A Quick And Easy Guide To The Fine Points Of
Basic Patches

By Dominic Milano

PROGRAMMING SYNTHESIZERS is easy. Programming them well isn't quite so easy, but it's not hard to learn. There aren't any short cuts, yet you have to start someplace. With this in mind, we've put together some basic instructions for a number of common patches. Using the suggestions on the following pages, you should find it simple to get started tweezing those factory presets and concocting sounds from scratch.

Since there's no such thing as a standard synthesizer, we've had to assume a basic voice of two audio oscillators, a VCF, a VCA, two ADSRs (one each for the filter and VCA), and an LFO, as shown in the diagram. Some of the interconnections we mention may not be possible on your particular synthesizer. Such things as modulating one of the oscillators with an ADSR, syncing the oscillators, and using highpass filters are mentioned to give you some idea of the kinds of things that can be done with these extras. Don't feel left out if your synthesizer doesn't have them. The challenge to creative programming, and synthesizer playing in general, is to get the most out of your instrument no matter what its limitations (and every instrument has limitations).

When you're attempting to come up with sounds on your own, it's important to be able to conceptualize what's going with the sound you're building. If you're replicating some acoustic instrument timbre, you need to listen to the original sound model and take it apart in your mind. Questions you need to ask include: What is its playable range? What happens to its pitch when it's sounded? Are there any pitches besides the fundamental that stand out enough to be important to the timbre? How do you get sound out of the instrument? Is it plucked, struck, blown, or bowed? Does it ring-on long after the notes have been sounded? How bright is the sound? What happens to that brightness over time?

These questions can all be translated into synthesizer parameters. Pitch is produced by oscillators. If there are certain harmonics that need to be present, you'll have to choose your waveforms accordingly. A second oscillator can be used to create any harmonic that's particularly strong. Brightness is going to be determined by your filter's cutoff frequency. How that brightness changes over time is going to be a function of the filter's envelope generator. Whether the brightness changes in conjunction with the pitch being produced is a function of the filter being tracked by the keyboard's control voltage. How the loudness interacts with time and the
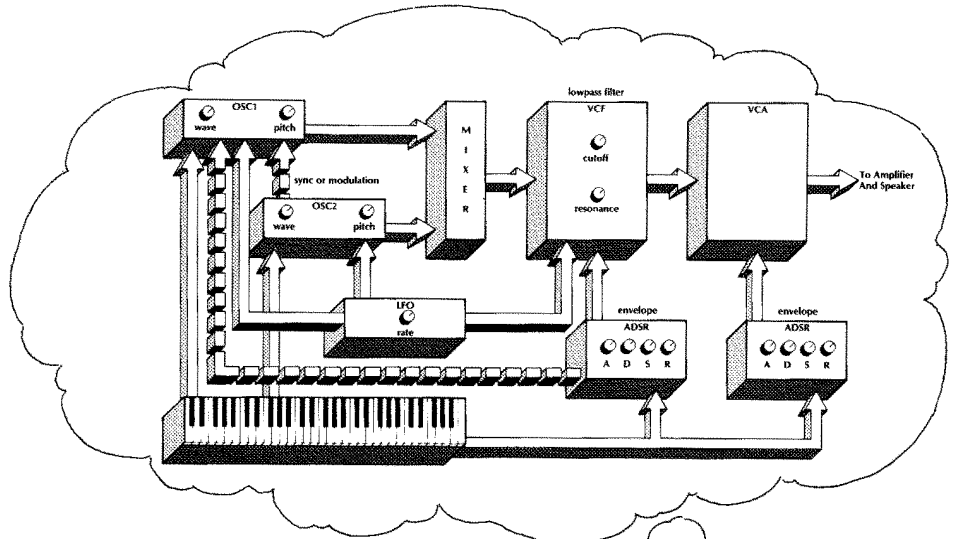
The diagram above represents the synthesizer voice that we assumed as more or less generic for the patches that follow. The voice includes two audio oscillators, a lowpass filter, a VCA, two ADSR envelope generators, an LFO, and a keyboard. In some cases we've shown optional connections that will enhance the patch. These are shown as dotted arrows connecting the modules. Envelope settings are shown as instantaneous, short, medium, long, and high (see the key with the Brass instruments diagram). Your instrument may or may not have these optional functions—for that matter, it may or may not be configured like our generic instrument. In any case, you should be able to use the patches on the following pages as guides.

brightness is a function of the VCA's envelope.

Of equal or greater importance is *playing the sound idiomatically.* How many times have you heard players sit down at a synthesizer, punch up a patch called acoustic guitar, and proceed to play block chords? When was the last time you heard a guitarist playing block chords voiced the way an organist would voice them? Half the battle in coming up with convincing sounds is playing them idiomatically.

