digital signal processing of audio material and sequencing of MIDI material, have been based on predetermined instructions that you ask the instrument or computer in question to perform. Some of the randomizing features found in some patch editors, and many of the functions offered by the algorithmic composition programs have brought in a certain sense of interactive creation – you select what parameters you want to randomize or what kind of randomization you want to perform on a given group of notes – but the new CDs should allow interaction on a more global level.

Hyper Music

IMAGINE A FORM of music where you could have control over several of a piece's most important characteristics, including the instrumentation, structure, etc. Both CD-I discs and CD+MIDI discs will, theoretically at least, give you that kind of power. In the case of CD-I, the material you could control would be the recorded digital audio tracks, while the MIDI data would be the only thing coming from a CD+MIDI disc that you could alter. In either case, you couldn't create new musical options – neither type of disc will create something from nothing – but you could create a new version of the piece, depending on how you combined or ▶

What is CD+MIDI? What is CD-I?

THE CD HAS been going through a number of changes recently as people start thinking of new applications for its optical storage capabilities. The thing to remember is that a CD is essentially like an incredibly high-density floppy disk – it holds up to 660 Megabytes of data. The specific type of data it can store is not restricted to digital audio, however: digital video information, computer software, MIDI data and ordinary computer data can all be written onto a CD alone and in various combinations. As a result, we have CD-ROM (which stores large chunks of computer data), CD-V (the V stands for full-motion video, like Laserdiscs), and CD+G (the G is for video graphics, but it's more like a slide show, not full motion video), which are all variations on the technology. Of course, you need the appropriate hardware to take advantage of these different types of data – an ordinary CD audio player won't be able to make use of anything but digitally-encoded audio – but the potential for numerous applications is there.

CD+G and CD+MIDI, both of which were developed by Warner New Media, are actually very closely related to CD audio. When the specification for CD audio discs was developed, 5% of the storage capacity was set aside for "subcode." (In fact, some high-end CD players have subcode outputs.) Up until now this subcode storage hasn't really been used for anything, so this is where Warner New Media chose to locate the graphics or the MIDI data. Up to 16 channels of MIDI information can be stored on a CD+MIDI disc, and it can either play in conjunction with or independent of the digital audio tracks stored on the disc.

CD-ROM, CD-V and CD-I, on the other hand, have entirely different specifications for storing the information on the disc (including several levels of audio quality standards) and consequently, require new types of CD players. CD-I combines digital audio, video and computer code onto a single disc and permits you to interactively choose which portions of the information you want to access at a particular time. As a result, a CD-I player must incorporate a computer brain (a CPU), as well as the appropriate audio and video hardware.

Unlike the CD+MIDI standard, which has not yet been finalized, the CD-I specification has been written. A solid base of CD-I products may not appear, however, until late in 1989, while CD+MIDI hardware and software is expected to surface by the end of this year. ■

► changed the existing materials. In the case of CD+MIDI discs the processing would occur outside of the player because you cannot change the MIDI data that's encoded onto the CD. It would essentially work as a playback-only sequencer. CD-I players, on the other hand, will incorporate a CPU for processing functions, but again, the options would have to be recorded somewhere on the disc.

After giving the subject just a little bit of thought, I came up with several different levels of interactivity which these discs could provide. First, on a very basic level, imagine a jazz CD that would give you the option of listening to any one of ten different improvised solos for each cut. If you wanted, each time you listened to that piece of music it could be slightly different, or if there was a particular solo you liked, you could program the CD player to always play your choice. On a slightly more involved level, a CD+MIDI disc would allow the listener to adjust the mix of a particular cut, or perhaps its instrumentation (by externally changing MIDI volume levels and patches). Finally, for the adventurous, it would be possible to go even further. You could have various sections of music, or a number of musical lines which could be juxtaposed against each other in a variety of different ways by intelligent algorithms under the listener's control. (You could think of it as Algorithmic Playback software.) Of course, there are plenty more potential applications, but these should give you an idea of what's possible.

As a composer, this new type of interactive music would present a number of new challenges. First, its acceptance would mean giving up complete control over the end result – the listener could have almost as much say in the final output of music as the composer. In fact, the line between composer and listener would become wonderfully transparent as the listener started to partake in the creative process. Second, it would require the conception and development of new forms with which to organize your musical ideas. As composers we would have to start thinking on a more abstract and, I think, probably more creative level. Finally, the new music would require new skills for us to master. In addition to creating the musical content, we would need to understand and control the various permutations that the media offers, for example.

In return for our efforts, however, we would gain the satisfaction of knowing that we had created a living, evolving work of art. To my mind, the new dimension of potential interactive change could give any type of music a new level of value and meaning.

Now, interestingly enough, there is an example of this kind of interactive music which already exists – though it's not available on a compact disc. Nevertheless, Laurie Spiegel's Music Mouse program for the Macintosh and Amiga (distributed by Opcode), does provide some interactive capabilities. When the user moves the mouse, the program will play musical notes (either on the computer or over MIDI) that are created by a harmony-generating algorithm. Control parameters of the algorithm, which provide different types of harmony, counterpoint and orchestration, are accessible in real time from the computer keyboard. According to its creator, it can be thought of as a new type of musical creation that lies somewhere between a composition, a compositional method and a musical instrument.

Where To?

I HAVE INTENTIONALLY skimmed over a number of different topics that eventually need to be addressed when talking about these developments, but my purpose here is to encourage creative thinking and speculation. Yes, it may be quite a while before these new formats become viable; yes, they may demand too much of the general consumer to ever become popular; and yes, the possibility of tying this all together with video images adds a whole other dimension. The point, however, is that we can and should start thinking about how technology affects music. In my mind, these new types of media could affect what we play and listen to in a very profound and positive way.

It's time to move beyond thinking about developments in technology as the latest and greatest sounds, or the trickiest new sequencer editing feature. Yes, new sounds and features are necessary and they will continue to inspire us, but I think we're starting to reach a point of saturation. Most people have the equipment they need to produce worthwhile music. What ought to happen now is that developments should encourage new ideas about music. This is much harder to do, of course, and may take quite a while to reach fruition, but the time for interactive music, it seems, is at hand. ■

The author would like to express his thanks to Stan Cornyn at Warner New Media, Laurie Spiegel, and Mark Fine at American Interactive Media for their help in refining this article.

For more ideas on the subject, see if you can find a copy of the *HyperMedia* supplement that *Mix* magazine put out a few months ago. In particular, take a look at Mark Fine's "Elastic Music" article. For more information on CD-I, contact Mark Fine at American Interactive Media (A.I.M.), 11111 Santa Monica Blvd., Suite 1000, Los Angeles, CA 90025.

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M1088

Passac SSC1

Sentient Six Guitar Controller

Billed as the ultimate MIDI controller that fits on your Strat, this Australian contender aims high.

Review by Rick Davies.

GUITAR SYNTHS HAVE been the bearers of bad news for years. First, we found out that pitch-to-voltage conversions introduce delays. Next we found out that we have to play "clean" to get accurate response. And now, we're finding out that our synths have to get their MIDI act together too!

Pitch-to-MIDI conversion technology has its drawbacks, but then so does every other guitar conversion technique. The Yamaha G10 and Beetle Quantar systems force you to watch your damping techniques, the Stepp and SynthAxe were costly and have two sets of strings, and the Photon prefers an alternate stringing – making none of them "real" guitars to boot. Therefore, it looks like pitch detection isn't out of the picture just yet. So, if you're looking for a guitar controller system that can hook up to your current guitar, then Passac's Sentient Six (SSC1) offers some of the most tempting features on the market: Delay Neutralization, Pick Direction and Position sensing. Can this be for real? Yes, indeed.

Overview

THE SENTIENT SIX is a 2U-high rack-mounted converter with two MIDI Outs and a MIDI In. It generates MIDI control messages derived from six independent pickups in Passac's MPX1 bridge assembly, fitted on a normally-strung guitar. In addition to the standard guitar controller functions – string transposition, Mode 4 transmission, and pitch-bend range adjustment – the Sentient provides a four-track sequencer and a barrelful of MIDI effects.

All of the various settings are stored in 100 user-definable programs (00-99).

The front panel controls are divided into two sections, separated by a 32-character back-lit LCD readout and inc/dec switches. Six switches (Response, Channel, Dynamics, Pitch Bend, Transpose, and Controllers) to the left of the display are dedicated to setting MIDI parameters. A second set of six switches (Delay, Tuning, Select, Sequencer, Compose, and Store) deal with the general operation of the Sentient.

Parameters are arranged in menus under each switch. The placement of parameters is logical and easy to figure out. My only complaint is that the Program Select sub-menu can be scrolled down past "00," right out of the Program Select sub-menu and into an error message. Call me picky, but I prefer keypads for selecting patches.

Passac has also included a Patch footswitch input for stepping through consecutive programs, or through a programmable program chain. Programs can also be selected by pressing the Patch footswitch, and then fingering two notes on the first string, in the event that you need random access.

The Guitar

PASSAC DESERVES PRAISE for designing a system which is as simple as one could hope for. The pickups are housed in Passac's MPX1, which is essentially a Kahler 2520 tremolo bridge modified to house special transducers and a printed circuit board. To the untrained eye, there is no cosmetic indication of any unusual goings-on. The Sentient even uses a standard ¼" stereo jack to connect the guitar to the rack-mounted converter. When you're not using the Sentient converter, the guitar can be plugged directly into guitar amps and effects.

As there are six strings, but only three conductors in the stereo cable connecting the guitar to the rack, Passac has multiplexed the six strings into one signal, and sent this signal down the same conductor

that supplies the MPXI with power and a clock. This allows the tip and sleeve of the jack to act as they do on a regular guitar, so you can plug directly into a guitar amp or effects box.

The guitar provided for this review was a Passac PSGI, which is essentially a Kawai Strat copy equipped with the MPXI retrofit. The PSGI also came with the tone pot modified to act as a continuous controller. If you don't use the tone pot on your guitar, this arrangement is highly recommended.

Passac has spent several years investigating alternatives to the magnetic pickup dilemma. The design they have arrived at uses six piezoelectric transducers, one under each string, built into the bridge itself. The supporting electronics are housed on a small printed circuit board.

One of the more interesting aspects of the MPXI is the design of six tiny metal lattice elements which hold the piezo transducers (Passac refers to this as the Electro Mechanical Transduction System – "EMTS"). Each lattice is cut so that each piezo picks up both horizontal *and* vertical vibrations. Passac discovered that when a string is bent, the string vibrations become polarized roughly perpendicular to the guitar body. While magnetic pickups lose a fair deal of the signal when this happens, Passac's lattice design does not, which adds up to more reliable tracking. I can't help wondering when we'll see this design applied to normal pickups . . .

Tracking

THE SENTIENT SIX'S Delay Neutralization feature is a MIDI sleight-of-hand trick (used only on the fifth and sixth strings) that is supposed to fool the ear into not hearing conversion delays. Instead of waiting until the note is stable enough to do an accurate conversion, the Sentient generates an initial MIDI Note On, followed by a second approximation once the string has settled a bit more. The trick is that the second note is sent without turning off the first note. If the receiving synth operates in *true* Mode 4 (ie. legato response to two note ons without a note off), it won't retrigger the synth upon receiving the second note message, and the ear hears no double trigger. The sloppier you play, the less accurate the first guess will be, and the more noticeable Delay Neutralization's effect will be. In practice, Delay Neutralization seemed to make little effect on conversion delays.

The main gripe that any guitarist will have with a MIDI converter is that the synth doesn't play the notes he or she is playing on the guitar. In fact, the problem is that the synth isn't playing the notes the guitarist *thinks* he or she is playing. There's no simple way around playing clean on a guitar controller, so some compromise is always necessary.

The Sentient provides a tuning mode in which the LCD indicates how closely in tune each note (as opposed to each string) is. The Compose switch activates a real-time display of notes played on each string. String sensitivities are adjusted with six pots on the back panel – right where you don't want them, particularly if you want to adjust the string levels while checking the LCD for signal peaks. Fortunately, the Sentient is easy to adjust by ear.

When it comes to playing plucked sounds, I found it difficult to play the Sentient as a synth-only system. Fast strumming, in particular, did not convert well; the strings do not decay fast enough to allow retriggering, and as there is no retrigger threshold parameter on the Sentient, I found no way to remedy this. In a recent conversation with Passac, I was informed that they are finalizing a new software version that uses a "last in/first out" approach to dealing with large amounts of note information. Because the Sentient relies on *consistent* note information before making conversion "guesses," the Sentient's new software will deal with the most recent signal peaks, and ignore earlier ones in order to speed things up a bit. Due to the high number of peaks that a high note can generate in a short amount of time, Passac has found that this method improves the Sentient's response to more wreckless guitar artistry. Unfortunately, this software is not finalized at the time of writing, but it's worth further examination. (Also worth noting is that all performance software upgrades will be free to registered users for the first year.)

For this reason, I found that, like other pitch-to-MIDI controllers, the Sentient works best coupled with slow-attack sounds like brass, synth, ethereal voices and the like. The slow attacks help mask the conversion delays, as well as the instrument's hesitant response to fast strumming and other wreckless techniques. Also, due to the pitch-bend jitter that plagues pitch-to-MIDI systems, I sometimes switched the Sentient's pitch-bend parameter to "semitone" resolution.

MIDI

THE KEY TO the Sentient's success is MIDI Mode 4, which is required for legato playing or Delay Neutralization. The sad truth is that few synths behave themselves in Mode 4, so don't settle for a "Full MIDI Implementation" claim on a glossy brochure – *play* the synth with a guitar controller before you spend your money. Passac strongly recommends the Sequential Prophet VS, Yamaha TX81Z or the Kawai K5 synths for good Mode 4 operation. I did most of my testing on the TX81Z and found its response to these techniques quite good. I recommend that guitarists question the synths as much as they question the guitar converters – some really do work better than others.

If your synth doesn't work in Mode 4, pitch-bending, slides, hammer-ons, pull-offs, and the like, are pretty much out of the question. For the heck of it, I played the Sentient in Poly mode with the synth operating in Omni mode. It worked fine, though with the aforementioned limitations. I didn't experience too much double triggering, but then again, I was selective about the sounds I used.

Expression *"The pick direction can either control MIDI Pan messages or it can switch between two sets of MIDI channels."*

The Sentient only allows pitch-bends to be transmitted on one string at a time, even in Mode 4. If two notes are played at the same time, the Sentient reverts to semitone pitch-bend resolution. At first I found this frustrating. For example, I couldn't bend entire chords with the whammy bar. On the other hand this limitation helps keep you from getting lost in stray pitch-bends, which do have a way of creeping up from time to time. Passac is apparently looking into changing this situation.

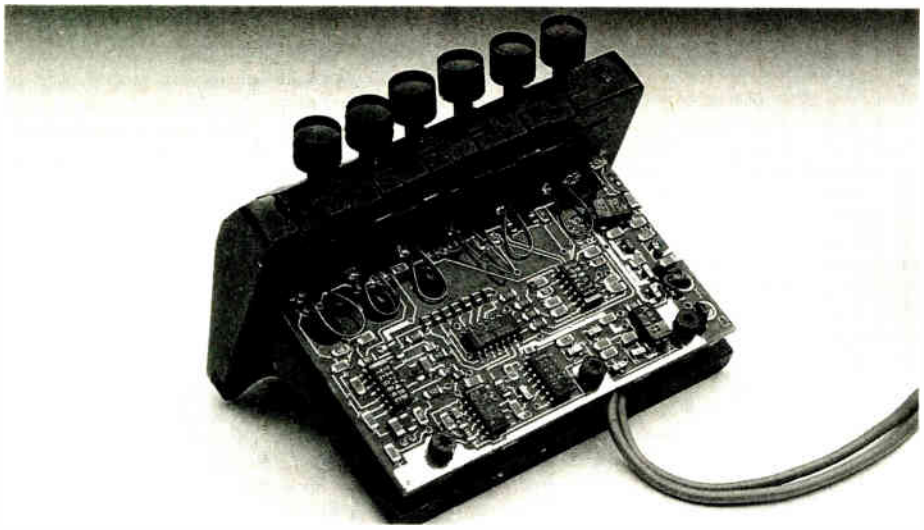
My main gripe about the Sentient's MIDI options has to do with the channel assignment – all you get to do is pick the base channel, and the Sentient automatically assigns the six strings to consecutive MIDI channels. It's easy to adjust the base channel, but it forces you to plan quite a bit before setting your synth's MIDI mode and channels. I prefer being able to set each string's MIDI channel individually.

The Dynamics switch leads into three MIDI velocity and volume scaling parameters. The minimum MIDI velocity parameter should be left at "0" most of the time, unless you feel like leveling out the Sentient's response a bit.

Performace Controls

THE SENTIENT'S PERFORMANCE controls include string bends, a remote pedal, two footswitches, pick direction, pick position, and the guitar tone control. All but the first three of these controls are unique to the Sentient, and could be just the sort of edge that could make it a favorite among MIDI hackers.

Pick Direction has two values: up and down. The pick direction can either control MIDI Pan messages (continuous controller #10) by sending out values of 0 or 127 for up and down respectively; *or*, it can switch between two sets of MIDI channels ("layers," in Sentientese). The Base and Layer channel can be any number ►



A close-up of the MPXI's piezoelectric pickups and multiplexer. Note the surface-mount ICs.

▶ you like, and the layer can transmit in Mode 4 or Mode 3. The bottom line is that you can produce different sounds when you pick up and down.

Similarly, Pick Position has two possible values: 32 for mid-string picking, and 96 for towards the nut or towards the bridge. This control is assigned to MIDI Pan. Synths such as the TX81Z and Prophet VS can use this data to pan voices left and right based on the pick position. Playing around the middle of the vibrating string gives you left panning. Anywhere else, and you'll get right panning.

Pick direction is determined by examining the initial polarity of the guitar signal. Pick position is determined through waveform analysis; that is, the more "highs" in the signal, the closer the pick must be to the bridge (or nut). Simple, but hardly foolproof. It's possible to pick hard in the middle of the string and make the Sentient think you're playing near the bridge, so if pick position sensing is crucial, you'll have to keep close tabs on your picking. Although it would be nice to have more than just "either/or" position sensing, this feature is more than other controllers offer.

While the Patch footswitch has a permanent function, the Sustain footswitch can operate the sequencer, transpose or delay effects, mute the guitar signal, disable MIDI transmission, sustain notes or activate the Sentient's "layers." All of this is useful and easy to set up.

A remote voltage pedal (such as a Roland EV5) can connect to the Sentient via a ¼" stereo to 7-pin DIN adaptor cable. The remote pedal can be assigned to MIDI volume, modulation, pressure, or to a General Controller, which is assignable to any continuous controller (1-95). The guitar's tone control can also be set up as a continuous controller if you choose, in which case it can be assigned independent of the remote pedal. Between these two controllers you can twist and stretch your MIDI synths and effects in whatever dimensions their real-time controls allow. Working with a DigiTech DSP128, I was able to fade reverbs in and out with the tone knob, while adding modulation to a TX81Z patch with the pedal. The list of possibilities goes on.