Please keep in mind that the patch settings on the following pages are only intended as rough guidelines. Filter settings are described as being bright, muted, and somewhere in between. Envelope times are instantaneous, medium, and long; levels are low, medium, and high. Keep in mind also that the filter cutoff will interact with the keyboard control voltage and the envelope amount settings. You're going to have to experiment to get a mix between all these parameters that's appropriate to your partic-

ular instrument. You'll also have to tweak the envelope settings to get just the right effect out of your instrument. If all you do is set up the envelope settings we've provided, chances are you won't get the same results we did. Even the most minute variations in an attack time or a sustain level can give you sounds that are nothing like the one you're aiming for, since envelope settings are perhaps the single most important factor in mimicking acoustic sounds.

Something we only brush over in the patch descriptions is the use of outboard effects to round out a tone color. Reverb, tape or digital delays, equalization, and chorusing all make a big difference in adding realism, fatness, and dimension to tone colors that would otherwise sound like they were coming straight out of your right ear heading for your left. How you apply these effects is largely a matter of personal taste, so we won't attempt to tell you what you should and shouldn't do. Anything goes, as long as it sounds good.
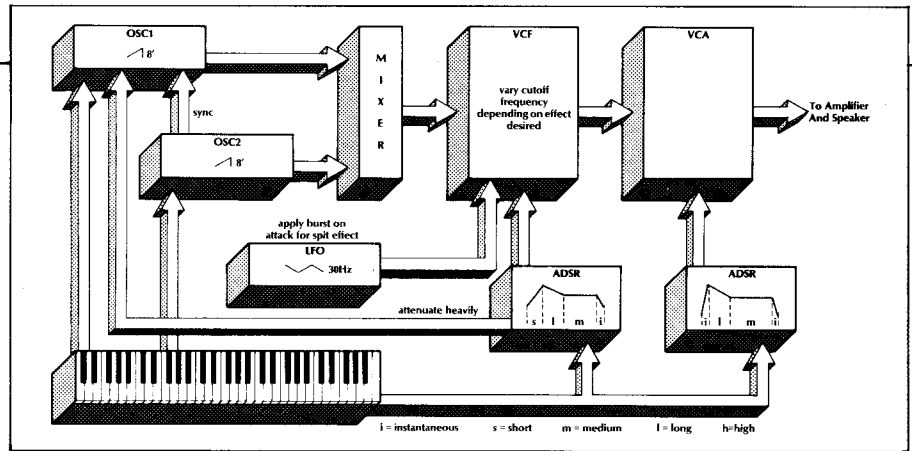
Brass

BRASS INSTRUMENTS are bright and buzzy, so a good waveform to start with is the sawtooth, which has lots of harmonics. Play in different octave ranges for the different brass instruments. Filter settings will vary with each instrument type, as will envelope attack characteristics. Cutoff frequency is crucial in getting convincing brass sounds; you'll need to play with this to get it just right.

Spice. There's a certain amount of spit in brass instrument attacks. To get that effect, use an LFO (sine or triangle waveform set to 25-30Hz) to modulate the filter's cutoff frequency ever so slightly. Ideally, you would control this amount manually, bringing it in very briefly on the attack.

To add more bite, use one of your ADSRs (if your instrument is capable of doing this) to control one of the oscillators, adding a slight, barely audible pitch-bend at the front of each note. Do this by setting the attack time to a little longer than instantaneous. Decay, sustain, and release controls should all be set to zero. Play with the amount of modulation and attack time settings to get them just right. Remember that you only want a hint of pitch-bend, so you'll want to drive one oscillator, not both.

Trumpet/Brass Section. 8' range, play the middle to high keyboard registers. VCA envelope: attack instantaneous (vary it for more realism), decay long, sustain medium, release instantaneous. VCF envelope: same as VCA's or a slightly longer attack time. Adjust the filter cutoff frequency to suit your taste. Use bandpass filtering for mute effect. Trumpets sound very good with the enve-

lope-generated pitch-bend at the beginning of each note. If you use this effect, the same envelope that drives the oscillator can be used to control the filter. The spit effect works well for solo trumpets. You can fatten the sound by detuning the oscillators slightly, adding chorusing (or similar devices), and/or adding pulse waves to the sawtooth waves. Brassier horn sounds are produced when you filter out some fundamental with a high-pass filter and sync the oscillators to get a tighter feel.

Trombone. 8' range, play lower end of keyboard (or 16' range, play upper end of keyboard). The filter should be more muted than for trumpets. Filter cutoff should be subtly varied (manually or with velocity keyboard) from muted to bright to follow the dynamics of the line being played. Envelope settings same as for trumpet. The spit effect

helps make the sounds more convincing.