Sequencer and Effects

THERE ISN'T MUCH to be said about this sequencer, except that it's a four-track job with 400 notes per track. Passac claims a 1600-note capacity, but the truth is that you can't record 1600 notes on any one track. If you want to put down a few basslines or chord progressions, then this works fine; but don't expect to fit a whole song in there. Even the bassline to 'Louie Louie' proved too much. Passac plans to release an update for upwards of 12,000 notes worth of recording. The update will also add a slew of new sequencer features including two more tracks with looping, multiple songs, support of MIDI Song Position Pointer, the ability to record continuous controller and pitch-bend – as well as MIDI data from an external source, and a bulk sequence dump feature.

Recording is controlled by the Sustain footswitch, while the Sequencer switch scrolls through your sequencing options. You can mute any combination of tracks, sync to drum machines, quantize (to ¼, ⅛, 1/16, 1/48), and even tap in the tempo (downbeat to downbeat) from the sustain footswitch. Even if you don't want to use the Sentient's sequencer, you could use the tap tempo feature to synchronize an external sequencer.

My one gripe with the way the sequencer works is the metronome: it consists of a series of quarter notes sent out over MIDI channel 16. The problem is there's no way to mute them, so I couldn't use channel 16 for the sequencer base channel.

Several MIDI effects are also available on the Sentient, such as delays, which make for some interesting textures. These delays are extra note messages sent over MIDI following a delay. Each subsequent repeat note message can be sent with an increasing or decreasing velocity, or on another MIDI channel, or be transposed. The delay time can also be set by tapping the Sustain footswitch, or even slaved to incoming MIDI clocks. There is also a dedicated Transpose switch which lets you shift into any key you like, or change each string's tuning (over MIDI) individually. A Momentary Octave Transpose feature lets you shift octaves by pressing the Sustain footswitch.

Does It Go To 11?

ONE OF THE questions that has come up recently is the future of stand-alone conversion systems. Casio's all-in-one approach has established a new standard of "vanilla" guitar controllers by providing built-in sounds, but at the same time seems to have taken a bit of the adventure out of guitar synth controllers. This is where the Sentient fits in. Its response is good, the price is competitive, the system is a clean design, and MIDI is handled elegantly. Pick direction sensing works fine, but Pick Position sensing leaves a bit to be desired (though the idea is great).

Apart from not being able to adjust the strings' channels individually, I'd say that the Sentient's MIDI is about the best I've come across. The assignable General Controller feature, coupled with the tone pot and remote foot pedal, provides unique expressive power, which is what a guitar controller should be all about.

Passac did a great job of whetting my appetite for what I hoped would be the Ultimate Guitar Synth Controller. In some ways, it delivers, but in other ways, it merely represents improvements to and embellishments upon current guitar synth technology. The Sentient's tracking is not a whole lot faster or more reliable than other systems I've played, and Delay Neutralization didn't appear to make the Sentient convert significantly faster – however, it's certainly not slower.

Added all together, the Sentient is great. It doesn't do anything to change the reputation of pitch conversion systems in general, but it is very expressive. It's also reasonably priced and can operate with a lot of different guitar models. I can't say that it is *the* ultimate guitar controller, but if you're planning on doing some serious MIDI with your *own* guitar, the Sentient Six is the first place you should look. ■

The author wishes to thank Guitar Showcase of San Jose for their assistance with this review.

PRICES $1245 for complete system; $1695 with sequencer upgrade

MORE FROM Passac Corp, 759 Ames Avenue, Milpitas, CA 95035. Tel: (408) 946-8989.

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REVIEWS

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SoundQuest SQ80/ESQ E/L
Digidesign Sound Designer Universal
Dr. T's K5 E/L

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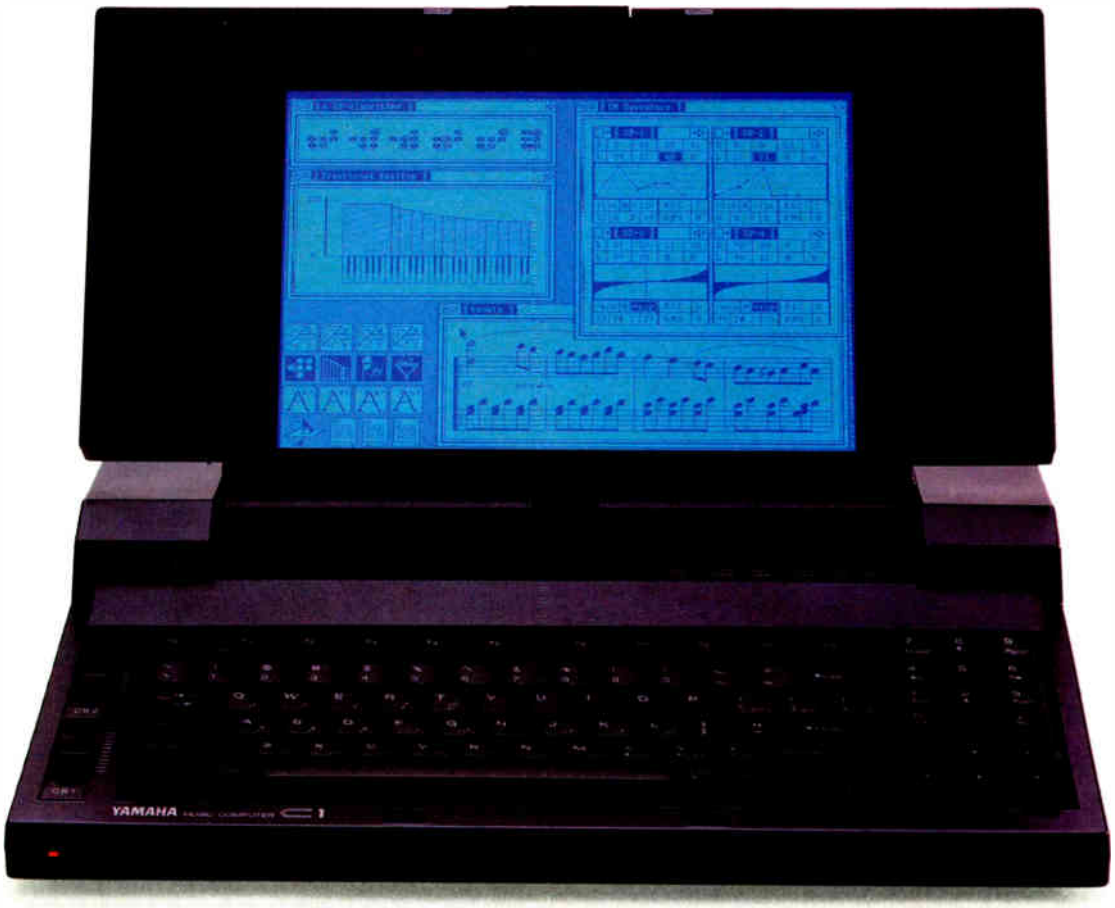

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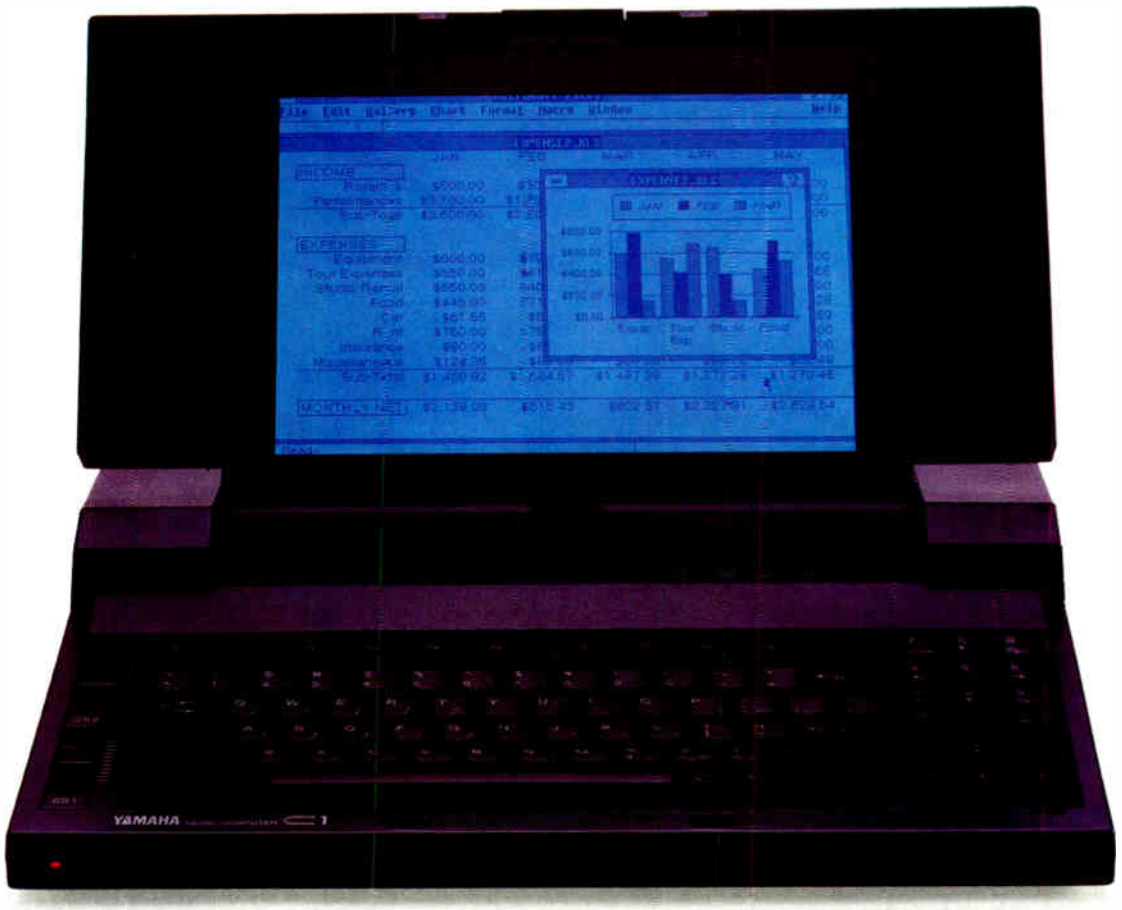

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COMPUTER NEWSDESK

MACWORLD AND ME

The recent Macworld Expo was held August 11-13 in Cambodia. Or somewhere in a steamy rain forest in the Amazon basin. Or maybe in Boston, Massachusetts. Yes, that's it. Boston. I remember now because the traffic situation was worse than any jungle nightmare.

The East Coast Mecca that brings Mac hackers and users out in droves of nearly 40,000 was so big this year that it had to be held in two separate locations, the Bayside Exposition Center and the Boston World Trade Center. Not especially convenient in the sweltering Boston summer heat.

Surprisingly, the number of music companies present was far less than many people expected. Of the larger and better-known companies, only Digidesign and Coda were present. Conspicuous by their absence were companies such as Opcode, Mark of the Unicorn, and Passport Designs. But a group of little companies showed their wares, with heavy emphasis on music training.

It was **Coda Music Software**, with the introduction of its Finale scoring package that managed to have the biggest musical impact on the show. Despite its $1000 pricetag in a $400-to-$600 world, Finale was considered not only a big deal for musicians, but also one of the stellar products at an otherwise routine show.

Tucked inside the Mirage Monitor booth was Boston's own **U.S. College of Music**, which sells a variety of music training and education packages. The primary one displayed at the booth was called Keyboard Virtuoso, a modern-day equivalent of player piano rolls. It uses an unusual system based on MIDI representation of data on a grand staff, which the user can then modify to control the view of individual bars, speed of tempo, as well as playback and record functions.

Digidesign showed up at the last minute – they weren't even listed in the program – to give demos of their Sound Accelerator card and TurboSynth software. Used in combination, these products provide a nice Macintosh hardware/software system for real-time synthesis. And the company had one of the nicer stereo-based sound demos at the show.

ARS NOVA demonstrated its Practica Musica software for music tutoring. The product teaches both rhythm and melody as part of an ear-training program, and the whole system keeps track of the student's progress. The student can use either the computer keyboard or a synth to play out the lessons.

Great Wave had a little package called ConcertWare+MIDI, which is a small sequencer package aimed at the low-end of the market. **Primera** showed its Different Drummer software, which is designed specifically for sequencing drum parts. Although only in beta-test, this package has some strong features which allow for extremely easy cutting and pasting of rhythm sections. Of course, more commercially-oriented products such as Jam Session were available from the myriad of distributors and retailers set up throughout the show floor.

Graphics Notes demoed its Music Publisher package for electronic music publishing. In some respects I think this product is as strong as Finale, especially in the beauty of its printed scores. With unlimited font use and some 2000 preformatted guitar boxes for notation, this product was probably the sleeper of the show.

Of the 115 tutorials and panel sessions, there was one seminar session on music called Music on the Mac. The 50-minute talk featured Nancy Dunn of Macworld magazine, Richard Boulanger of Berklee, and Phil Farrand of Coda (they managed to be almost everywhere at the show). The seminar covered some of the readily available products and solutions to getting the most music out of the Macintosh.

Of course, Macworld had everything else imaginable to offer the rest of the world, from huge color screens to laser printers to video editing software to animation to scanners to camera input to . . . well, you get the idea. This show was simply huge. One disappointment of the show was that Apple themselves didn't release any major new products.

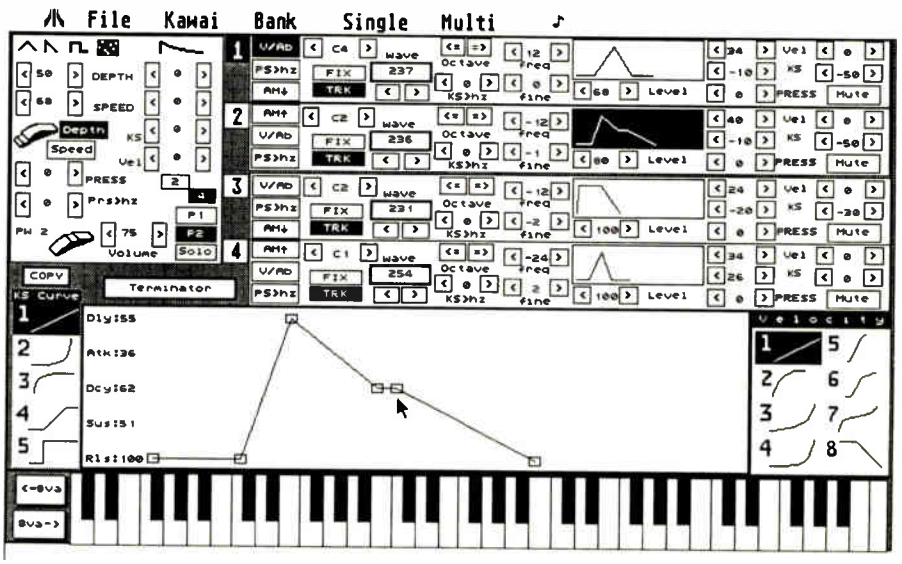
All in all, though, a very informative show for the novice or professional Mac user. The next Macworld show is in San Francisco from January 20-22, 1989. I expect more music companies there due to the West Coast location of so many music software developers. At least at that show, though, you won't need a portable air conditioner. You will, however, need a portable heater, and an umbrella. And a parka. And gloves. And. . . . ■ *Harvey P. Newquist*

NOW KI HAS THEM TOO

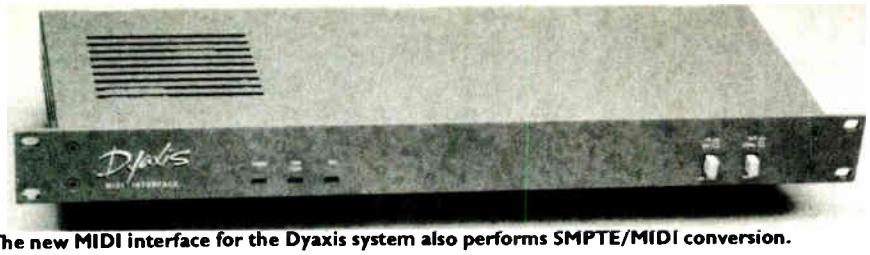
Two editor/librarians for the Kawai KI and KIm cross the news desk this month, both for use with the Atari ST. From Drumware, comes a mouse-driven graphic editor with a front panel screen arrangement. Drumware boasts a randomizer patch generator for generating new sounds, and program interpolation. The program retails for $119.

The second comes from Synergy Resources and is called SynthView KI. It's a GEM-based graphic sound librarian/editor which also comes with a desk accessory that lets you send your custom banks of sounds to the KI from within other GEM programs. The price for SynthView is $69 plus $3 for postage.

MORE FROM Drumware, Inc. 12077 Wilshire Blvd. #515, Los Angeles, CA 90025. Tel: (213) 478-3956. Synergy Resources, 754 N. Bolton Ave, Indianapolis, IN 46219. Tel: (317) 356-6946.



The main screen from DrumWare's KI E/L for the Atari ST.



The new MIDI interface for the Dyaxis system also performs SMPTE/MIDI conversion.

DYAXIS GOES DIGITAL

Integrated Music Systems has released an update to their Dyaxis direct-to-hard disk recording system. The system, which works with the Apple Macintosh computer, now incorporates multi-format digital input/output ports. With Dyaxis fully operating in the digital domain, the need for digital-to-analog converters is eliminated.

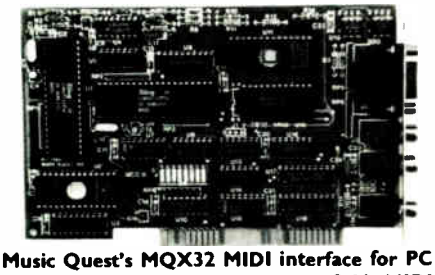
The three digital input/output ports support the Sony SDIF-2 (1610), AES/EBU, or S/PDIF (CD/RDAT) standards. Translation between these is performed internally, allowing the user to record in one format, and play back in another.

IMS has also worked with Opcode Systems to develop a MIDI interface for the Dyaxis system. The interface, which takes up a single rackmount space, acts as a SMPTE-to-MIDI timecode converter. It has the ability to read and write SMPTE and MTC, via the Mac. The interface's JamSync mode allows the user to lock SMPTE Out with SMPTE In. The unit houses two MIDI Outs and one switchable MIDI input, so that the interface can be used when Dyaxis is not running.

MORE FROM Integrated Music Systems, 1552 Laurel St., San Carlos, CA 94070. Tel: (415) 592-8055.

QUEST FOR SYNC

Music Quest, Inc. has introduced a new MIDI interface for use with the IBM PC/compatibles. The MQX32 features two separate MIDI Out ports, operating on two independent MIDI paths, thus allowing for a total of 32 MIDI channels. The interface uses MIDI Song Position Pointer to determine tape position, using what Music Quest calls Chase Lock Tape Sync, and lets users set the playback location anywhere they choose.

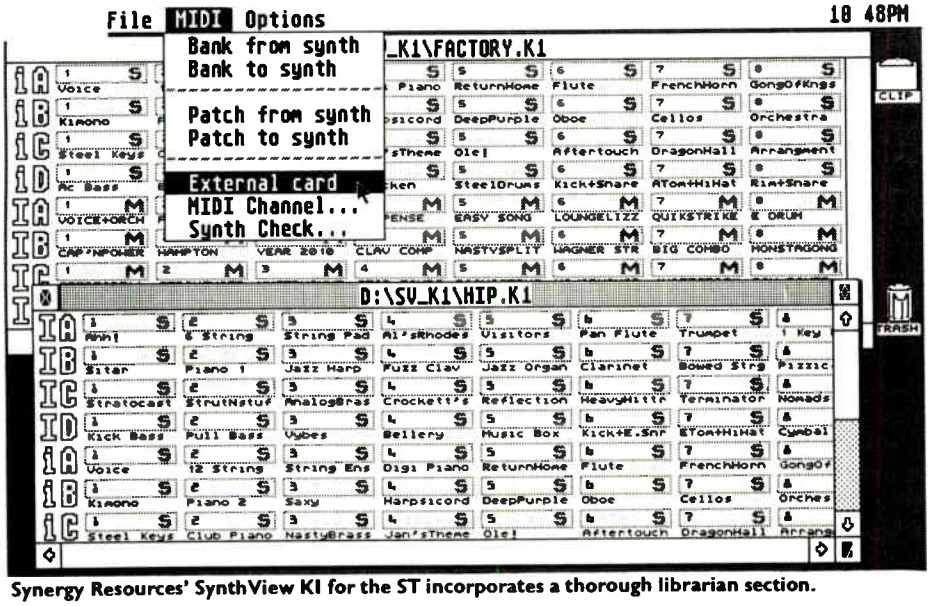


Music Quest's MQX32 MIDI interface for PC compatibles supports two sets of 16 MIDI channels and incorporates FSK tape sync encoded with Song Position Pointer.

In addition, the MQX32, which lists at $299, can read and write 30 frame non-drop SMPTE, generate MIDI Time Code, map out SMPTE events, and receive MTC messages from external SMPTE units.

The MQX32 is compatible with Music Quest's MIDI Co-Processor Card and the standard Roland MPU chip set. Some of the software which supports the MQX32 includes: Twelve Tone Systems' 'Cakewalk,' Magnetic Music's 'Texture,' LTA Productions' 'Forte,' Robert Keller's '48-Track PC,' Imagine Group's 'Master Series,' Club MIDI's 'ProLib,' and The MIDI Connection's 'Tape 'n' Step.'

MORE FROM Music Quest, Inc, 1700 Alma Dr. Suite 260, Plano, TX 75075. Tel: (214) 881-7408.



Synergy Resources' SynthView KI for the ST incorporates a thorough librarian section.

GIVING A HAND TO YAMAHA

Software companies are already eager to support the anxiously awaited MS-DOS compatible CI computer from Yamaha. Twelve Tone Systems, for one, planned on releasing a version of Cakewalk, called Cakewalk/CI (clever, eh?) in conjunction with the CI's anticipated September release. The price is indetermined as of yet, but it's expected to be higher than the $150 price tag on the normal IBM version of Cakewalk 2.0.

Passport has announced that both Score and Master Tracks Pro 3.0 will be released for the Yamaha CI. Passport claims that the new version 3.0 "has many new enhancements for MIDI power users and those users working with SMPTE on soundtracks for film or video."

And sequencing software isn't all that's coming out. Bacchus Software Systems has released their TX81Z and TX802/DX7II Graphic Editing Systems for the CI. The TX81Z program sells for $199, and the TX802/DX7II package sells for $249.

MORE FROM Twelve Tone Systems, PO Box 226, Waterman MA 02272. Tel: (617) 924-7937.
Passport Designs, Inc, 625 Miramontes St., Half Moon Bay, CA 94019. Tel: (415) 726-0280.
Bacchus Software Systems, 2210 Wilshire Blvd. #330, Santa Monica, CA 90403. Tel: (213) 820-9145.

EFFECTS EDITING

Now you can edit your Lexicon PCM 70 with Snap Software's text version of PCM 70 Companion for the IBM PC/XT/AT/ compatible. The software gives you real-time patch editing with alphanumeric display and a single screen layout of all the parameters in a given patch.

The program runs on any MS-DOS based computer with a monochrome card, text monitor, MPU, and at least 256K of memory. If you want to buy the graphic editor, you can save $60 off of the $225 anticipated price by getting the PCM 70 Companion now, and upgrading to the graphic version (for $50) due out in January, '89. The text version is available now for $115.

MORE FROM Snap Software, 1116 Janey Way, Sacramento, CA 95819. Tel: (916) 451-9914.

SEARCH FOR SOFTWARE

IntelliCreations, Inc. is "actively" soliciting MIDI software. In an effort to enter the music software biz, they are searching for interactive composition programs, educational programs, and sequencers. They want the software to be written for Macintosh, Atari ST, Amiga, IBM, Apple II series, Commodore 64/128, or Tandy systems.

MORE FROM IntelliCreations, Inc. 19808 Nordhoff Pl., Chatsworth, CA 91311. Tel: (818) 86-5922.

Performance Computer Concepts MIDI-Manager 7

An entire environment for creating music with the IBM PC and MIDI - including sequencing, voice librarian functions and a programmable MIDI patchbay. *Review by Michael Andreas.*

YES, TRUE; IT'S getting increasingly hard to get excited about yet another new sequencer. However, what if someone were to develop a MIDI program that could handle all the normal MIDI applications (sequencing, voice librarian, MIDI patchbay assignments, etc), and then added some new goodies that would allow you to store and instantly recall all the voices you had been using for a particular project? Then, what if this program could set up your whole keyboard master/slave network and load all tempo, volume, MIDI channel assignments and timbre changes for you - automatically? And then, what if these same people added an option to their program that would allow you to take all this information, place it in a master file, and use it to control every MIDI event in a live performance or recording session, with total remote control over the real-time occurrence of any or all of these events? I ask you, *then* would you be impressed?

Well, the folks at Performance Computer Concepts (P.C.C.) hope so, because their MIDI-Manager 7 system (MM7) does all the above and more. And amazingly, it does it on the IBM computer - you know, that neglected outcast lost in the shadows of the Macintosh/ Atari wars.

THE SYSTEM

The MIDI-Manager system is comprised of a circuit board (the PCC X7000 MIDI interface - which is *not* compatible with the industry standard MPU-401), a remote MIDI Inter-Connect Box (featuring seven MIDI In and Out ports), a 50-pin connecting cable, the MM7 manual, and software. There is also a deluxe system that includes the above and a remote footswitch controller, heavy duty cable, and an FSK tape sync kit. You will need an IBM PC/AT/ XT or compatible computer with at least 384K of memory (512K recommended), two disk drives (a hard drive is preferred, but not necessary), one or two expansion ports for the circuit board and optional FSK tape sync kit, MS-DOS 2.1 or higher, and a few screwdrivers - and, possibly a hammer (but I'm getting ahead of myself).

Installation of the MM7 system is supposed to be fairly simple. Unfortunately, life is never that easy. The 50-pin connecter at the end of the circuit board would not fit into my particular IBM compatible's expansion slot. I called P.C.C., "Yes, this has happened once before with another compatible. We had to cut out the expansion slots to accommodate the connector."

P.C.C. said they're changing the connector in the future, but that wasn't going to help me now - and there was no way I was going to saw my (and my wife's) computer. Since the PC board looked rather sturdy (and it was so close to fitting), I conferred with P.C.C., who assured me that I was free to try using a little persuasion to get it installed. So there I was, hammering a circuit board into my computer, praying the whole time that neither of two things would happen: first, I miss, and end up ruining the computer. Second, that my wife would walk in the door. However, with a little "nudging" (about fifteen good whacks), it *did* go in (just kidding, honey . . .).

After this, the rest was easy. I closed up my computer, hooked up the cables and MIDI InterConnect Box, and plugged in my synths, and I was up and flying.

PAGES AND COMMANDS

The MM7 software is both user friendly and pleasing to the eye. Still, it can get a little mind boggling at times. Basically, the program is divided into six main Pages, with each page representing one of the MM7's basic functions. Within each of these pages are subpages which are accessed through a command window, allowing for the quick loading, saving, insertion, and deletion of files, and access to a Main Page Menu, and other functions singular to whichever file is currently being used.

Since this program works on so many levels of pages within pages, when referring to any of the

Main Menu Pages, I will capitalize the word "Page." Any subpages will be in lower case. I hope this will help keep things clear.

Along with these Main Menu Pages there is a set of universal commands (system wide utilities) which can be typed in at any A> or B> prompt. These can also allow you to control certain Page functions from another Menu Page. The final set of controls are the Function Keys, which facilitate getting around the program.

• Configuration Page

The first of the Main Menu Pages is the database for the MM7. Into it you enter the name and manufacturer of each of your MIDI devices, the port it is plugged into, its MIDI channel number, and the kind of access it will have to the system (ie. Input/Output, Input Only, or Output Only).

This page is easy to understand, but there is a certain amount of what the P.C.C. manual refers to as "User Responsibility" involved in getting it to work. Basically, this is understanding the MIDI implementations of your individual synths and how to set their MIDI transmit and receive channels, the Omni On/Off Modes, etc (well, you eventually wanted to learn about this stuff anyhow, didn't you?).

• Network Page

This page is the MM7's computer-controlled MIDI patchbay. It "reads" the configuration page and presents this information in a side-by-side display, showing which synths are transmitting information to the computer and which are receiving information from the computer. From this Page you can change master/slave assignments without having to physically repatch your synths.

Along with the standard window commands, the Network Page has a Display Ports/Units command which will specify any of the seven MIDI In and MIDI Out ports and display which synths, sequencers, or effects are connected to it. The MM7 program is capable of driving up to 50 (that's right, fifty) MIDI devices simultaneously.

• Direct Page

The Direct Page is the Librarian Function of the MM7 system. Its subpages are three kinds of data cards. The first of these is the Voice Data cards, in which you can store a library of individual voices, banks of voices or performance voices for each synth supported by the system. There are only thirteen MIDI devices recognized by the present version of the program, but P.C.C. intends to have a software update available by the time you read this that will allow the user to enter a Voice Data Card for any MIDI device.

The second card in the Direct Page is a Sequencer Data Card which allows you to load and store sequences from an external sequencer. This feature permits you to upload sequences from any MIDI rhythm machine to a diskette. The third is the Function Data Card, which stores Program and Function Information such as Omni On/Off, Poly On/Off, MIDI volume, and Program selection.

Since neither of my synths (Yamaha DX11, Roland D110) are supported by a Voice Data Card, I couldn't use the Direct Page (the Universal Librarian will help). However, that still leaves one serious flaw with the MM7: although there is a window in the Voice Data card for Voice Editing, there are no plans for voice editing in the immediate future. This leaves the user of the MM7 with some less-than-desirable choices – either you can do all your voice editing on your synths, or you have to install an MPU-401 board in your computer to run some of the available voice editing software (expensive). In their favor, P.C.C. said that any legitimate source interested in writing voice editing software to work with the MM7 should contact them, and they will give out the specs for the program. Let's hope someone does.

• Multitrack Page

This page is the sequencer for the MM7. It allows the individual recording of up to 16 tracks (the MM7 can also double tracks on different MIDI channels without using up extra tracks). The Multitrack Page also accesses the FSK tape sync option, which allows you to sync the MM7 to any multitrack tape recorder. The MIDI InterConnect box (also accessed in this Page) also has two sets of 24/48 ticks in/out, and start/stop jacks for syncing pre-MIDI rhythm devices to the MM7. SMPTE timecode will be ►

► included in a software update which is supposed to be ready within the next few months, but it will only support two of the four possible formats – it won't support 30 drop frame (video) or 24 frame (film) standards.

Also accessed on the Multitrack Page are the Sequence Start/Stop; Punch Start/Stop functions (a punch is stored in RAM, so you can audition it without losing your original track); Master Transposition of the entire Multitrack; Tempo adjustment; Beats Per Measure; Beats 'Til Start; Number of Plays (repeats a sequence); and an Available Memory and Memory Used display that helps you keep track of the amount of RAM used. During Playback, you can solo any track or tracks, mute any track or tracks, fast forward, and increase or decrease the tempo.

The Options Window offers Record, Playback, and a Track Sheet (which displays the status, Unit number and name for each track). Editing of this track information can be done on all tracks while in the Track Sheet display, or on a single track in the Single Track Display which appears on the Multitrack Page.

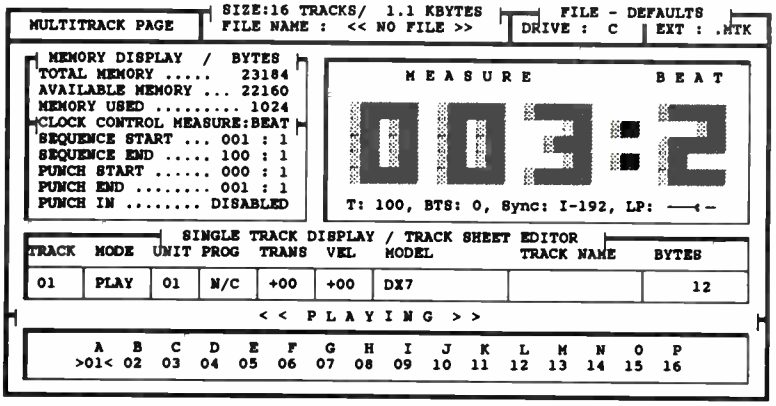
Also in the Multitrack window is a Parameters and Utilities function. Choose this and a new window appears which gives you the choice of Playback Quant/Skew. This allows the quantizing of a track and/or the skewing of any MIDI event to any point in any measure with a 1/192 of a beat resolution (great for doubling a track with a slight flange, or skewing a late speaking string track just enough to make it enter right on the beat). One of the nicest features of both these functions is that they are executed during playback, and not written onto the track. If you only want to quantize part of a track, there is a separate Quantizing function (also in the Utilities/Parameters window) for this.

Another function in this Utilities/Parameters subpage is the Logical Units option. This allows you to send a single track's data to an array of up to 15 units with separate control over each unit's voice program, transposition, and volume (velocity). As I mentioned earlier, this allows you to save on tracks and gives the MM7 a lot of voicing possibilities.

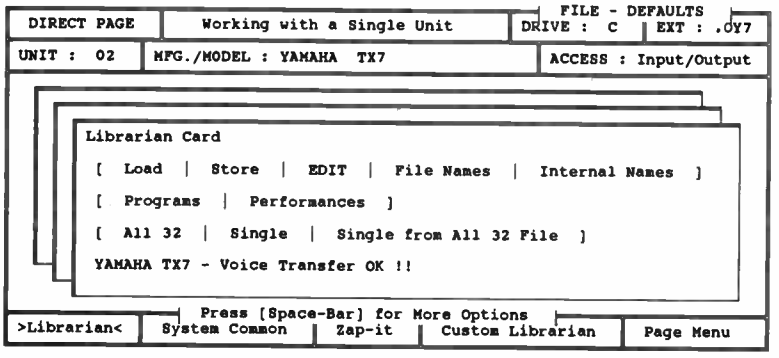
The Program Track page permits the assignment of up to fifty events to a finished Multitrack performance. In other words, at any spot in a song you can send a program change to a specified synth, or a volume change, or a tempo change, or a set of commands for external drum machines, sequencers, etc. The only thing missing is a transposition utility which would allow you to change octaves within a track.

Next in the Parameter/Utilities window is the Track Copy/Merge/Erase function. By employing these options you can Copy any part of a track to any other track (or to itself), you can Merge two tracks or any parts of two tracks into one track, and Erase all or any part of a track.

The final option in the Parameter/Utilities subpage is the Track Edit function – which is an Individual MIDI Event editor. This editor displays each MIDI event on a track in decimal and hexidecimal form. If you're trying to find out what that weird note was you played in the third beat of measure four, this isn't going to help you much (unless you're familiar with computer programming). Fortunately, in the next version of the software there will be a real-time piano scroll window that will allow for direct "step" editing of individual notes. P.C.C. will be keeping this digital event editor in the new software program – music to my ears, because (much to my surprise) I found myself using it regularly to make fine adjustments on tracks (and believe me, I'm no computer whiz).



Multitrack Page



Voice librarian functions from Direct Page

All of these features are powerful, and relatively easy to use – but there were a few things I found wanting. First, the Punch In/Out function can only be performed on a beat (no subdivisions). An editing option of 1/12th or 1/24th of a beat would allow for most double or triple meters, and it seems that this would be a fairly easy upgrade to write. As it is now, if a phrase extends into the final beat of a measure you have to punch out on the downbeat of the following measure. More than once I found that the Punch Out had erased the first note in the following measure.

Unfortunately, there are a few fairly major shortfalls in the multitracking functions of the MM7 program. The first (and most frustrating) of these is that the system shuts off the Network access to any synth it is playing. As I was using two multitimbral synths, when I tried to program a track into the Roland D110 (after the first track had been recorded), the system disconnected the D110 so I couldn't play it from the Master Keyboard. The only way around this was to turn off all the tracks previously recorded on this synth so I could hear what I was recording. Multitimbral synths also cause another problem with this program in that the Network Page allows only one MIDI channel per port to be assigned as a driver. This forces you to keep going back to your synths and changing their MIDI assignments each time you want to record or playback a new part.

I had a few other problems with the MultiTrack program. First, my remote foot controller tended to freeze up after an hour or so of use (if I rebooted the system it would start working again). And second, when simultaneously recording and monitoring a synth, the sequencer would have a MIDI overload, which could only be fixed by turning off some of the playback voices while recording.

- **Performance Page**

I mentioned earlier the way the MM7 program can set up your synths' MIDI Configuration, its Network, and how its Sequencing (or Multitracking) program works. The next Page of this program is the Performance Page, and it is at this point that the MM7 program really starts excelling as a live performance tool. Here, you can program single or system-wide voice or program changes, along with instant Network Changes. (Remember those? They delineate your setup's Master/Slave relationship.) This page will also Load and run one or a series of Multitrack sequences with remote control capability over their start, stop and tempo.

Now, if you're playing a five-nighter at the nearest Motel 6, this won't mean much to you.

However, if you are performing at the concert level doing arena shows, this becomes an incredible tool. At the push of a button (either using the remote foot controller or at the computer keyboard) all the Voices, Volume Levels, and Master/Slave relationships for your next song could be called up within seconds (with a hard disk, 1-4 of 'em), along with multitrack sequences.