French Horns. 8' range, played in the middle keyboard register. Filter cutoff frequency almost completely closed down. Filter envelope: attack a little longer than instantaneous, decay high but not full-on, sustain little or none, release instantaneous. VCA envelope: identical to VCF, but with a medium sustain. Spit effect can work, but don't overdo it, because French horns are thought of as being very clean-sounding. Using pitch-bending device to play a slight bend into some of the notes (coming up from about a half-step below the notes you're aiming at) will make it more convincing in a caricature-like way.

Tuba. 32', played at the lower end of keyboard. Other settings the same as French horn.

i = instantaneous   s = short   m = medium   l = long   h=high

Bass

THERE ARE SO MANY different formulas for getting bass sounds that just about anything goes. There are muted bass sounds and bright buzzy synthesizer bass sounds, so you can experiment with any conceivable combination of waveforms. Try varying the number of oscillators, too. Fat bass is obtained by putting the keyboard in a monophonic unison mode and detuning as many oscillators as you can get your hands on. Tight bass is better achieved with one oscillator or with two oscillators synced. Let the situation dictate the kind of bass sound you use.

Synthesizer Bass. 16', 32', or combination of the two ranges. Combine pulse and sawtooth waves. Play in lower to middle registers. Filter cutoff set to suit taste. Add resonance for quack as desired. VCF envelope: attack instantaneous to medium depending on the amount of quack desired, decay medium, sustain low to high depending on how plucked you want it to sound, release fast to medium. VCA envelope: attack instantaneous, decay medium, sustain medium, release fast to medium.

Fretless. Sawtooth waves, 16' range, sync oscillators. Filter very muted. Very slight amount of resonance. Add delayed vibrato at slow speeds or use mod wheel. Envelope
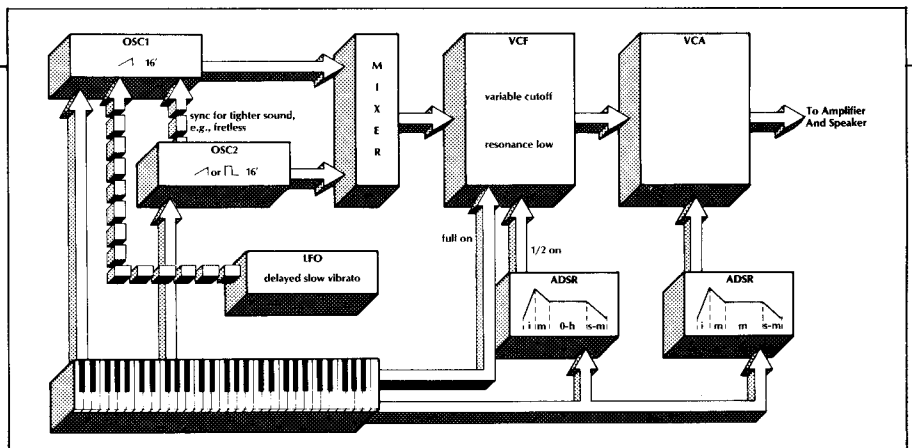
settings similar to synthesizer bass above, but use longer attack times and medium sustain level. Play with lots of pitch-bending.

Popped. Sawtooth waves, 16' range, sync oscillators. Filter slightly more open than fretless. No vibrato. Filter envelope: attack slightly longer than instantaneous, decay medium, sustain high, release instantaneous. VCA envelope: attack slightly longer than instantaneous, decay slightly longer than the attack, sustain medium, release instantaneous. If instrument is equipped to do it, apply velocity sensitivity to filter cutoff for
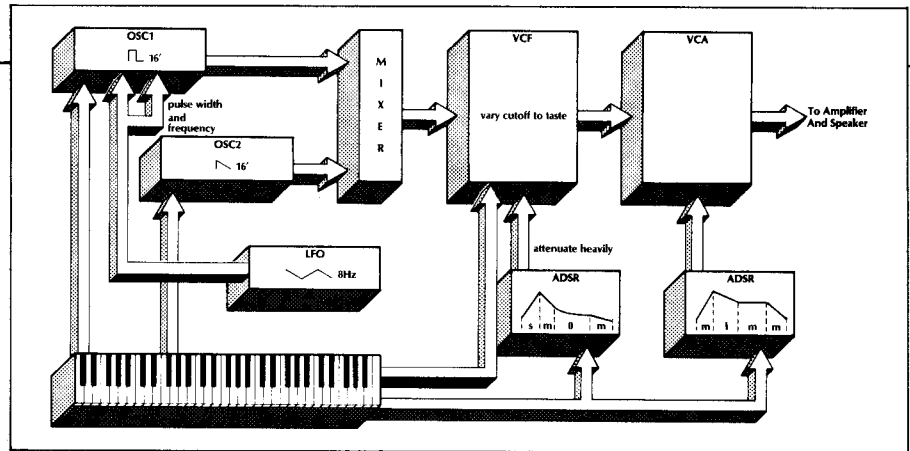
emphasis of popped notes.