Loading and Running a Performance Page is easy once you've done a few. But before making one, you'll have to brush up on your synths' program assignments. This entails some of that "User Responsibility" the manual mentions, and will probably send you scurrying back to your synths' owners manuals.

After getting this information, the rest is easy. Select the unit number (synth) you want to play, enter the program number you want, add any volume change you would like, and that's it. You can do this for each of your synths or sequencers, with up to 25 selections per step. If in the middle of a song you want to change your setup, just write another step into your Performance. During run time, the computer's screen will display the measure, beat, and tempo on the right side of the screen, and the Step Number on the left side. Each step can be activated either remotely using the foot controller or from the computer keyboard.

- **Batch Page**

Basically, the Batch Page takes everything you can do in the MM7 program up to this point, and puts it into one master program. When a Batch is run, every command in the Batch is executed in order, with any degree of automation desired. For instance, you can order the program to go into your DX7 library and load a bank of 32 voices, call up a multitrack sequence, load a Network, load a percussion file, switch to the B drive on the computer and find a Performance Page from a disk, play the sequence, pause and wait for a restart command, play upon command and, if you wish as a final command, load another Batch File for the next part of your performance. Amazing, isn't it? And the uses for this Batch page aren't limited to live performance – you can do all your editing, programming, voicing, etc, for a recording and store it in a Batch File so that when the session is finally called (say a month or two later), you won't be running around trying to find what settings you used at home that made everything sound so great. There is also a Print option which allows you to print out hard copies of Batch, Performance, Network, and Configuration Pages as well as your Library Listings.

SUMMATION

In spite of the problems I had with the MM7's sequencing functions, it is hard not to be impressed by this program. Having a program that is dedicated to a standard different from all the other IBM programs may be going out on a limb for both P.C.C. and someone who buys it, but I have to give credit to P.C.C. for their vision. They are also constantly updating their software, and all software updates are free to registered owners for one year (after that, it's $15 per update).

Would I recommend the MM7 program? Well, that depends. I can think of no program that is better suited for live performance applications (Mr. Mister is controlling their entire show with the MM7, and I can certainly understand why). In studio situations or for home composition applications, my judgement would be a little more reserved. First off, you have to be able to live without compatible voice editors, film and video SMPTE rates not being supported, and annoyances when using multitimbral synths. If your setup is primarily single voice synths, the MM7 system will serve you excellently. But, if you are starting out from scratch, I would wait – P.C.C. is designing a new MIDI interface which will feature merging, mapping and switching (rumored release: spring of 1989), and these features would eliminate almost all of the problems I had with the system.

The ultimate question is, would *I* consider buying an MM7 system? Sure, but I don't think I'll have to. I've got one permanently wedged inside my computer, and it's going to take an act of God to extract it. ■

PRICES Basic package, $1099; with foot controller and FSK options, $1299.

MORE FROM Performance Computer Concepts, 2378 Sirius St., Thousand Oaks, CA 91360. Tel: (805) 493-1476.

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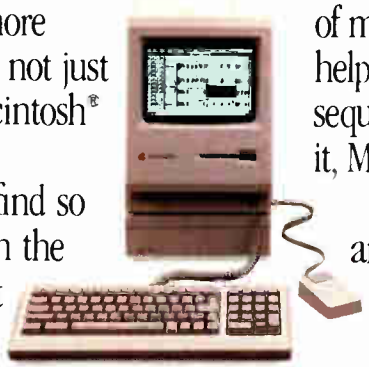

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algorithmic COMPOSITION

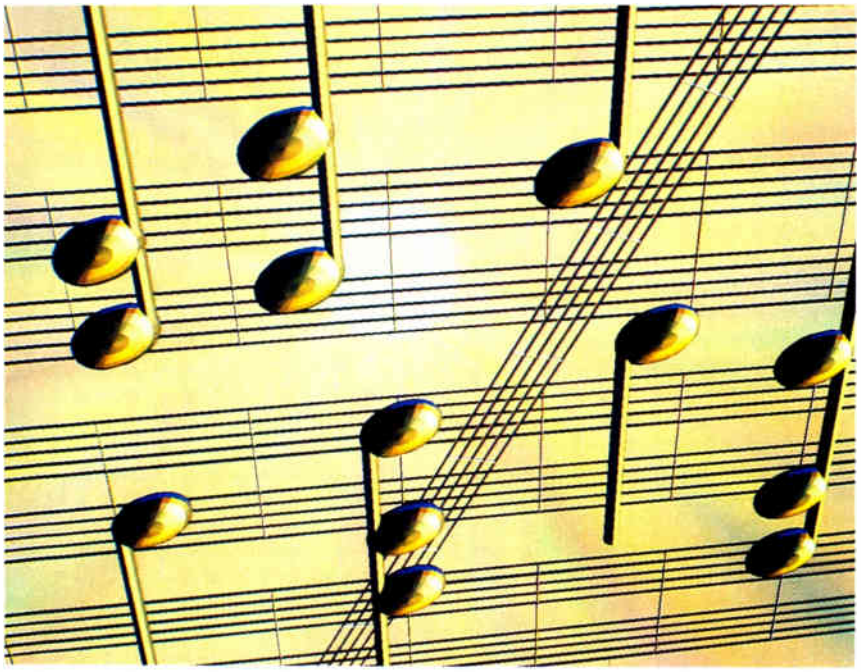


Illustration Colin Cantwell, © 1988 Crystal Chip, Inc.

Out of the labs of the computer music academies and into the hands and personal computers of the general public: such has been the progress of programs which aid the compositional process. What follows is a history of the movement and a survey of the products currently available. *Text by Carter Scholz.*

WHAT IS "ALGORITHMIC composition?" MIDI musicians can be excused if they think it was invented last month, or even last year – it indeed seems to be the fastest growing field of MIDI software. Yet in fact, the use of computers to generate music is over 30 years old, and the basic idea of automated composition dates from Mozart's time.

The current spate of composing programs derives from pioneering work done in the 1950s, 60s, and 70s by adventurous composers working on mainframe computers. Today's desktop computers are far more powerful, and enterprising MIDI programmers have made it possible for owners of any home computer to get a taste of these previously esoteric composing techniques. What follows is a report on the democratization of algorithms.

A BRIEF HISTORY OF ALGORITHMS

The word "algorithm" goes back to the ninth century. It probably derives from the name of the Persian author who introduced Arabic numerals to Europe. Its original meaning went not much further than "number," but computer science has adopted the word to mean a computational method.

The use of the term in music is recent, but the idea is old. "Mozart's Musical Dice" may be the first example of algorithmic music. Published in the 18th century under Mozart's signature (though he probably had nothing to do with it), the game included dice, notation of a few dozen musical phrases, and instructions on how to assemble these phrases, with the help of the dice, into a composition. This is an example of random, or "aleatoric" composition ("Alea" is Greek for dice). It's interesting that this was marketed as a game – a "diversion" – since the current-day MIDI equivalents also stress the sense of "fun," and many have screens that suggest a game.

A common misconception is that "algorithmic" music is random. Not necessarily. Conventionally a composer specifies every event of his or her music; by contrast, a musical algorithm is a process or set of rules for generating events. The composer doesn't specify every note; rather, s/he specifies the process. The process can be random, or it can produce a completely predictable and repeatable sequence. I personally favor a broad definition: if the details of a composition are not explicitly determined by the composer, it is algorithmic.

For instance, Terry Riley's classic 'In C' (1964) is, to my mind, algorithmic; the score comprises a set of 52 notated melodic patterns, which are to be played from beginning to end by any number of players with any instruments, repeating each pattern any number of times. The resulting performance is indeterminate in structure (I've performed it at lengths ranging from thirty minutes to three hours), yet derives inescapably from a fixed, small core of material and rules. Other non-notated, "instructional" scores from the 60s and 70s also partake of the algorithmic spirit.

If an algorithmic process *is* random, it's more properly called "aleatoric" or "stochastic." "Aleatoric" refers to compositions in which chance processes play a prominent role. An example would be John Cage's 'Music of Changes' (1961), in which notes, durations, and dynamics were all determined by tossing coins; this procedure produced a fixed score, so that all performances of the piece are similar. Another example is Karlheinz Stockhausen's 'Klavierstuck XI' (1956), in which modules written by the composer are played in an order determined by the performer; performances can vary widely.

"Stochastic" music, as pioneered by Iannis Xenakis, refers to the use of probability theory to determine the details of a piece. This differs from "aleatoric" music in that the composer

determines the overall form of the piece – the note density, the rhythmic character, the instrumental distribution, the registers, the dynamics – but leaves the business of selecting actual notes, durations, etc, to a stochastic process – which is *constrained* randomness – usually executed by a computer.

ENTER THE MACHINE

The first comprehensive attempt to make music with a computer was the 'Illiac Suite' (1956) by Lejaren Hiller and Leonard Isaacson. The aim was less to produce a successful piece of music than to investigate the musical possibilities of the computer. Many of the areas explored, including rules for counterpoint, random (white noise) numbers, and Markov chains, are still staples of algorithmic composition. The computer generated a list of numbers, which were then translated by hand into a score for string quartet.

Xenakis, by leaving the details of a work to statistical methods, was the first composer explicitly to concern himself with the aggregate effect of sound masses rather than specific relationships between events. 'Pithoprakta' (1956) for string orchestra, was written using hand computations, but by 1962 Xenakis had developed a "stochastic music program" that ran on a mainframe computer. Like Hiller's program, it produced not sound or notation, but a list of numbers which the composer transcribed into standard notation for performance by conventional ensembles.

In James Tenney's Noise Study (1961) the computer both structured the piece and generated the sound by algorithmic processes (in this case random). Tenney says, "A (computer sound) 'instrument' was designed that would generate bands of noise, with controls over the parameters whose evolution seemed essential . . . the large-scale form of the piece was sketched out, in terms of changing mean-values and ranges of each of the variable parameters; the details – the actual note-values in each parameter – were determined by various methods of random number selection."

Investigations into those specific *methods* of random generation are important, for there are many flavors of randomness. The first thing you'll notice when you start playing purely random music, with pitches and durations derived from white-noise, or "uniform" distributions is that it gets old fast (anyone remember sample/hold modules?). A big compositional task, therefore, is to constrain randomness in an intelligent way. Of the dozens of methods tried, one of the more successful has been the 1/f ("one-over-f") distribution; this distribution repeatedly crops up in nature, in the shapes of mountains, coastlines, star clusters, etc. And 1/f music, while still perceptibly random, does seem more interesting. (The 1/f phenomenon is related to Benoit Mandelbrot's concept of "fractals.")

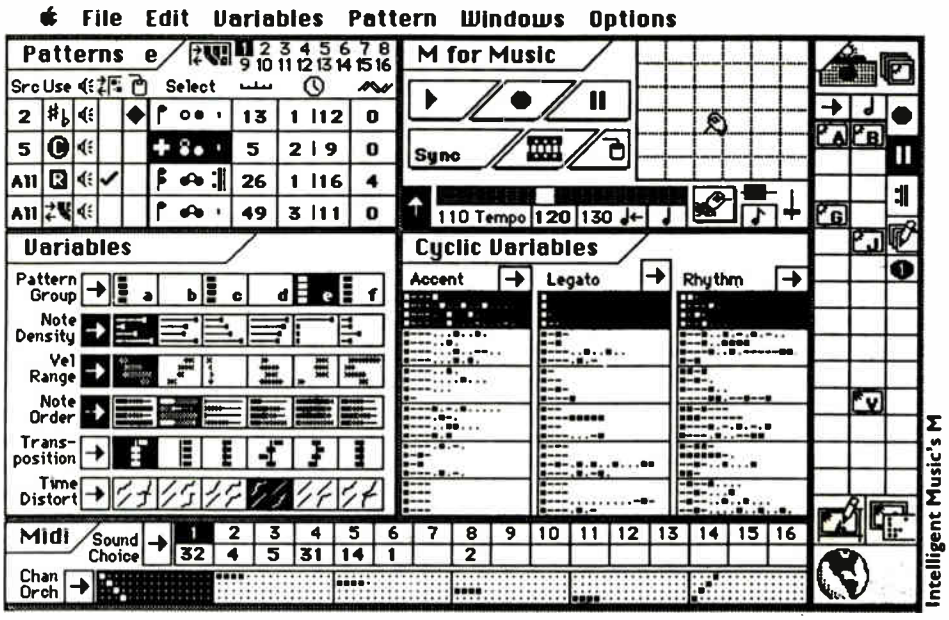
As computers became faster and more sophisticated, the field of "interactive" composition was opened. (*For more ideas on Interactive Music, see the similarly titled feature elsewhere in this issue – Ed.*) Max Matthews' GROOVE software (1968) was the first to permit a user to modify in real-time an ongoing musical process. Laurie Spiegel was an active user of GROOVE in the mid-70s, and describes her piece 'Patchwork' as follows: "The program I wrote had all Bach's favorite manipulations – retrograde, inversion, augmentation, diminution, transposition – available on switches, knobs, pushbuttons, and keys, so that I could manipulate simple melodic and rhythmic patterns with them." In a similar vein, Salvatore Martirano's elaborate 'Sal-Mar Construction' (1971–) is an analog synthesizer containing hundreds of simple digital circuits which could be programmed to control, in real time, the evolution of a piece. By selecting various pre-programmed logic modules in performance, Martirano could improvise sophisticated pieces over the parts of which he had a general, but not precise, control.

There are many more examples, and for anyone interested in pursuing the topic in depth, I recommend Charles Ames' survey (see below) which itself lists over a hundred references, and/or the *Computer Music Journal*.

WHAT'S AVAILABLE

In the space I have, I can only describe programs that I've personally used and liked. After these descriptions, I'll list other programs that I'm aware of – but the field is changing so rapidly that you can bet the list will be incomplete by the time you read this.

The first MIDI algorithmic software was **Dr. T's** *Algorithmic Composer* ($99) for the Commodore 64 (created by Jim Johnson and Jack Deckard). Really three programs in one, its ▶



Intelligent Music's M

► ideas have been integrated into the company's later products for the Atari ST. The thrust of these programs is not to generate complete compositions, but to create short musical phrases which can be incorporated into a conventional sequenced composition.

The "Phrase" generator combines user input and random numbers. The user can specify such parameters as scale type, root key, phrase length, average notes/measure, pitch range, maximum step size, probability of rests, harmonicity factor, and velocity factor & range. The program then generates random themes within these user constraints. As the manual states, the intent is "to generate phrases according to some simple rules . . . it is up to the user to determine the aesthetic value of the phrase."

The "Series" program is a non-random module based on the medieval compositional technique of *isorhythm* (I told you these ideas weren't new). Isorhythm is created by looping two series of musical parameters against each other; for instance, let's write a rhythmic series of half-note, dotted quarter, eighth; and a pitch series of C, F, E, G. The rhythm will cycle every three notes, the melody every four notes, producing an overall pattern twelve events long that looks like this:

C . . . F . . EG . . . C . . FE . . . G . . CF . . . E . . G

(. = *eighth*) Isorhythm is a powerful compositional "algorithm" that has come back into use in some recent "minimalist" music. In a MIDI environment, the "Series" parameters include pitch, duration, event time, velocity, and MIDI channel; two isorhythmic sequences can be played at once.

"S.A.C." (Stochastic Algorithm Composer) uses some of Hiller's and Xenakis' techniques, selecting pitches with a 1/f generator, and durations from a Gaussian (bell curve) distribution. The user can set some constraints on tempo, velocity, voice transpose, and available pitches, and the program will generate four-part random melodies.

M (Mac, $250; ST, Amiga: $200; IBM, $250 from Voyetra Technologies; Mac version reviewed March '87, ST version reviewed March '88) and *Jam Factory* (Mac, $200, reviewed February '87) from **Intelligent Music** partake of the "interactive composing" aesthetic of the company's president, Joel Chadabe. Chadabe has used similar compositional algorithms in live performance with a Synclavier – his 1981 recording *Rhythms* (Lovely Music VR 1301) sounds intriguingly premonitory of M.

Both programs use cyclic and random variation on user-supplied melodic material (or groups of pitches) to produce four voices. In M, isorhythmic patterns of pitch, duration, accent (velocity), and articulation (note length) can be set to cycle with or without random variations. Literally hundreds of parameters can be adjusted in performance on the dense user screen; settings can be stored as "snapshots," and performances as "movies" for later use or modification. Real-time recording and interaction with a MIDI keyboard is possible with M, but even more is the forte of Jam Factory, which simulates four "improvising" players. These programs are intended as live performance environments, but the sequences they generate can also be saved as Standard MIDI Files, for importation to a sequencer.

UpBeat (Mac, $150), a "smart" rhythm programmer, is more limited in terms of algorithmic functions, and is not meant for live performance, but is optimized for use with drum machines. *MIDIDraw* (ST, $95), a new program, records and interprets mouse gestures as MIDI notes in two voices. All Intelligent Music programs are notable for their well-thought-out user interfaces.

On the horizon from Intelligent Music are: *RealTime* (ST, $350), a full-functioned sequencer with an automatic variation generator; *OvalTune* (Mac, $145), for independent gestural control of graphic images and algorithmic music; and *Riff* (Mac, no price yet), another program consolidating graphics and music.

Whereas M and Jam Factory vary and transform a user's MIDI input, *Sound Globs* (IBM, $150) from **Twelve Tone Systems**, though also performance-oriented, takes a more "classic" stochastic approach: it accepts no MIDI input, but lets the user draw detailed probability curves for pitch range, horizontal density, vertical density, note duration, and loudness (it's the only program that does give this level of control). Hit "play," and stochastic patterns are generated on up to 16 different MIDI channels. A separate performance screen lets you vary any of the parameter limits in real time, and move between – or layer – up to 24 textures. Five user-drawn curves for mod wheel and pitch wheel control are also available. You can record a performance in real time – either your screen actions, or the MIDI output (as standard MIDI files, or as Cakewalk sequencer files) – and you can edit the saved screen actions with a built-in editor. Sound Globs requires a mouse, a Hercules-type monographics adaptor, and 640K of memory.

A unique Mac program not yet in release is David Levitt's *Hookup*, from **Hip Software**, an iconic programming language. The user drags logic modules from a palette onto a blank screen, connecting them with a wiring tool. There are clocks, timers, sliders, pushbuttons, MIDI ins and outs, memory cells, and Boolean logic and arithmetic modules (in keeping with Levitt's philosophy of music, there is no random-number module). Although MIDI output is one possible termination of the signal chain, Hookup can also control video animation (via a VideoWorks driver), and is meant to demonstrate the advantages of iconic programming as much as to produce musical output (akin to Digidesign's Turbosynth – reviewed September '88 – which employs an iconic language for designing samples). Levitt has also written *Harmony Grid* (Mac, no price yet) which, while not being precisely algorithmic, is an unconventional tool for learning and exploring twelve-tone harmony.