String. Sawtooth, pulse, or square wave, 16' range, one or synced oscillators. Filter extremely muted, closed down almost completely. Use resonance to add hollowness and wolf to tone as desired. Track filter with keyboard. Filter envelope: attack slightly longer than instantaneous, decay a little faster than medium, sustain high, release slightly longer than medium. VCA envelope: attack slightly longer than instantaneous, decay a little faster than medium, sustain medium, release long.

Strings

S TRING ENSEMBLES ARE bright and there is a lot of movement in their waveform, so use sawtooth and variable-width pulse waveforms combined. Play in different octave ranges for different stringed instrument effects. Attack and release times can be varied greatly depending on the effect desired. Change cutoff frequency to suit your taste. Solo instruments require that the filter attack and decay occur before the VCA attack reaches full amplitude, so that the high harmonics come in before the fundamental has time to build, simulating what happens when a bow is drawn across a string. Tracking the cutoff with the keyboard gives the effect of thinner strings on the high notes.

Spice. For ensemble effects, modulate the variable-width pulse wave with a slow to medium triangle wave from the LFO. Add vibrato (slow to medium speed) to only one oscillator. Detune the oscillators slightly. Use outboard effects like chorusing or soft flanging to add movement within the harmonics. For solo instruments sync the oscillators and use little or no pulse-width modulation, chorusing, or flanging. Add vibrato with key pressure or mod wheel.

Solo Violin. 8' range, oscillators synced, middle to high keyboard registers. Use filter envelope set to: attack medium, decay medium, sustain less than medium to off (depending on length of note), release nearly instantaneous. VCA envelope: attack medi-

um, decay slow, sustain a little less than medium, release short. Use highpass filtering (if available) to thin sound. Track filter cutoff with keyboard; add a slight bit of resonance to give the sound of wood body. If you want to have Jack Benny playing badly out of tune, add a bit of modulation from the filter's ADSR to the oscillators.

Viola. 8' range, middle to low keyboard registers. Envelopes identical to violin except for little or no highpass filtering. Pull lowpass filter's cutoff down slightly.

Cello. 16' range, oscillators synced. Play in the middle of the keyboard. Use slow delayed vibrato, or introduce it with pressure sensitivity. Track filter cutoff with the keyboard and use highpass filtering to thin out
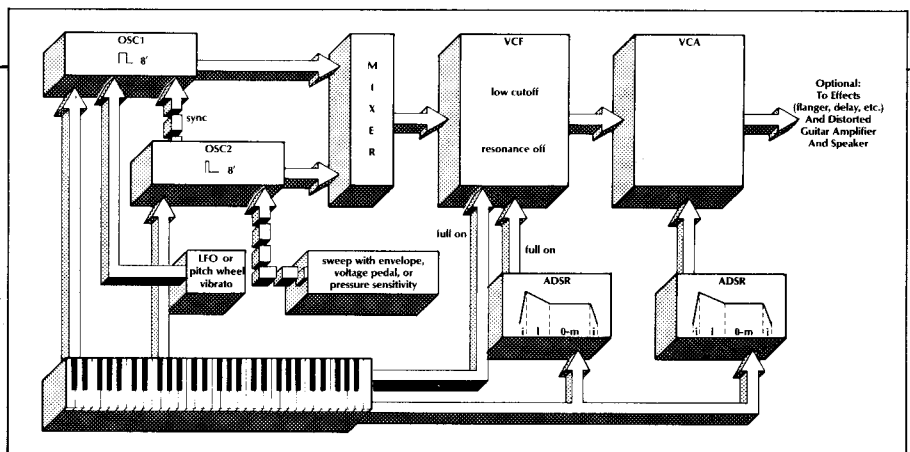
the string sound. Filter envelope: attack slightly longer than instantaneous, decay just a little longer than the attack, sustain slightly more than medium, release nearly instantaneous. VCA envelope: attack medium, decay medium, sustain medium, release medium.

String Section. 16' or 8' range, play keyboard range to suit taste. VCF envelope: attack short to medium, decay medium, sustain off, release medium. VCA envelope: attack medium to short, decay slow, sustain medium, release medium. Adjust filter to suit taste. Use a hint of pulse-width modulation and vibrato from LFO set to triangle, slow to medium speed. For more orchestral sounds, run one osc at 8', the other at 16'.