Similar to Hookup is *MusicBox* (IBM, free) by **John Dunn**. Available for download on GEnie and the WELL (Tel: (415) 332-6106), MusicBox is conceptually like a modular synthesizer. The outputs of modules are patched to the inputs of other modules in a signal chain. Cryptic-looking icons represent the modules, which include clocks, sequencers, random generators, switches, mixers, and much more (there are over 150 different kinds of modules). Their intricate interactions produce multi-channel MIDI output. While not easy to learn, Music Box is an intriguing and powerful environment, and you can't beat the price.

TrackGenie (IBM, $100) from **LTA** generates notes at random within a large set of user constraints, storing the result as one of eight possible monophonic tracks. You might direct it to generate notes only of the pitch classes CDEFA, in an overall four-segment shape that moves from C3 to G5 to D4 to A5 to C2 (selecting pitches within a range of 7, 11, 15, and 3 semitones for each respective segment), with a rhythm that may be quantized or randomized within given limits, and velocity likewise. Once you've set these constraints, which include the length of phrase in bars and in number of notes,

you have a random track. You can play tracks, mute them, transpose them (pitch and velocity), and transform them algorithmically. Though intended to work with LTA's *Forte II* sequencer (you can import/export tracks between it and TrackGenie), TrackGenie also reads and writes MIDI Files. The program is distributed with *FWAP!* ($80), a non-algorithmic drum machine pattern generator.

From **Dr. T's**, *Tunesmith* (ST, $149) is a much-expanded version of the "Phrase" program from the C-64 Algorithmic Composer, while *Fingers* (ST, $79) is an expansion of "Series" from the same program. Both will output standard MIDI files, and can run under Dr. T's Multi-Program Environment at the same time as their Keyboard Controlled Sequencer. *KCS Level II* (ST, $325, reviewed August '88) itself contains "PVG" (the Programmable Variations Generator), which has ten screens of algorithmic music generation features.

Hybrid Arts' *Ludwig* (ST, $149) combines algorithmic composition and drum-machine-style sequencing with real-time modification of parameters like loop points, velocity levels, randomization, and so on. It's designed to work with Hybrid Arts' MIDI recording programs. *Mousterpiece* (ST, $229), by **MIDImouse Music**, is a MIDI controller and compositional tool that includes sequencing and mapping functions, controllable in real time by the mouse.

PHILOSOPHICAL CONSIDERATIONS

I left Laurie Spiegel's *Music Mouse* (Mac, $60; Amiga, $79; from **Opcode**, reviewed December '87), one of the first "intelligent instrument" programs until now, because it leads directly to my next point. Music Mouse is a two-dimensional grid, around which you scoot a mouse; the position of the mouse determines, within user-selected harmonies, what notes the program plays. Control over the algorithm is limited for the sake of simplicity. You don't have to know anything at all about music to produce pleasant sounds with Music Mouse; all you have to do is push the mouse. But wherever you push it, the output sounds pretty distinctly like Music Mouse. The documents ask (rightly, I think) that you credit Music Mouse when you distribute music made with its help.

The question, then, is "whose algorithms are these?" Any composing program, simple or complex, displays the bias of its designer. To what extent can users open up the environment, and make it their own? Personally, I can't use M without feeling that I'm performing a Joel Chadabe meta-composition; therefore I don't use it for composing, only for noodling. You can certainly make "serious" music with off-the-shelf software; but in this new, flexible environment each user will have to think about just where the program's contribution to their music begins and ends, and what that means to their music. Because whatever an algorithmic composing or intelligent instrument program is, it is *not* a traditional musical instrument in the sense of a piano or even a synthesizer – it changes the relationship between composer, performer, and instrument (introducing the programmer into the transaction), and demands that the relationships be rethought from the ground up. Failure to do this will surely and quickly lead us to where certain "algorithmic clichés" will be as recognizable and shopworn as DX7 factory patches are today.

GETTING DOWN TO CODE

One way to escape clichés (though it's not for everybody) is to design your own algorithms. Music programming languages are available on every computer. This escape is earned at a price: you have to write code, and debug it, before you can jam. On the plus side, these languages provide a lot of MIDI-specific tools that conventional programming languages lack.

HMSL (Amiga & Mac, $150, reviewed September '88) is a language for experimental composition which includes numerous algorithmic capabilities. To use HMSL requires a knowledge of the Forth programming language, and the appropriate Forth version ($99). *FORMULA* (ST, free) is a Forth-based music programming language for the Atari ST, written by **David Anderson** and **Ron Kuivila**. It's especially well-suited for music made up of many concurrent processes (isorhythm, for instance). FORMULA requires and includes *Forthmacs* (shareware, $50 registration). *Ravel* (IBM & ST, $30 shareware, $50 registered), by **Jim Binkley**, is a C-like music language well-suited for algorithmic experimentation. *COMPAK* (Mac or IBM, $35), from **Winsor/Knudson Software**, is a collection of over 100 routines for algorithmic composition, available as BASIC or C source code for either the Mac or the IBM.

CONCLUSIONS

The MIDI marketplace can hardly keep up with the flood of algorithmic ideas in the academic world. Although commercial software lags, as always, behind the cutting-edge work, the lag is considerably less than it used to be, and communication between the two worlds is better than it's ever been. As personal computers become more sophisticated and powerful, the distinction between "home computer" and "professional workstation" continues to blur, and it takes less time for ideas to trickle down from institutions to individuals – partly because the people working on institutional computers want the code to run on *their* home computers! This democratizing of creative resources benefits everyone.

The benefits, however, may not always be manifest; as these ideas are adapted for survival in a commercial marketplace, they can be distorted or trivialized. There's nothing wrong with a product that merely diverts and amuses its users; but for the creative dialog to remain fruitful, commercial companies must develop, not just borrow, ideas that originate in the academy. They must be participants in the creative process, not just beneficiaries of it.

And it's vital that users add their own intelligence to the dialog. Software will become slicker and friendlier, and there's a danger of ►

Glossary of Terms

1/f distribution: a series of random numbers in which there is some correlation between previous and subsequent results; many random distributions display this trait, but the 1/f distribution shares "self-similar" traits imitative of natural phenomena (see *Fractals*).

Aleatoric: a musical process in which chance or randomness is purposely included.

Algorithm: a computational method; in music, a method for generating musical events or structure without specifying each individual event.

Boolean Logic: a simple algebraic logic invented by George Boole in the 19th century, and now the basis for virtually all computer circuit design. The fundamental operations are AND (if 'A' and 'B' are true, then 'C' is true), OR (if 'A' or 'B' is true, then 'C' is true), and NOT (if 'A' is true, make it false). For musical applications, replace 'is/are true' with 'happens.'

Fractals: a theory revolving around "growing" or evolving something by adding on smaller copies of the original. These "smaller copies" are a *fraction* (*1/f*) of the size of the original. This theorem (developed by Benoit Mandelbrot) is successful at replicating natural occurrences (ie. building a snowflake by starting with a triangle, and adding on smaller triangles with the same proportions). An example of applying fractals to music would be repeating a musical phrase an octave higher with all of the intervals halved.

Gaussian Distribution: the normal "bell curve" probability density function (namely, that events in the middle of the range of possibilites have a much better chance of happening than those at the extremes).

GROOVE: the first real-time interactive computer composition program, developed by Max Matthews at Bell Labs in the late 1960s.

Isorhythm: a compositional technique of the 14th century in which a melodic cycle and a rhythmic cycle of differing lengths overlap. Can be extended to include any musical parameters with overlapping cycles.

Markov chain: "A chain of events in which the outcome of each individual event is conditioned by the outcome of its immediate predecessor." (Ames).

Stochastic: a musical process in which randomness is purposely included, but constrained by use of the theory of probabilities – "calculated chance" (Xenakis).

Uniform distribution: a series of random numbers in which the occurrence of any number is equally likely. The occurrence of each number is in no way dependent upon, or correlated to, the occurrence of a previous number or event (eg. the roll of a single die, or the makeup of white noise). ■

being seduced by it. As the computer's capabilities increase, our ideas must keep pace; we must continue to invent more interesting things to do with this power, not just make the common things easier. Software may let you do a thing with ease, but philosophy insists that you have a solid reason for doing it. The difference is the difference between games and composition. Games are fine in their place, but if we want the field of computer music to progress, we must think about what we are doing and why. ■

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- Frog Peak Music, Box 9911, Oakland CA 94613. Tel: (415) 530-4553.
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- Hybrid Arts, 11920 W. Olympic Blvd., Los Angeles, CA 90064. Tel: (213) 826-3777.
- Intelligent Music, PO Box 8748, Albany, NY 12208. Tel: (518) 434-4110.
- LTA Productions, PO Box 6623, Hamden, CT 06517. Tel: (203) 787-9857.
- MIDImouse Music, Box 877, Welches, OR 97067. Tel: (503) 622-4034.
- Opcode Systems, 1024 Hamilton Ct., Menlo Park, CA 94025. Tel: (415) 321-8977.
- Twelve Tone Systems, PO Box 226, Watertown, MA 02272. Tel: (617) 924-7937.
- Voyetra Technologies, 426 Mt. Pleasant Ave., Mamaroneck, NY 10543. Tel: (914) 698-3377.
- Winsor/Knudson Software, 2800 Ft. Worth Dr. #43, Denton, TX 76205. Tel: (817) 497-6185.

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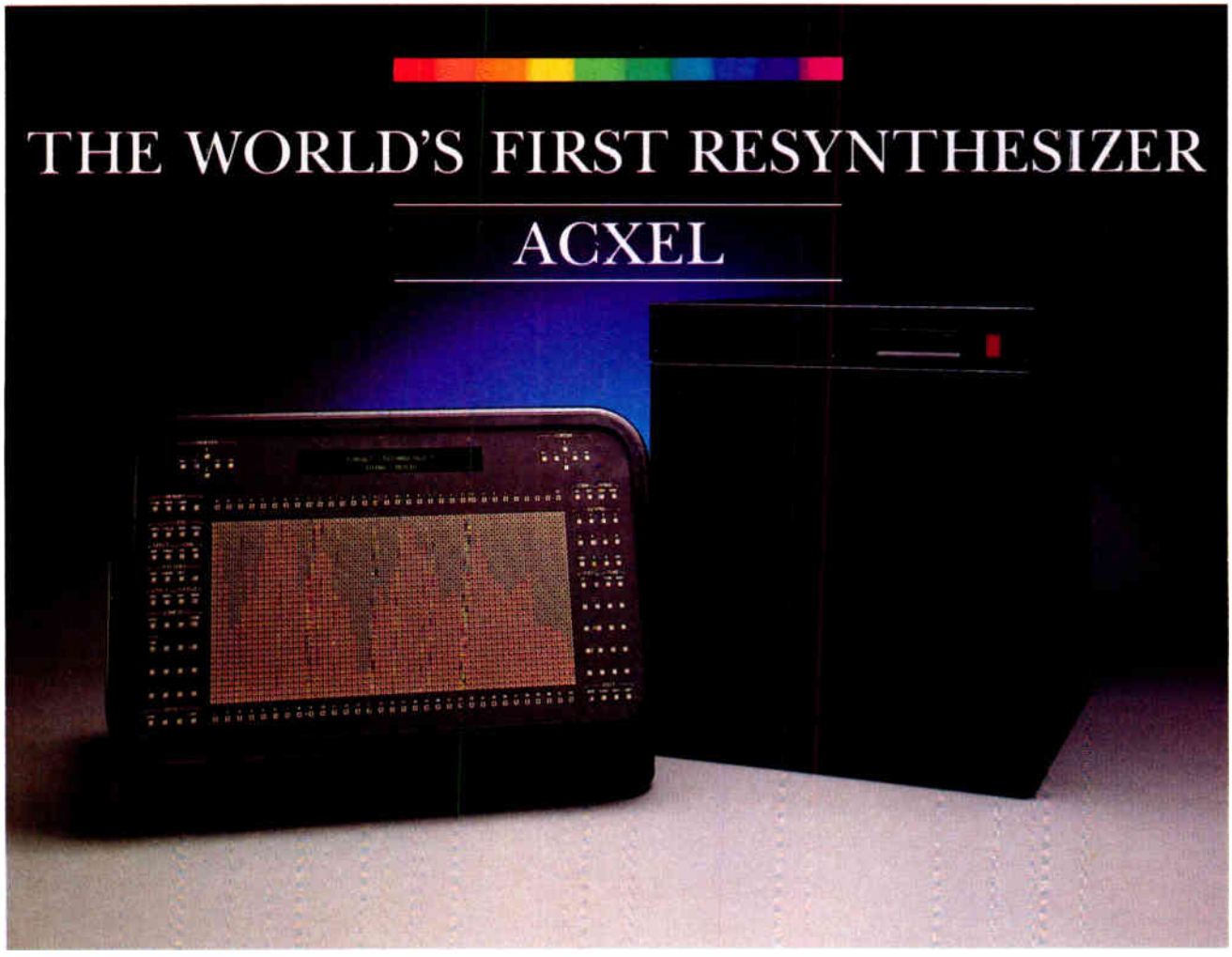

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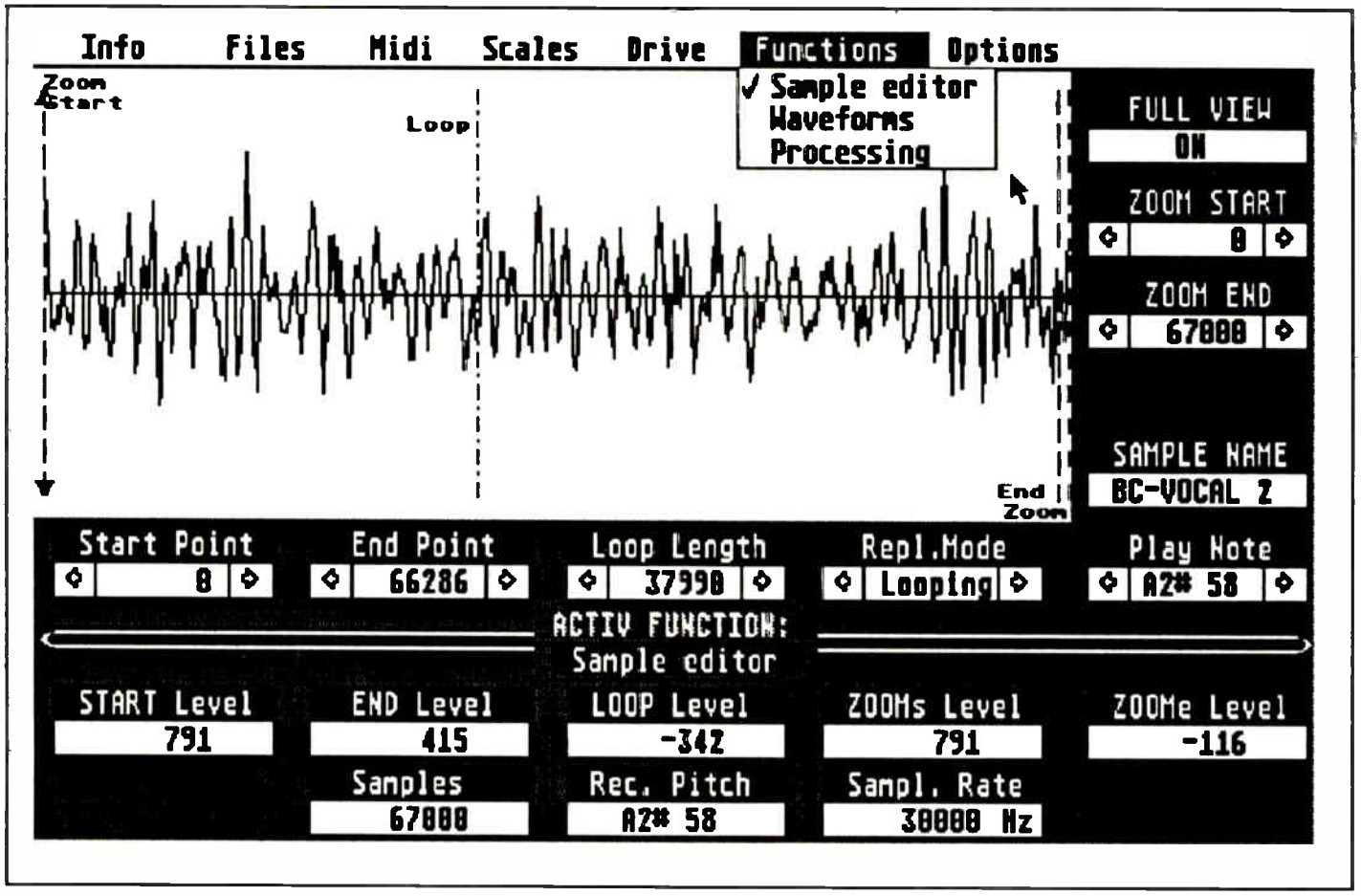
THE WORLD'S FIRST INTELLIGENT SYNTHESIZER

Dr. T's S900 Pro Sample Editor



A package for the Atari ST that not only allows editing of S900 samples, but also permits you to slice out loops and download them to a Kawai K5 or Prophet VS too. *Review by Lorenz Rychner.*

WHAT WOULD YOU say if some character accosted you in a back alley off MIDI street, hissing from the corner of his mouth "Psst – wanna buy some harmonics? Cheap? They fell off the back of an S900 sampler, right into my Atari 1040ST. Too hot to handle, so I'm hiding them inside a Kawai K5. Could have put them into a Prophet VS, but I didn't have one handy. Editing's no problem. Wanna buy some?"

If you didn't speak MIDI, you'd probably think he was on drugs. If you *did*, and happened to have access to an S900 (not to mention a K5 or a VS), you'd want to sample the merchandise, right? Here, I'll be taking a look at the S900 and harmonic conversion side of the deal; over in the *Micro Reviews* section, I'll also be looking at an editor for the K5 that could be used in conjunction with this package.

ENTER THE EDITOR

As the Pro Sample Editor's subtitle "Sample Processing Software" correctly reveals, it is not designed to deal with the Edit Program aspects of the S900 – just the sample data. Items like keyboard level scaling and positional crossfade, keygroup assignments, fine tuning, filtering, etc, still have to be edited on the S900.

Editing *"As the Pro Sample Editor's subtitle correctly reveals, it is not designed to deal with the Edit Program aspects of the S900 – just the sample data."*

To use the program, first you have to establish two-way MIDI communication between the Atari and the sampler. You'll be able to play a selectable note from the computer (with the mouse), at two different velocity values, so you can live without a keyboard. If you have a merger or an A/B MIDI switcher, connect it between the Atari Out and the S900 In, so that you can also play the S900 from a keyboard with a wider variety of pitches and velocities. Load some sounds into the S900 from its own disk drive, or record a new sample. Then it's time to boot the program up.

The S900 Pro Sample Editor comes on a copy protected disk, with a user's manual. The program and its files can be installed in a folder on your hard disk, but the original disk is needed in the floppy drive for keying when you boot from the hard disk. After loading is completed,

the program defaults to the Sample Editor mode screen. A total of three modes (called Functions) are available in the program, each of which has their own respective screens. In all three modes the screen has a large area – better than half the screen's height from the top down – reserved for graphic data viewing. It only leaves a margin on the right, where all three screens show the identical function boxes: Full View (on/off); Zoom Start and Zoom End, both showing a sample point number and increment/decrement arrow click boxes; Sample Name; and Play Note (a pitch/octave readout with MIDI note number and increment/decrement arrow click boxes). Below the viewing area are four function boxes that also stay identical in all three modes: Start Point, End Point, Loop Point – each with a sample point number and increment/decrement arrow click boxes – and Replay Mode, which is switchable from One Shot to Looping to Alternating (Back-and-Forth).

Viewing the sample can be done in several ways. At first, you see the entire sample displayed in Full View, above and below the horizontal zero crossing line. Four vertical lines are shown with the names Start, End, Zoom Start, and Zoom End. These line markers can be moved left and right after pointing the mouse cursor at the line marker name, and you can drag them anywhere on the screen, except for the logical restriction that Start can't be shifted past End for both sample and zoom. The S900 only allows one loop that can begin at any point in the sample to the right of Start. The loop must end at the sample End Point, so there's no need for a separate Loop End Point.

After you define an area for closer inspection, clicking on either of the function boxes Zoom Start or Zoom End brings up the detailed zoom screen. Line movement is still active. Another way of redefining a zoom area is the use of the increment-decrement arrow click boxes, where the selected line can be moved left or right by single sample points (click the left mouse button) or by hundreds (right mouse button). This also works for shifts of Start, End and Loop Points. In addition, the numerical Loop points readout can be changed to show as Loop Length, from a pull-down menu called Options. Clicking the left mouse button with the pointer on the black part of the Start Point, End Point, and Loop Point/Length boxes moves the point to the nearest zero crossing that the computer has already memorized.

Clicking the right mouse button on these same boxes brings up screens with the point in the center and zoom Start (left) and End (right) on the far sides of the viewing area. All these display changes can be further enhanced by selecting from four scales: Scale 1 is the regular proportion of the waveform, while Scales 2, 4, and 8 increase the height of the displayed waveform without affecting the data in any other way. During all these display changes the screen updates instantly – there's no waiting for the redrawing of the waveform or for updates of the sample point values. While you drag or otherwise redefine any of these line markers, the values in the respective readout boxes are updated faster than they can be read. Anytime you stop you're already presented with the latest values.

The lowest quarter of the screen contains the function and readout boxes that vary from mode to mode. In the default Sample Editor mode they display the amplitude levels for the currently selected sample points Start, End, Loop Point, Zoom Start, and Zoom End, on a scale from −2048 to +2047. The remaining three boxes show the total number of samples of the current file, the recorded pitch as a pitch/octave and MIDI note number, and the Sampling Rate.

Harmonic Analysis *"After clicking on the Spectrum button, the program's graphic display changes from an amplitude waveform above and below the zero crossing line to a screen of harmonic analysis."*

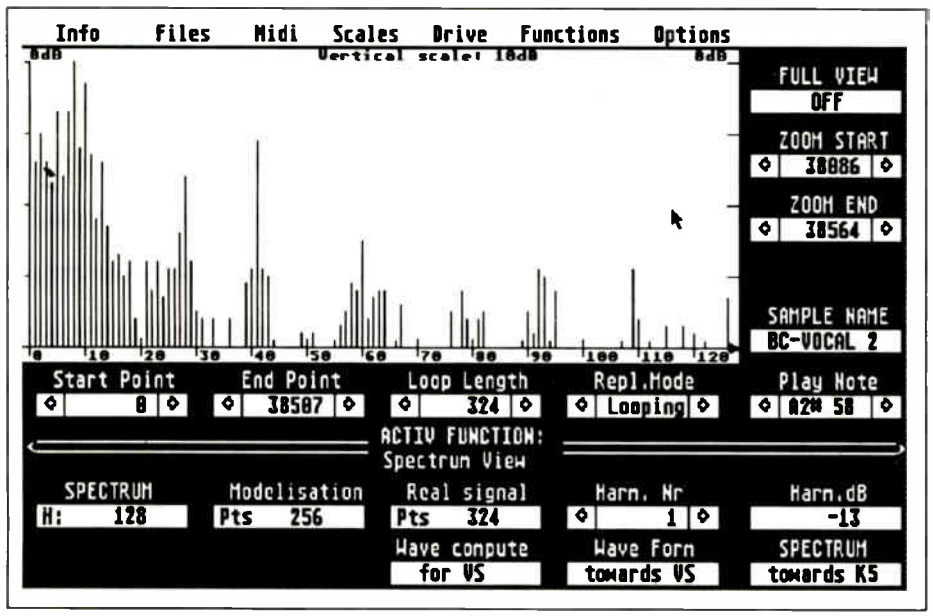
SECOND & THIRD GEAR

In the second mode (called "Waveform"), the function boxes at the bottom of the screen come to life after you click on the first one: Spectrum. This changes the graphic display from the amplitude waveform above and below the zero crossing line to a screen of harmonic analysis. Depending on the section of the sample that was defined with Loop Length and Sample End at the time of selecting Spectrum, the number of displayed harmonics can be anything up to 128. The amplitude of each harmonic is indicated by the tallness of vertical lines, from −40dB up to 0dB. The numbers of the harmonics are displayed from left to right along the bottom of the viewing area.

Time for what Pro Sample Editor calls "Modelization." The Function boxes now show the number of analyzed harmonics, the number of sample points that were analyzed out of the total number from the real signal (the area defined with Zoom Start and Zoom End), and two boxes with increment/decrement click boxes let you select individual harmonics and alter their amplitude in decibels. The first of the three remaining boxes executes the waveform computation that's necessary for transmission of waveform data to the Prophet VS, and the remaining two boxes activate the transmission of the data to the VS and to the K5 synthesizers (see *sidebar for more details*).

The third mode function is called Processing. The lower screen is taken over by ten boxes for the following sample data manipulations: *Delete*, *Insert*, *Replace*, *Maximize*, *Horizontal Offset*, *Amplify*, *Invert*, *Save*, *Load* and *Clean*. *Delete* affects the area defined with Loop and End Points; the remaining data simply closes rank. *Insert* takes the data between Loop and End and copies it to the area starting with the Zoom

Start point (pre-existing data is pushed to the right). *Replace* takes the data between Loop and End and inserts it at the Zoom Start point, erasing the old data for the length of the new data. *Maximize* increases the amplitude of the whole sample in memory to the maximum that the S900 can handle before clipping distortion sets in. *Horizontal Offset* takes the data between Zoom Start and Zoom End and adjusts its center away from the current zero crossing by a value between −2048 and +2047. *Amplify* proportionally increases or decreases the amplitude between Zoom Start and Zoom End by a factor between 0.001 and 2047 for each, for fades or swell-ups. *Invert* works on the data between Zoom Start and Zoom End, in one of two selectable ways: *Reverse* (play backwards) or *Phase Invert* (flip-flop the waveform vertically around the zero crossing line).



Save writes the data between Zoom Start and Zoom End to disk, as a .PRT (part) file. *Load* brings up data from disk that was saved as a .PRT file, and it gives the user three choices for placement: Insert places the data at the Zoom Start point and moves subsequent data to the right; Replace overwrites old data for the equivalent length of the new data, starting at the Zoom Start point; and Mix blends in the new data with the old. The Mix option also lets you type in the amplitude percentage of the new sound versus the old. *Clean* is a permanent truncating of data before the Start and past the End points. All processing functions initiate an alert box from which you must send the modified sample data to the S900 before the result can be heard.

IN USE

How does Pro Sample Editor work? Remarkably well, considering that the program doesn't offer a drawing mode or a clipboard buffer. If you're patient enough you can massage your data in many useful ways. The tedious act of looping is made considerably easier, especially because the new Loop, Start, and End points can be heard immediately without having to send the entire sample to the S900. But while this saves time, the lack of edit buffering means that the user must frequently save to disk (a hard disk is almost mandatory).

This becomes even more necessary in the Processing mode – it is here that I would welcome more user-friendly features. Alert boxes that let you type in values require hitting the Return key – there's no going back if the wrong value was chosen. Undo is supposed to

VS and K5 Conversions

AS YOU MAY recall from earlier articles (ie. the MT review August '87), the K5 is a sinewave additive synthesizer that creates waveforms based on user-programmable harmonics from two DHG modules (Digital Harmonics Generators). Each DHG allows individual amplitude control over 64 harmonics. Four different envelopes can be set up, and any harmonic can be assigned to any one of the four envelopes. The two DHG-produced sounds can then be blended for more complexity, as in a dual-oscillator setup. As an alternative to this dual arrangement, for sounds with extended harmonic content, the two DHG modules can be stacked into a single sound source, to give control over 128 harmonics.

Once past the DHG stage, the signal gets treated as in a sophisticated subtractive synthesizer, with envelope controlled lowpass filtering, amplitude envelope, elaborate keyboard scaling, and modulation. Multitimbral setups allow independent MIDI control over up to eight such finished sounds at once.

The Prophet VS (reviewed in MT's Inaugural issue), on the other hand, is a wavetable synth with four oscillators per voice. There are 128 waveforms onboard, with 32 being user-modifiable in RAM. These can be altered by mixing other waves already in the VS (pre-tuned to specific harmonics), or by injecting waves into the VS over MIDI via the Sample Dump Standard. Each waveform is 128 bytes long, which means it contains 64 harmonics. These waves are mixed in a quad panner under envelope control, and then pass through a normal analog synth VCF/VCA/panning chain.

Getting a wave into the VS is pretty straightforward - Pro Sample Editor just has to take the harmonic content of the sample between the markers, convert it into a wave 128 bytes long, send it into one of the 32 slots in the VS, and you can do with it as you may. The K5 requires a little more thought.

From the Waveform screen of the S900 editor the currently displayed harmonic spectrum is transmitted to the internal memory location A1 on the K5. But don't raise your expectations too high - it's not a case of transferring an S900 sample to be played by the K5. Only a snapshot of a single wavecycle is transmitted. The manual suggests capturing a single cycle of the source sample, but it doesn't elaborate on any reliable formula, nor does it define in plain English just which part of the loop is translated and what happens if the loop is not exactly one cycle long (usually, some weird sidebands get created). Two tutorial examples on the program disk help illustrate the procedure, but for your own samples you'll still be guessing.

Once in the K5, the harmonics data meets default settings for all programming parameters. The envelopes of the DHG are square (organ-like), and there's no indication as to the timings of individual harmonics in the original sample. Trial and error will have to do with both synths. But how else would you create the "right" spectrum if it couldn't be loaded from the S900 via the Atari? Unless you had the benefit of literature listing the harmonic content of just the kind of sound you're after, you would be where the average K5 programmer (or one who has tried to use the VS for additive synthesis) has been all along: in the dark. This transfer of snippets of real sounds is a great starting point, though I do wish *some* attempt was made to create amplitude envelope shapes for the harmonics. You can send several sections of the sample to either synth, copy them into different memory/waveform locations, and then get down to some serious programming. But at least now you have a nice harmonic headstart. ■

halt processing, but I was left with garbage on the screen that clicking on Info (which is supposed to clean up the screen) didn't fix.

Often I received a message "Something strange has happened - follow on," which is a nice new way of announcing a fatal crash. When I hadn't saved my latest moves I had to start over, usually rebooting the S900 as well. The minutes spent waiting for disk drives add up quickly, and productivity suffers. Many more minutes go to waste because each move in Processing mode (no matter *how* tentative) requires a Send to update the S900. Productivity would be greatly enhanced if the modified sample could be auditioned from the Atari monitor speaker or from an attachment like Practical Solution's Monitor Master.

The manual is the least helpful I've seen from Dr. T's yet - though it may be because this program comes from France and is only being distributed by the company. Functions and options are dealt with in single sentences, with dubious grammar and misprints clouding the issues. The only tutorial chapter deals with the transmission of data to the K5. Contrary to similar programs by other manufacturers that offer some background and tutorials on sample manipulation, and also contrary to other Dr. T's programs with elaborate tutorials, here the user is on his/her own.

CONCLUSION

I like Pro Sample Editor for its quick screen updates, but not for its lack of other timesaving features or for the bare-bones manual. The sample data conversion, while still open to trial and error, is a bonus for K5 owners. This program makes the S900 and K5 or VS work well together, and should be seriously considered by anybody with such a sampler/synth combination. ■

PRICE $149

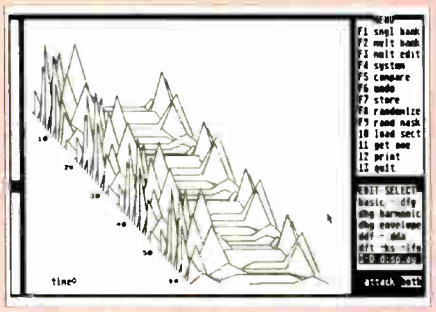
MORE FROM Dr. T's Music Software, 220 Boylston St. #306, Chestnut Hill, MA 02167. Tel: (617) 244-6954.

MICRO REVIEWS

Dr. T's K5 Editor/Librarian

A voice editor for the Kawai K5 and the Atari ST. *Review by Lorenz Rychner.*

DR.T'S EDITOR/LIBRARIAN programs tend to follow a particular (impressive) tradition: they work just fine and they always seem to have a number of helpful features. For example, they all generally have useful grouping of related parameters on busy screens, envelope graphics that can be drawn with the mouse while the numbers update in real time, and randomizing and masking functions for those times when you want to ask the computer to be creative. Their K5 program is no exception. It loads four banks of single sounds, allows you to swap and copy sounds, and lets you set up multitimbral configurations with ease. The DHG page in the Single Edit mode is particularly useful – it gives you control over the relative amplitude of the harmonics either one at a time, or by odds or evens. You can even draw a new spectrum with sweeping mouse movements. The four DHG envelopes have their own page where each can be redrawn at will, and on the harmonics display they are assignable from four strips below the vertical harmonics' amplitude bars.



The neatest display by far is the 3D page, where the harmonics are shown standing up, either from front to rear or reversed (always at a slight sideways angle for easier viewing), conforming to their different envelope shapes. While it's sometimes tricky to see a harmonic with lower amplitude among the taller ones, particularly when its attack is slower than that of its neighbors, it's still a fun page to look at because it combines what you set up at different times on the DHG page and on the DHG envelope page. Here you bridge that gap visually and your eyes reinforce what you hear as you play the sound.

The manual of the K5 Editor/Librarian is adequate, but doesn't take the place of the excellent K5 owner's manual. Both should be consulted if you're new at programming the K5.

Now that we have the K5 Editor/Librarian and a way to get real-world harmonics into the K5 (see the Pro Sample Editor review elsewhere in this section), there's no excuse for putting up with some of the less convincing factory sounds. The K5 offers a lot of sonic potential and any help like these new programs is appreciated. ■

PRICE $175

MORE FROM Dr. T's Music Software, 220 Boylston St. #306, Chestnut Hill, MA 02167. Tel: (617) 244-6954.

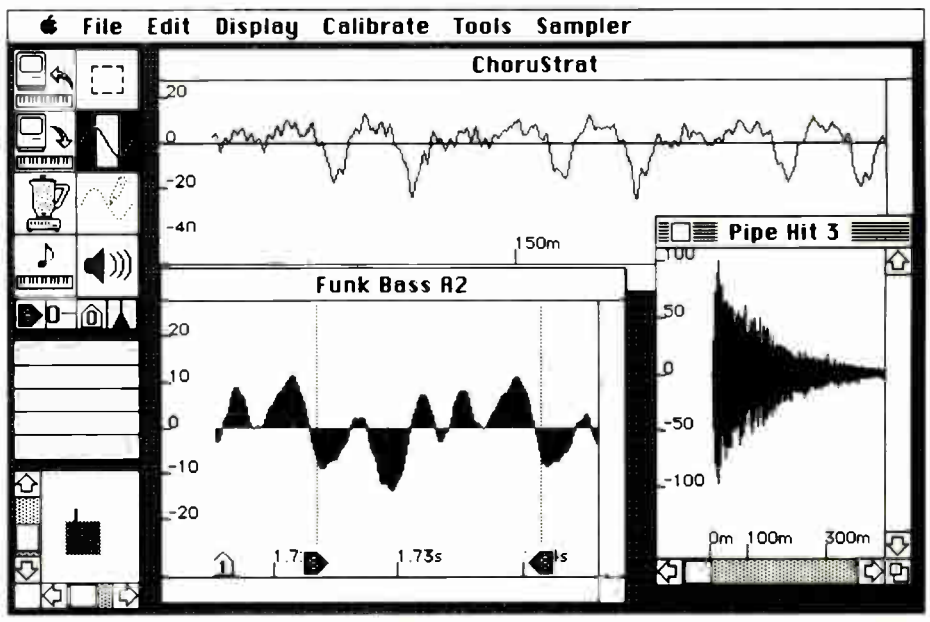
Digidesign's Sound Designer Universal 1.3

A multi-sampler version of sample editing software for the Macintosh.
Review by Thomas J. Clement.

SEVERAL YEARS AGO, Digidesign awakened the world to affordable visual sample editing with Sound Designer for the EII. Other, more affordable sampler versions followed, each taking the complexities of waveform manipulation and giving it the power of Sound Designer.

But software stops being "affordable" when owners of several samplers need to buy a new editor for each machine. Digidesign has answered this with Sound Design Universal, which uses the same tools found in the company's dedicated editors. The new 1.3 configuration supports an impressive stable of samplers: Akai's S900, X7000, and S700; Casio's FZI and FZI0M; E-mu's EII and Emax; Ensoniq's Mirage and EPS; Korg's DSSI and DSMI; Oberheim's DPXI; Roland's S50, S550, SI0, S330, S220, and MKSI00; Sequential's Prophet 2000 and 2002; and Yamaha's TXI6W. The Sample Dump Standard is also addressed. One other point worth mentioning is that in conjunction with this release, Digidesign has finally confirmed suspicions about their plans for the Atari ST by introducing a version of Sound Designer Universal for that computer as well.

Once you understand the program's slice 'n'



dice tools, you can quickly dart between every sampler in your arsenal, mixing digital data like a master chef – and since you're using the same program for every machine, the recipe is always the same!

There are restrictions. The main thing missing from the Universal version is on-screen replicas of sampler front panels, but since you own the samplers anyway, this is an acceptable loss. You also have to be aware of each sampler's quirks – something that tends to go unmentioned in the individual owner's guides. Not to worry. Digidesign has created a stupendously thorough and readable manual that not only describes the program, but covers each sampler's key features and foibles in the bargain.