Lead

T HE RANGE OF LEAD synthesizer sounds is so great that you're going to have to experiment to find the timbres that suit your needs. Lead sounds work with just about every waveform combination you can imagine, so we won't try to be all-encompassing. Here are a few suggestions for getting some stock lead sounds.

Guitar. Pulse and square waves, 8' range. Hard-sync osc 2 to osc 1. Sweep osc 2 with voltage pedal or key pressure to get harmonic effect. Play in monophonic unison mode if desired. Filter cutoff set low, but use full envelope amount on the filter's ADSR to drive the cutoff wide open. No resonance. Keyboard tracking on full. VCF envelope: attack instantaneous, decay long, sustain zero to medium, release instantaneous. VCA envelope: identical to filter. By itself, this setting produces a bright electronic tone color that's quite usable as a lead sound. To obtain a more guitar-like sound, feed synthesizer signal into a guitar amplifier and crank it up so it distorts the way it would for a guitar player. Use outboard effects like slap echo and flanging to finish out the sound. Distortion effect can be mimicked in the synthesizer by modulating the filter with an audio range oscillator (8' to 4' setting, saw-

tooth or square wave, set to track keyboard). Another popular way to add bite is to feed the audio output back into the filter, creating a feedback loop (this is only possible on a few instruments).

Hollow Reedy Lead Sound. Square and pulse waves, 8' range, oscillators detuned slightly. Filter bright, no resonance. Keyboard tracking full on. Filter envelope: attack instantaneous, decay long, sustain medium, release instantaneous. VCA envelope: identical to filter. Cliched effect is produced when portamento is added to this patch.

Flutey Lead. Triangle waves, 4' range. Filter cutoff muted, no resonance. Keyboard tracking on full. Filter envelope: attack instantaneous, decay medium, sustain high, release medium. VCA envelope: attack slightly longer than instantaneous, decay medium, sustain high, release medium. Sync osc 2 to 1, set it to sawtooth wave, 2' range, and mix it in quietly for sound with a little more body. Add vibrato to VCF as well as oscillators.
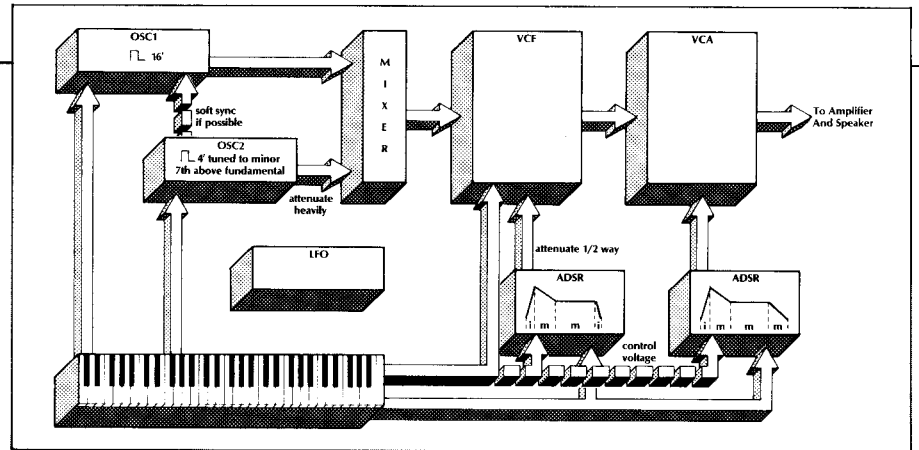
Keyboards

E LECTRONIC APPROXIMATIONS of various keyboard instruments require various waveform and octave range settings. Envelope settings are crucial. If possible, set the envelopes to track the keyboard so that the higher you play, the shorter the envelope times become.

Harpsichord. Both oscillators set to narrow pulse waves, osc 1 at 4' range, osc 2 at 8' range. Filter cutoff bright, use highpass if available to thin out sound as desired. Filter envelope amount full up. VCF envelope: attack instantaneous, decay slightly longer than medium, sustain medium, release instantaneous. VCA envelope: attack instantaneous, decay slightly faster than medium, sustain medium, release medium.

Clavinet. Waveform a little wider than the pulse for harpsichord. Both oscillators at 8' range. Filter cutoff low. Filter envelope amount full up. Full filter keyboard tracking. VCF envelope: attack instantaneous, decay medium, sustain high, release instantaneous. VCA envelope: attack instantaneous, decay medium, sustain medium to low depending on how plucked you want it to sound, release instantaneous.