One interesting problem I ran into while using the program is that by re-inserting the master disk when requested by the computer I was able to make it crash. Apparently, if you move the write protection tab into the protected position after you've booted the program it will lock up – though Digidesign says that this is because of the way the Mac works. Once I moved the tab back and rebooted, everything worked fine. Strangely enough, the program is also the only application I have, MIDI or not, old or new, that won't work with Electronic Arts' Disk Tools II Desk Accessory. Finally, though this may not present a major problem, Digidesign recommends that you do *not* use Sound Designer with Apple's MultiFinder.

Despite these drawbacks, Sound Designer Universal is forgiveable. The program is easy to operate, loaded with helpful prompts, has a great manual, and is an excellent sample Swiss-army knife in a truly "affordable" package. ■

PRICE $395; $345 for ST version
MORE FROM Digidesign, 1360 Willow Rd. #101, Menlo Park, CA 94025. Tel: (415) 327-8811.

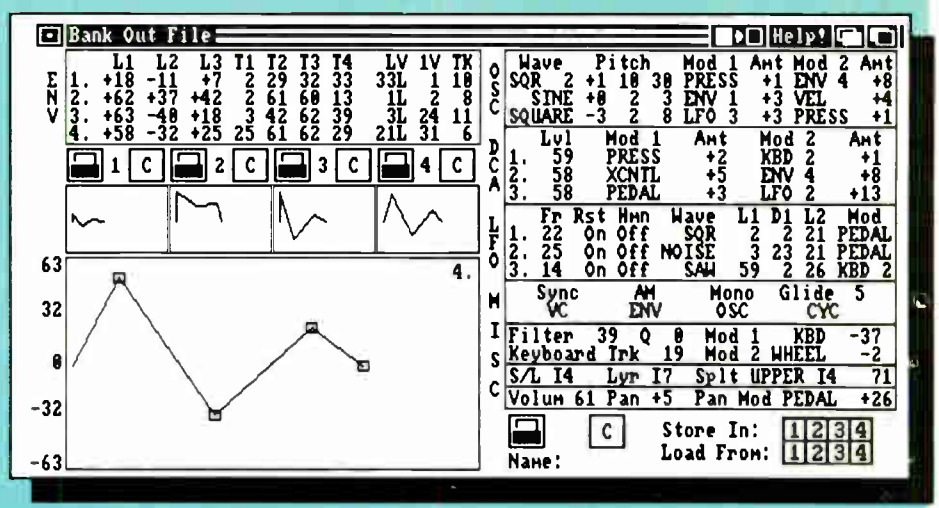
SoundQuest Ensoniq Master Editor/Librarian

In which a friendly IBM helps Mr. Harvey save and edit his ESQ1 and SQ80 patches. *Review by Harvey Newquist.*

TODAY, KIDDIES, WE'RE going to look at a software product that lets you control most of the features of Ensoniq's ESQ1 and SQ80 family of synthesizers. Let me start off by saying that the ESQ1 is one of the more difficult machines for which to store data. The product has a data dump and retrieve feature which is supposed to allow you to save information, especially sequences, to tape. Allegedly, this can be done with any tape recording device. Well, I've used stereo cassette decks, dedicated signal recorders, boom boxes, portable and compact recorders, dictation machines, and even the cassette deck stored inside a talking Garfield doll, and the ESQ1 still finds some reason to be extremely finicky about each method. Depending on the position of the moon, the tides, and the barometric pressure in my studio, restoring information into the ESQ from a tape source gives new meaning to the word "adventure." Can you say that? "Adventure?" Sure you can.

Thus, it was with great anticipation that I booted up SoundQuest's new product, the SQ80/ESQ1 Master Editor/Librarian. The version I tested runs on the IBM PC and related clones. It requires 640K of RAM, a color graphics adaptor, and a MIDI interface unit – the Roland MPU401 being the one I happen to use. As with most music software editing packages for a PC of the IBM variety, the developers strongly recommend the use of a mouse to make the product run more efficiently. If you don't have a mouse, the cursor keys will do. However, you'll really want to get a mouse. The movement of the keyboard cursor on this thing is s-o s-l-o-w that it would make a sloth impatient.

On to the product itself. Much like other PC programs which emulate Apple Macintosh screen and window functions, SoundQuest has included most of the standard windowing features (open and close window, size window up and down, move window front or rear, click and drag icons, menu bar, etc). While this particular product is a little less Mac-like than



others, it is still straightforward enough that most users will get the gist of these features with little or no trouble. As for other features, one of the treats with this package is that newly-edited sounds can be played directly from the computer by a short sequence of notes (up to 16) or a chord.

The primary functional capability of the software lies in the SysEx window, where patch editing is done. A multi-panelled single window appears here when a patch has been loaded. The panels all look like different parts of the programming sections available on the ESQ, including the illustrated envelope configurations on the top of the actual ESQ. Here envelopes can be modified either graphically (by drawing it on a chalkboard panel) or by changing values from the keyboard in other panels.

This works well with another window found in the Custom menu, which displays the button configuration on top of the ESQ. Laid out to mimic all the buttons on the synth's control panel, this remote screen feature means that you can go into any ESQ programming or performance selection function such as sequencing or cartridge selection without leaving the computer keyboard.

One of the more unusual features of the Custom menu is a function that provides for the setting of a base set of parameters that remain constant throughout any modifications. I found this useful specifically because Mr. Harvey likes a certain level of attack on all his sounds when playing a guitar synth, and this feature lets me keep those attacks at a common level.

Generally, all of the software features tended to be well-thought out, and provided a degree of control over the ESQ that I don't think is available on the machine itself. On other fronts, the manual is decent enough – not exceptionally good, but in no way bad either (though I *did* catch the references to the Amiga instead of the IBM as the computer in use).

So, if like me, you find that the choice between using tape storage on your Ensoniq synth and getting a root canal is a toss-up, get this product. Now say goodnight, kiddies . . . ■

PRICE $150
MORE FROM Sound Quest, 5 Glenaden Ave. East, Toronto, Ontario M8Y 2L2 Canada. Tel: (416) 234-0347.

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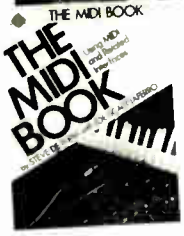

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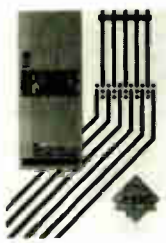

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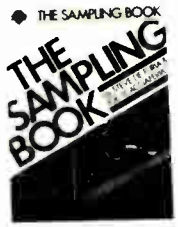

The Sampling Book
This book provides a complete step-by-step presentation of all of the sampling skills one would need to master this technology. Some of the topics covered include: looping, splicing, multi-sampling, velocity crossfading, resynthesis, choosing the best sampling rate, key mapping and much more. Includes over 25 actual hands-on experiments that walk you through practical and useful musical applications of every aspect of sampling. Provides the skill and talents needed to get the most out of any sampling instrument.
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MUSIC TECHNOLOGY *Reader Survey Winners*

Dear MT Readers,

We'd like to thank everyone who completed and returned survey forms for our 1988 Music Technology Reader Survey. The response was great, and the information is invaluable to us. (You can check out some of the results in this month's Editorial.) As you may remember, we offered three prizes as incentives for you to send back your surveys. Now, we'd like to introduce the winners of those prizes:

Michael Perez,
Huntington Beach, CA

Michael is currently working as a plastering contractor, and spends much of his spare time composing and orchestrating his own pieces. He started playing the drums at the age of eleven, and always had an interest in keyboards. With the advent of MIDI, Michael began to expand his drum kit to include several synths, and a computer. We at MT are happy to announce that his setup now includes a **Kawai KI synthesizer**. He's heavily involved in sequencing and songwriting now, and we hope the KI enhances his musical escapades.

Ken Jacobson
Moorpark, CA

Ken, a 40-year-old native Chicagan, is an auto sales manager, and the happy new owner of the **Alesis HR16 Drum Machine**. It's only the latest addition to his extensive home studio, which is built around the Atari 1040ST and the Steinberg Pro24 sequencer program. He also owns a Casio CZ1 and FZ1, Kawai K5m, Yamaha TX81Z and SPX90II, Roland Octapad and TR505, Alesis Midiverb II, Yamaha KM802 mixer, and Akai MG614 multitrack tape recorder. Ken moved to LA from Chicago in 1973. He was a member of the Chicago All City High School Band for three years, playing the trumpet, and went on to attend the Berklee School of Music in Boston for one year. At Roosevelt University in Chicago he majored in music education, but chose to complete his education in music by playing in several big-band jazz bands during the late '60s and early '70s. Although Ken no longer plays the trumpet, he is now actively involved in music by way of synthesizers and sequencing. The HR16 should fit in nicely with his home studio.

Tom Martin
Boston, MA

Since Tom makes his living in music, we hope that the **Shure SM94 sampling microphone** will come in handy. Tom is 36 years old, and works in synthesis and wind synthesis with Downtown Recorders, in Boston. He's currently completing a "New Music" album with vocalist/co-writer Michael Troy which will include a nice piece he sent us entitled "Aurisphere." His toy collection includes a Yamaha WX7, DX7, TX802, and QX5, the Roland D50 and MC500, Moog Memorymoog Plus, and an RMS modified Minimoog. If Tom's got a sampler somewhere on his wishlist, the SM94 mic should compliment it well. ■

PATCH WORK

Got a killer pad, some monstrous strings or any other sonic creation you'd care to share? If so, send it – on a patch chart from the owner's manual (along with a blank one for artwork) – and a demo-tape (very important) to: *Patchwork, Music Technology, 22024 Lassen St., Suite 118, Chatsworth, CA 91311.*

If you dazzle us with your brilliance, we'll reward you with a *free one year's subscription* to *MT*. Get twiddling and get scribbling.

OBERHEIM MATRIX 6

'Strngout'

Jon W. Brakebill, Rancho Cucamonga, CA

Jon describes this patch as a guitar/string combination, originally intended for foundation playing. I tend to think the actual title is 'Strungout', because of its distant, cold tone. However, the patch is thick, even in the extreme registers, and makes for a good pad sound when sustained, or a punchy techno-pop sound when struck. Jon notes that cutting back ENV2 release rate will give it less sustain, if desired. ■

	0	1	2	3	4	5	6	7	8	9
00 DCO1	Freq	Fr/Lf1	Sync	Pw	PW/Lf2	Wave	Wsel	Levers	Keybd	Click
	12	0	0	31	+57	0	PULSE	OFF	KBD	OFF
10 DCO2	Freq	Fr/Lf1	Detune	Pw	PW/Lf2	Wave	Wsel	Levers	Keybd	Click
	12	0	0	24	-57	0	PULSE	OFF	KBD	OFF
20 VCF/VCA	Mix	Freq	Fr/En1	Fr/Pre	Res	Levers	Keybd	E-VCA	VCA/Vel	VCA/En2
	31	53	+61	0	0	OFF	KBD	63	0	+63
30 FM/TRCK	FM	FM/En3	FM/Pre	TrackIn	Track1	Track2	Track3	Track4	Track5	
	0	0	0	KBD	0	15	31	47	63	
40 PM/P/PRT	R1 Spd	Trigger	R2 Spd	Trigger	Port	Spd/Vel	Mode	Legato	Keymode	
	0	STRIG	0	STRIG	0	0	LINEAR	OFF	REASGN	
50 ENV1	Delay	Attack	Decay	Sustain	Release	Amp	Amp/Vel	Trigger	Mode	Lf1trig
	0	0	0	0	0	63	0	STRIG	NORM	NORM
60 ENV2	Delay	Attack	Decay	Sustain	Release	Amp	Amp/Vel	Trigger	Mode	Lf1trig
	0	0	0	50	28	63	0	STRIG	NORM	NORM
70 ENV3	Delay	Attack	Decay	Sustain	Release	Amp	Amp/Vel	Trigger	Mode	Lf1trig
	0	0	0	0	0	0	0	STRIG	NORM	NORM
80 LFO 1	Speed	Sp/Pre	Wave	Retrg	Amp	Amp/Rp2	Trigger	Lag	Sample	
	0	0	TRI	0	0	0	OFF	OFF	KBD	
90 LFO 2	Speed	Sp/Pre	Wave	Retrg	Amp	Amp/Rp2	Trigger	Lag	Sample	
	15	+28	TRI	0	0	+63	OFF	OFF	KBD	

Matrix Modulation

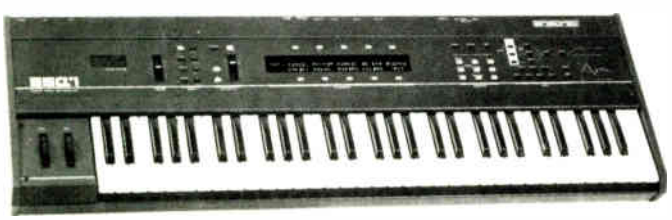
	Source	Amount	Destination
0	PED 2	+15	E2 REL
1	PRES	+63	VCFFQ
2			
3			
4			
5			
6			
7			
8			
9			

Performance Notes

ENSONIQ ESQ1

'2Gethr'

Greg Varlotta, Fullerton, CA



Greg's got a funky, thick analog-sounding bass patch here that he modelled after the bass sound in Sting's hit 'We'll Be Together.' As he notes, the L1 and T2 on ENV3, as well as the FREQ and KBD on the filter page, can be adjusted to taste. Good groovin'. ■

'2GETHR' Parameters

OSC	Oct	Semi	Fine	Wave	Mod1	Amt	Mod2	Amt
1	-2	00	00	SQUARE	WHEEL	-63	*OFF*	00
2	-2	00	04	KICK	WHEEL	-63	*OFF*	00
3	-1	00	03	SQUARE	WHEEL	-63	*OFF*	00

DCA	Level	Output	Mod1	Amt	Mod2	Amt
1	63	ON	*OFF*	40	*OFF*	00
2	55	ON	ENV4	00	*OFF*	00
3	63	ON	*OFF*	00	*OFF*	00

FLT	Freq	Res	Kbd	Mod1	Amt	Mod2	Amt
	17	09	46	ENV3	63	*OFF*	63

DCA	Level	Pan	Mod	Amt
4	63	08	*OFF*	63

LFO	Freq	Reset	Human	Wave	L1	Delay	L2	Mod
1	20	OFF	ON	TRI	00	01	05	WHEEL
2	00	OFF	OFF	TRI	00	00	00	*OFF*
3	00	OFF	OFF	TRI	00	00	00	*OFF*

ENV	L1	L2	L3	LV	T1V	T1	T2	T3	T4	TK
1	63	00	00	00	00	00	01	00	00	01
2	63	10	00	00	00	00	62	40	10	00
3	17	00	-09	00	00	00	12	22	00	00
4	63	63	63	00	00	00	00	00	00	00

MODES	Sync	AM	Mono	Glide	VC	Env	Osc	Cyc
	ON	OFF	ON	00	ON	ON	ON	OFF

SPLIT	S/L	Prog	Layer	Prog	Split	Prog	Key
	OFF	BAS+AH	OFF	BAS+AH	OFF	BAS+AH	60

PATCH WARE

NEWS: If you own a **Korg M1**, you'll be interested in the first Series of patches for your keyboard in the **Pro-Studio Series** from **New Man Studios**. Series #1 consists of 100 programs, and 100 Combinations. Sound Groups include: keyboards, organ/rhythm, brass/guitar, strings/voice, New Age, brass/woodwinds, orchestra/combo, synth, bells, and effects. Compatible formats for the Series #1 include RAM Card and Quick disks for the Yamaha MDF1. The Atari ST version will soon be out, and others are in the planning stages. The patches are priced at $30 for each Series, plus $3 postage and handling in the US, $7 overseas. For more information, contact *New Man Studios, 1530 Kingsvalley Hwy, Dallas, OR 97338. Tel: (503) 623-2849.*

REVIEW: Solid Sounds has just completed their third volume of **sounds for the Oberheim Matrix 12 and Xpander**, and recently shipped us all three for review. To quote Solid's main dude David Ziegele: "I use the same overall concept for all the patch volumes – providing sounds in the eight or ten categories used most frequently by synth players. However, I try to develop sounds that are beyond the patience or programming capabilities of the average Xpander owner, and strive to come up with patches that are in some way unique without being so 'out' as to be unusable to many people. Volume One is fairly balanced in approach. Volume Two has slightly more emphasis on Plucked/Picked sounds, Percussion, and on the use of Pedals to modulate patch settings. On Volume Three, I wanted to provide more lead synth voices and 'pads' than in the other two volumes."

I have to give David average to just slightly above average marks for his efforts. His patches do thankfully sound just a bit more detailed and complex than typical analog synth patches (as they should, being on the Big Brothers of analog synths – the Xpander and Matrix 12), but aren't on the whole as complex, innovative, and fresh as I would have liked. Volume I has an emphasis on buzzy timbres and flute-like sounds. There are some nicely rounded patches in the bass end, but many suffer from release times that are too long (which hinder fast playing). Only about half the patches make use of velocity (and just slightly more, wheels), but David's approach to wheels and pedals is more subtle and complex than most – kudos. Also, virtually all patches that make use of the footpedal expect you to be using one hooked up to the Oberheim itself; they ignore the hold pedal over MIDI. Volume 2 has a slightly higher number of patches that tweaked my ear and in general they're less buzzy, but they have the same expression control problems (and strengths). Volume Three was my favorite – many of the pads are great, and whereas the leads won't rip flesh, they're usable. Virtually all have expression mapped in, and the release time is more under control. Only about one or two of the fifteen or so percussion sounds per volume cut it (so what's new), and there's barely a convincing imitative patch each (if imitative's your bag, go check out MIDIMouse). Also, the earlier volumes suffer just a tad of the "variations on a patch" syndrome.

These aren't bad patches; Xpander owners would learn a little from tearing some of these apart. However, I'm obstinate about insisting that *every* bought patch or sample disk have velocity, pressure, mod wheel, and hold pedal mapped. I would also have liked to see some more complex, cloudy, Steve Roach-type sounds (David's patches lean more towards the clear with rounded bottom ends). Overall, I would go about buying the volumes backwards. Volume Three is suggested for all Xpander or Matrix 12 owners (it currently sits inside my "X"), and then work your way down to Volumes Two and One if you find you like David's sounds. They cost $30 per volume on cassette ($25 each if you buy two or more, Xpander Users' Group members get $5 off per order; overseas customers add $3 per order for airmail). For more details, contact: *Solid Sounds, 7207 45th Street, Chevy Chase, MD 20815. Tel: (301) 654-6743 (evenings and weekends).* ■ Chris Meyer

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Judas Priest

Photography *Bob Leafe*

HI-TECH HEAVY METAL

You may love it or hate it, but there's no denying that Heavy Metal music is enjoying a major resurgence. What follows is a report from the front, where our correspondents found that there's a lot more to this wave than meets the eye . . . *Interviews by Lars Lofas and Nick Armington.*

POWER CHORDS, GUITAR heroes, screaming vocalists, and huge bass drums are only the obvious ingredients of the phenomenon we call Heavy Metal. To find out more, we dug in for a few months, following the trail through one of the most tightly-defined subcultures in the music business. Along the way, we talked to some of the most prominent producers and artists in the field, gathering information, trading war stories and living the lifestyle backstage.

Once the veil of amps and costumes was lifted, the vision came into focus. This is one of the most successful pieces of the music business pie, thriving on (of all things) a finely-tuned sense of technology, driven by an incredible savvy of the young record-buying public.

It's a fascinating world – and we've never had as much fun researching an article as we did with this one. We salute and thank all the folks who made it possible, and apologize to those who we couldn't include.

IN THE BEGINNING, heavy metal (or power rock, or hard rock, or whatever you want to call it) offered up bands like Ten Years After, The Jimi Hendrix Experience, The Who and Led Zeppelin, who emerged as an alternative to the folk music and soft rock bands of the day. Although they weren't yet referred to as heavy metal artists, these bands played the guitar in a new way – heavily distorted through "fuzz" distortion boxes or large tube amplifiers.

But by the early 1970s, the "Heavy Metal" moniker had been created, and was bestowed upon bands like Black Sabbath, Deep Purple, Iron Butterfly, Steppenwolf, Judas Priest, Alice Cooper and Bad Company, who were playing a new and highly rebellious type of music. Back then, the live shows were still rough, with overworked PA systems often cranking out sound at dangerously high levels in a wash of muddy sound.

By the end of the seventies, despite the increasing presence of the synthesizer in popular music, metal fans (who rejected the Top Forty of the day by wearing "Disco Sucks" buttons) saw a second wave of acts like KISS, AC/DC, Scorpions, Aerosmith, Iron Maiden, Rush, Ted Nugent and Van Halen explode to arena-rock status – though they still had problems getting radio airplay.

But metalheads didn't mind a bit. When MTV, the all-music video cable network, was launched in 1981, heavy metal bands immediately found a new home, one where the flash, energy and power in their live shows could be seen as well as heard. This ►

led to yet another stream of groups which continued to push the boundaries of their sound and forced record executives to take notice of their musical appeal.

The changing of the guard gave the world a plethora of new acts, including Ratt, Motley Crüe, Rainbow, Dokken, Whitesnake, Quiet Riot, Def Leppard, Ozzy Osbourne (with superguitarist Randy Rhoades), and the flamboyant David Lee Roth. These acts continued to define the term "heavy metal" with highly theatrical stage shows and well-publicized excessive behavior.

Today's music scene is full of promising new bands like Kingdom Come, Poison, Guns 'N' Roses, White Lion, Europe, Stryper, Bon Jovi, and Cinderella, who coexist with more extreme "speed metal" bands like Anthrax, Megadeth and Metallica.

Photography Ian Smith

Bob Rock, engineer/producer

THE EVOLUTION OF heavy metal is producing albums which are a far cry from those of even a few years ago. Though the guitar is still prevalent throughout, modern metal mixes feature a wide range of sounds, sophisticated recording techniques and, as always, outrageous performances. Much of the credit goes to the producers and engineers behind these projects.

"We're really trying to produce an emotion and a feeling – not like a bunch of chart-reading session players," says Tom Werman, the former Epic Records A&R executive turned record producer, and the man behind Motley Crüe's and Poison's recent platinum albums. "Hard rock bands are more anxious to do well, they're more driven to be commercially successful than you would think.

"With these guys, you have to communicate that you enjoy their music and that you're involved. I've done albums that aren't heavy metal, and there's not a big procedural difference in recording them. It just takes more patience and inventiveness to work with a self-contained band."

Vancouver, B.C. producer Bruce Fairbairn, who's helped Bon Jovi and Aerosmith hit the top of the charts, concurs. "I see myself as the coach of a basketball team. My job is to get the players motivated towards good performances, to make sure that the atmosphere in the studio is really positive. If everyone's having a good time, enjoying making the record, then they put their best ideas and best attitude forward – and that shows up on records."

Neil Kernon got his start in the music business as a tape operator more than a decade ago, and has since engineered and produced dozens of albums, including recent LPs with Dokken and Queensryche. "I'm very performance oriented," says Kernon, "and the first thing you hear when you put a record on is how much fun – or intense – a performance is. I go for maximum intensity in everything I do."

Donn Landee has been Van Halen's studio engineer and self-described "straight man" ever since the group started recording together. On their most recent album, *OU812*, he also found himself co-producing. "There's definitely a team feeling in the Van Halen camp. The five of us produce together. Each member does what he does best. I have my own strengths, and I think it's rare when something like that works."

"You couldn't even make records today without a team," says Tom Werman. "I work with Duane Baron, my engineer, and John Purdell, who understands all the hi-tech stuff that we use in the studio – the samplers, sequencers and keyboards. And they co-produce with me as well.

"We start off by recording everything live, but usually end up replacing everything from the bass on up. That's not unusual these days – it's actually more unusual to keep anything other than drums from the basic tracks, because it's possible to improve on the sounds of everything else."

John Purdell adds, "After the basics are down, we may decide to trigger a part or rearrange something to make it sound better in the final mix. If a band member hears a space where we can do something, then we'll make sure we have everything at our fingertips to create the effect they want.

"We're out to create an atmosphere, and to that end, we sample a lot of sound effects like street scenes, explosions and gunshots with an Emulator, which get mixed in with the track. You can hear what I'm talking about on a track like 'Wild Side' from Motley Crüe's last album – we went crazy on that one, really.

"I've started using Hybrid Arts' ADAP Sampling System attached to an Atari computer for a lot of our projects. It's great – it lets you extend the range of the samples and has the bandwidth you need with digital recording. With Motley Crüe, we used a lot of keyboards – an Emulator II, an Oberheim OB8, a Roland JX10, a Korg DW8000 and a Yamaha DX7II.

"In this type of music, the meat of the song is still the guitar. Keyboards add a little color and take a song to a new plateau that guitar overdubs can't do as well. The songs would suffer without them. When used properly, they really help out, lifting choruses to create a different atmosphere in the song."

Engineer/producer Bob Rock, who's worked with Bruce Fairbairn for many years, looks for sounds that stand out. "On Bon Jovi's 'Living On A Prayer,' we used a voice box with the guitar," Rock says. "That's not really hi-tech, but it's a sound that hadn't really been around for awhile. When you're dealing with pop music, you're always trying to get sounds that will catch people's ears. That's why we go back to the older instruments sometimes.

"When the Roland D50 came out, the whole world bought them, and every record had D50's all over them. We'd rather try something different – like the old Mellotron we used on 'Angel,' from Aerosmith's *Permanent Vacation* album. That's what Bruce and I do – mix technology with junk. It's garbage can and hi-tech all wrapped up in one."

"Van Halen records almost everything live, to get the right energy," says Landee. "We record like we rehearse – as naturally as possible. When we're doing a screamer, so to speak, we've been using a handheld mic, this gold Shure SM58 which the group won as an award from a Circus Magazine reader's poll contest in 1982. Most of the vocals for *OU812* were done with that mic. Sammy holds it right in his hand – he's just a lot more comfortable that way."

Neil Kernon takes the process of recording vocals to another extreme. "On my projects, I always try to have 48 tracks of masters with another 24-track recorder slaved for vocals, which eventually get bounced down. So they're really 72-track projects. When I'm

doing vocals, I analyze the song and see which parts I *don't* need to duplicate. For example, you usually have a chorus that's either the same length throughout the song, or a second chorus twice the length of the first one. In that case, I'll get the band to sing it just once, and record it across 24 tracks.

"Sometimes, when we're doing 'gang vocals,' there will be ten people singing the same part twenty-four times. That's two hundred and forty vocals all going at once, which really builds out the track. To get that huge vocal effect, I varispeed some of the tracks, use expanders on others, and record some with Dolby, then play them back without it.

"When I'm all done, I'll mix everything down from the slave, and either sample the results or just fly them back into the 48-track masters with a DAT machine wherever I need them. Ever since I worked on Queen's 'Sheer Heart Attack,' where there were something like eighty tracks of vocals bounced around, I've been using this technique."

Sometimes a vocal sample can even become the backbone of a hit song. Bob Rock recalls, "The first thing you hear on Aerosmith's 'Dude (Looks Like A Lady)' is this vocal sound effect. When Steve (Tyler) and Joe (Perry) did their original preproduction demo on an Akai 12-track, they got these two noises which kind of made up the rhythm of the whole track.

"I took samples right from that 12-track demo and fixed them up a bit with some EQ and compression, because they were really dreadful. But it was better to start there than to start with something clean. I could have tried to recreate those samples, make them nice and sparkly, but the original sounds had character and the right attitude."

Bruce Fairbairn and Bob Rock often use natural sounds to their advantage. "I find that sometimes you get so wrapped up with cleaning up your drum sounds that you forget you're recording a band in the studio," says Fairbairn. "A drummer can sit there beating on his toms for hours and hours without actually playing a thing, so he'll either get bored or pissed off or both.

"The way I mix drums, with a fair amount of room sound and ambience in them, I find that a lot of those rattles, pings and rings get eaten up anyway with all the other tracks going. You'll never hear a ring on a snare drum by the time you've got a couple of Marshall stacks on the track, and musicians will always thank you for letting them play when they're still fresh."

Producers will go to great lengths to keep their artists happy. "Dokken's George Lynch is my favorite guitarist," says Neil Kernon. "He's like that guy from 'Spinal Tap' – his amps always go to '11.' But all kidding aside, he's absolutely brilliant, and we've worked hard to get his sound just right.

"When we were doing the last album, we had over fifteen amps of every size and shape to choose from in the studio – and we tried all of them in preproduction just to find the right sound. We were fanatical about it. We ended up using two classic Marshall amps – one red and one purple – from the mid-1960s that had sets of perfectly-matched 'Groove Tubes' in them."

"Sometimes you can surprise a guy, especially a guitar player," chuckles Bruce Fairbairn. "In the studio, you can take them a step beyond what they're used to hearing in their live setup. They get inspired that way.

"Richie Sambora (Bon Jovi's guitarist) found that getting a good headphone mix was a bit of a problem. So I brought him into the control room and had him play just behind the board. He loved it, because we could crank it up and give him as much guitar as he wanted in the mix. He had a half million dollar monitor mix, and he sounded like God!"

Speaking of which, Eddie Van Halen's hammer-on style of playing guitar leads, since imitated by countless players, found its way onto vinyl on the track called 'Eruption' from the group's debut album. Donn Landee recalls the day it happened.

"The stories are that Eddie was just noodling around. But that wasn't the case. He came in knowing exactly what he was going to do. It was totally worked out. He said he wanted to record this little thing, and we already had his amp set up and miked from an earlier session, so we just let the tape roll.

"What you hear on the record was the first take. We were amazed. We had never heard anything like it. 'Star Wars' was playing down the street at the time we were working on the album, and that afternoon, I had just seen it. I came back to the studio, and the two experiences were not a whole lot different. They both had a similar type of impact. It was an amazing time."

Eddie and the boys are still knocking them dead today. Last summer's 'Monsters of Rock' tour, featuring headliners Van Halen as well as four other major heavy metal acts, was one of the largest – and most expensive – ever mounted. Two complete touring setups – including stage, lights, sound system and over 150 technicians – leapfrogged from stadium to stadium across the United States and Europe.

More than ever, live shows depend on elaborate technical rigs, armies of sound, ▶

Tommy Lee, Motley Crüe

Photography *Eddie Malluk*

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▶ lighting and computer specialists, and of course the artists themselves, who are all driven towards one goal – making the live shows sound as good as, or even better than, the album. "I spend a lot of time in the studio lifting sounds in the digital domain off our multitrack tapes into my samplers," says Tommy Lee, Motley Crüe's outlandish drummer and resident technocrat.

"I really want to recreate the album onstage. It should be a little different live, but I'm sorry, man – this is 1988 and the live show should sound just like the record. People pay to come see you play, and I know for a fact that you can get really, really close. With today's technology, it can be done."

Brett Tuggle, who plays keyboards for David Lee Roth, agrees. "On tour, I play a lot of brass parts, strings, orchestration, pianos, even a sax-sound solo in the middle of the show. I try to match the sounds and stereo imaging we get on our records, but I approach live playing totally separate from my studio work. You might overdub a lot in the studio, but live you can only play so much with your two hands."

Judas Priest's guitarists, Glenn Tipton and K.K. Downing, write material for the group's albums with their audiences firmly in mind. "Anything the Priest ends up doing in the studio," vows Downing, "has to be something we can play onstage without using tapes and such."

Tipton adds, "We play everything live – we're not going to cheat. For us, the live show is more exciting; it's more than what goes down on plastic. We try to give the kids in our audiences a great show, but I think they would be surprised at how much you need to do to sound good live. We have to be continuously aware of what other guitarists and technicians are doing – we're competing, and it's a hard world out there.

"We have very skilled people working with us on our shows. They know almost exactly what we want, and quite often, we're able to just walk onstage at showtime. A band on the road is only as good as the people it surrounds itself with, and our advantage is that we have surrounded ourselves with long-term experienced people."

Sound engineers have even come up with the means to make rock bands sound good in arenas that were designed as hockey rinks, not music halls. "Some of these places are such God-awful sounding rooms," says K.K. Downing. "You've got to come equipped to combat that."

Tommy Lee amplifies the thought: "You've got to feel the sound, man. Anything can be loud, and people will dig it, or at least tolerate it, because it's a live show. But we tell our soundmen at Tasco to bring more than enough sub-woofer cabinets. I want to make sure we shake the arena."

"Our house mixer, Gordon Patterson, has been working with us for years," explains Glenn Tipton, "and he brings along three Pete Cornish mixing consoles as well as racks full of equipment so we can get the sound we want no matter where we play. The equipment and technology side of this business has really taken off and made a move for the better."

From all angles, the Judas Priest show is elaborate. Lighting director Louie Ball reports, "The show has over 1000 lights in the rig, and they're all controlled by a computer-assisted lighting console. A few years ago, you'd have a dozen guys sitting up there before the show just to focus the lamps at each new venue.

"Now, we're using an IBM PS/2 personal computer, which allows me to set everything up from the mix position out in the audience. It's running a customized system under Microsoft Windows that lets us punch up any lighting combination or even redesign the whole show in an hour if we have to. It's great – two of us can run everything from the console."

Heavy metal bands have always gone all-out to create spectacular staging for their live concerts. Sometimes, players themselves co-design their own onstage effects. "I'd been having dreams about strapping myself into a bolted-down drum kit and having the whole thing spin upside down," relates Tommy Lee.

Photography Rose Rounseville

Tom Werman

"So they took a lot of measurements and built this cage around my entire drum setup, which is pretty elaborate. I play a customized Pearl kit, with the May miking system. It's cool – all the mics are mounted inside the drums, and there are mic jacks right on the shells. That eliminates mic stands, because we wanted the rig to look as clean as possible.

"For samples, I use two Dynacord drum brains, which are hooked up to the Drastic Plastic triggers mounted on my kit, which were made by my buddy Reek Havoc, plus a couple of Dynacord pads. With all that stuff, plus a Linndrum which we use during the show, I need 72 channels on our mixing console just for my drums.

"We have the drum world totally covered. I use two brains because I like to stack sounds. For my snare sound, I might mic the actual drum on the top and bottom, and then trigger up to four sounds at once, like 'Trash Can' and 'Gated Snare.' It's awesome – you get this massive snare sound – *BLAM!*"

Seems like it's all about finding the right sound. As Brett Tuggle says: "Before we went on the road, I spent a lot of time with a programmer figuring out the sounds and all the patch changes that would happen during our set. One of the most technically intensive parts of our show is the keyboards. I have two different stacks on either side of the stage, playing a lot of other synth modules which are offstage.

"I think I have two of just about every synthesizer made, all controlled and run by a Macintosh computer. I could have had a lot of problems with my rig, but we put a bunch of thought into designing it before we went out on the road, and on tour, my technician is great – he takes care of the entire system."

When we took a look at Judas Priest's stage equipment before a recent concert at New Jersey's Meadowlands Arena, we were intrigued to find, of all things, guitar synthesizers in their offstage racks. Glenn Tipton confirms: "We're not a keyboard band, but we thought it would be interesting to incorporate some new sounds into our show.

"We now use Roland GR700 Guitar Synthesizers onstage, which add tremendously to the versatility we're looking for – even though they're used in ways far beyond what their designers ever imagined. We don't use them totally on their own – they're mixed in with the straight guitar.

"The key to Judas Priest's sound is the fact that we use so many complimentary combinations of different sounds and equipment that it makes for a very unique identity in our music. We've always experimented, and that's why we've been around for more than 15 years instead of for just two or three. To come up with 14 albums you have to stay on top of the music and the technology that's out there."

When we saw Brett Tuggle backstage after an impressive David Lee Roth show at Madison Square Garden, he summed it all up. "Technology is changing faster than I can keep up with it. And it's exciting. Everybody's challenging themselves to make our work and our creativity better, enhancing each idea we might have. Technology has been a blessing – it has allowed musicians to do things we never thought we could do before." ■

Lars Lofas and Nick Armington are converted metal mongers, now running a tattoo parlor on New York City's Lower East Side.

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COMPUTING

DR. T'S KCS C64, $90. Convertifile, $45. Passport Music Shop C64, $85. MIDI 4+, $65. Jeri, Tel: (615) 444-0382. 2019 Kimberly Dr, Mt. Juliet, TN 37122.

MASTER TRACKS PRO, for Apple II/e, w/manual, $100. Tel: (212) 547-5676, after 6pm EST.

OPCODE MIDI INTERFACE for Mac, $100. Intelligent Music M v.2.0, $100. Opcode DX7 Editor/Librarian, $100. Fairlight IIx disks. Mark, 4 Bartley St., Chippendale, Sydney, Australia, 2008.

PASSPORT MASTER TRACKS PRO, for the Commodore 128, w/backup, manual, $100. Tel: (212) 547-5676, after 3pm EST.

ROLAND MPU-401, Apple II/IIe interface card. Roland MUSE sequencer software, mint cond, original boxes, cost $555, sell $250. Tel: (315) 683-9460.

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ALESIS MMT8 8-trk sequencer, $200. Yamaha MT44D 4-trk cassette w/6 channel mixer and remote, $500. David, 584 S. Main St. Manchester, NH 03102.

DBX 224X RACKMOUNT noise reduction, for cassette decks, unused. Tel: (218) 749-8729.

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FOSTEX MODEL 80 multitrack recorder, ¼" format with Dolby C and autolocate. Very little use, EC, $1500. Tel: (716) 254-5326.

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BOSS EFFECTS PEDALS - flanger, chorus, graphic EQ, heavy metal, dimension C, Super Overdrive. Call for prices. Tel: (301) 564-1325.

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