Acoustic Piano. Osc 1 set to pulse wave that's almost square, 16' range. Osc 2 pulse wave that's almost square, 4' range and tuned to a minor seventh above the fundamental

produced by osc 1. Soft-sync the oscillators if possible. Mix osc 2 at low level. Filter is set somewhere between bright and muted. Pull back slightly on the envelope amount to the filter. Full filter keyboard tracking. If possible, track envelope times with keyboard so the higher you play, the shorter the envelope times. VCF envelope: attack instantaneous, decay medium, sustain medium or none, release instantaneous. VCA envelope: attack instantaneous, decay medium, sustain slightly less than medium, release medium. Use pedal to turn release on and off.

Organ. Osc 1 set to pulse wave, 16' range. Osc 2 set to sawtooth wave, 16' or 8' range.

Filter cutoff is muted. Resonance is tuned to a fifth or an octave above oscillator(s) depending on desired effect. The filter tracks the keyboard. Filter envelope is completely off. VCA envelope: attack instantaneous, sustain full on, release instantaneous. For key click effect, turn up filter envelope amount control, but leave all filter envelope settings at zero. For pipe organ effect, tune oscillators to octaves, add slightly longer attack to both VCA and filter envelopes. Add full sustain level to filter envelope. Turn filter resonance off.

Sound Effects

T HE REALM OF SOUND effects is so vast that there's no way we could include even a small selection of the "standard" sound effects here. Instead, we've limited ourselves to a couple of patches that can be turned into many things, depending on how you "play" the parameters. You should experiment as much as possible. Try combinations of parameters. Change parameters while you're playing, and, above all, *don't think like a keyboard player.* A good way to get into creating sound effects from scratch is to try cranking all the parameters of your instrument to full on. This will no doubt produce an awful racket, but you can experiment with taking out various parameters until you get something useful.

Effects 1. Osc 1 set to sawtooth wave, 32' range. Osc 2 set to triangle wave, 32' range, detuned from osc 1. Oscillators cross-modulate each other if function is available; filter envelope can control amount of modulation. Filter cutoff medium to high (variable). Resonance off to full on. LFO set to negative-going sawtooth. Vary rate as you play—audio range for initial note on, move to slowest speed as you release the key. LFO controls both oscillators and the VCF. Filter envelope: attack medium, decay short to instantaneous, sustain medium, release medium. Invert as desired. VCA envelope: attack medium, decay long, sustain medium, release medium

Playing different ranges of the keyboard produces different effects.
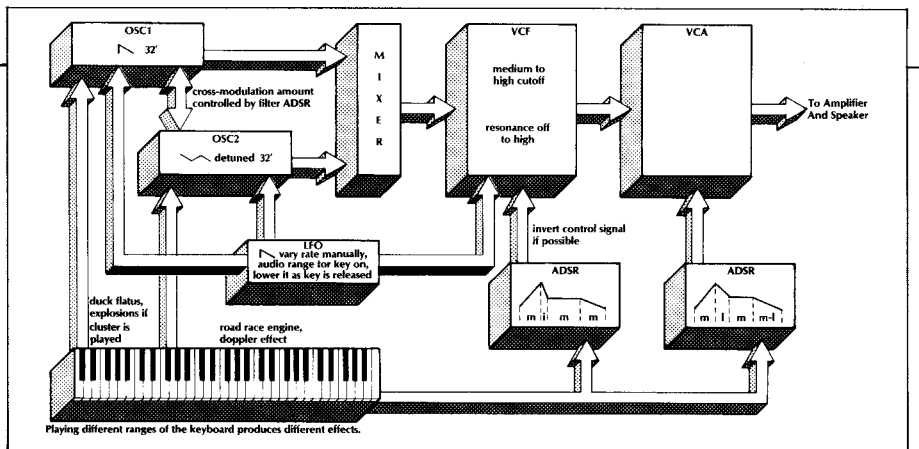
to long. Playing in different ranges of the keyboard will produce different effects. Change LFO rate to coincide with keyboard range. Add filter resonance to low end for famous goose flatus effects. Playing clusters in low end produces a tuned repeating explosion/grinding surf effect depending on how high the cutoff frequency is. If you don't want the explosion to go off repeatedly, turn off the LFO modulation to the filter. Upper registers will sound like something out of a Pole Position game or a Saturday morning cartoon version of a motor starting and dying out.

Effects 2. Osc 1 set to triangle wave, 16' range. Osc 2 set to triangle wave, 16' range.

Filter cutoff set low. Resonance high. Filter tracks keyboard. LFO set to triangle wave, rate slow (about 1Hz). LFO controls oscillators. Filter envelope: attack slightly longer than instantaneous, decay long, sustain low (off), release medium. VCA envelope: attack slightly longer than instantaneous, decay instantaneous, sustain high, release medium. Playing chords in the bass register will produce your basic spooky noise. Playing seconds in the upper register gives that old Penderecki-meets-Friskies-cat-food-commercial effect. Playing the filter cutoff frequency manually produces B-grade space movie computer sounds. ■

Top Studio Programmers

Tell How They Make Those Million Dollar Sounds
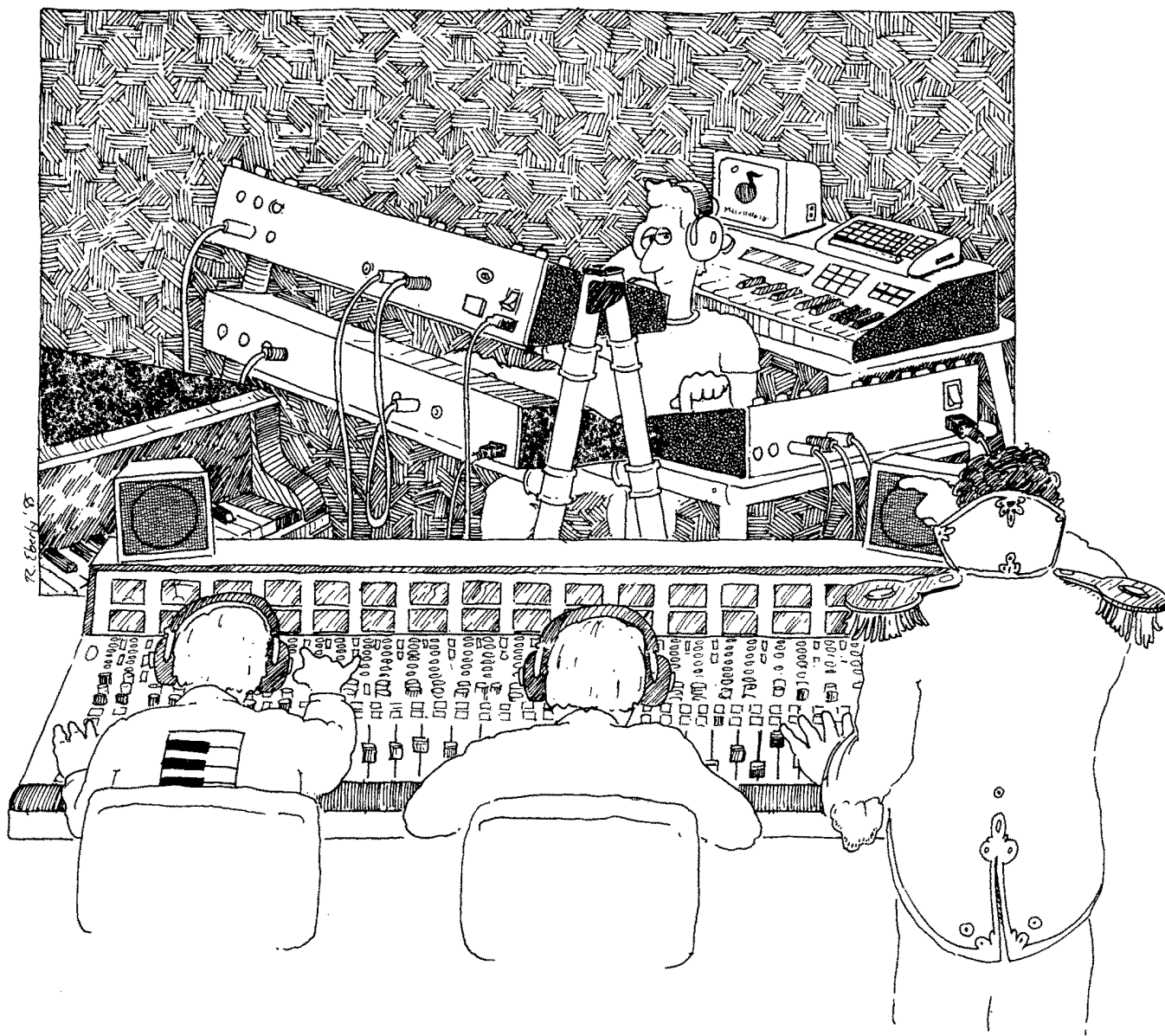
By Dominic Milano

HOW DO PROFESSIONAL synthesists deal with the often unfathomable directions given to them by producers? How do they avoid repeating themselves? What are some of their recipes for getting those killer sounds? How do they make use of memory during a session? These are a few of the questions we put to **Michael Boddicker, Suzanne Ciani, Ed Walsh**, and **Alan Howarth**—four player/programmers who have carved solid reputations in very different, yet similar, fields. Boddicker, an L.A.-based player, has done innumerable record dates, including Michael Jackson's *Thriller*, and has written film scores to *Buckaroo Banzai* and *The Magic Egg* (for more details on the latter, see this month's Soundpage feature on page 34). Suzanne is the head of Ciani/Musica, a New York company

that specializes in creating sound effects and scores for the advertising world. Her list of clients reads like a *Who's Who* of advertising. Walsh, also New York-based, does album work for the likes of the Pointer Sisters and the Rolling Stones. Alan Howarth is another L.A. programmer; his specialty is sound effects and soundtracks for movies. You can hear his work on such pictures as *Poltergeist*, the *Star Trek* movies, and many of John Carpenter's films, including *Escape From New York* and *Christine*.

In the interviews that follow, these players provide insights into their individual ways of working. As you'll see, even though we were trying to limit our talks to synthesizers, all stressed the importance of sampling machines, MIDI, and outboard gear in their current work.

Alan Howarth

WHAT'S THE MOST *outrageous sound effect direction you've ever been given?*

It came from Steven Spielberg when I was doing sound effects for *Poltergeist*. There's this little girl who's disappeared into another dimension, and we have to hear her voice. The only clue he could give me as to what he wanted it to sound like was "Earth to Venus." My job was to take the little girl's voice and make it sound like it was coming from Earth to Venus. I went through a number of experiments trying to process it. I tried vocoders, Harmonizers, echoes, the whole thing. I worked for four weeks on that particular element of the show. I hadn't come up with anything exciting until I remembered the old Led Zeppelin tune "Whole Lotta Love," where they had some print-through in the vocal break. I thought, that sounds as if it's coming from far away. So that was my inspiration for ultimately coming up with a process that turned out to be a reverse reverb as well as regular reverb on the voice. So I ran it through the processor, flipped the tape, and banged it into the reverb again. All of a sudden I had this anticipatory reverb that turned out to be Earth to Venus. We processed the sound further by doing a multichannel effect on it, so I had different reverb and reverse reverb times on each channel, one approaching from the far right, the other from the far left, converging in the center. Finally you heard the girl's voice dry so you could understand what she was saying. We had another trailing reverb with a certain amount of phasing on it that took off into the back of the hall as a surround channel. It started out as Earth to Venus and ended up as a 4-channel forward/backward reverb thing. The thing is that a creative person who doesn't know the equipment can only give you abstract terms. Your job as a programmer is to interpret the situation and what he's saying, trying to come up with a solution that makes him happy.

What if the person is specifying a musical instrument and a sound it will produce?

Then you have to interrogate the guy and ask if there's something he's heard in the machine that's close. You start looking for pointers or directional things. If he's got the instrument out and says he wants you to do this, then there's a good chance that he's heard something in there that makes him believe this box has it over any other box. The first thing I'd do is have him play me the sound. That way you've narrowed the possibilities down to at least a hundred or so. I let him lead me down the path to the sound.

Do you find synthesizer memory useful for sound effects work?

The very first film I ever worked on was *Star Trek: The Motion Picture*. There were three teams of effects people generating special sound effects and I was one of them. It was the beginning of my career, and I was using a Prophet-5 and my Tascam 4-track. The Prophet's memory solved all the problems involved with getting a sound back after you'd thought you were done with it. You program a sound, have the producer say he's not sure that's it, and have it be no problem. You store it in memory, and go on. When he wants to hear that sound again, you just punch up the preset. We were working on the end of the film where V'ger, which is the Voyager spacecraft gone megabucks, has to have a discussion with Kirk. They wanted V'ger to talk back. One of the other effects guys tried to actually make the voice of V'ger everything—this big conglomeration of everything from Earth that there was a sound recording of on the original spacecraft. It came out confused-sounding. That didn't work, so they tried this gong effect slowed way down, but that still wasn't selling, and they were running out of time. They called me and asked if I could get my stuff and come to the dubbing stage. They had three union mixers and the whole dubbing rig—dozens of people standing around—and they said, "Okay, watch the picture and make this thing talk." Well, what I wound up doing was to play the programs in addition to the keyboard. So I would set up an attack sound, a sustain kind of sound, a lot of frequency-modulated filter things, and so on. The performance ended up being as much playing the program select button as it was playing different ranges on the keyboard. There's no way I could have done that without memory. It was interesting, because it was my first movie, and here I was standing in front of all these people being told to make it happen right now. I was shaking in my shoes when I did that one. But they used it.

What kinds of things did you play on the keyboard?

I used it more for gating and for playing ranges than for specific notes. Most of the sounds I'd set up were unison things so they'd sound big. So it was a question of finding ranges, not playing notes. In fact, when they said make it talk, the only thing I could thing of was, "Well, what do you want it to say?" The director took my earphones and recorded what he thought, at least in English, V'ger ought to say. I used the cadences and rhythm of his voice as a guide for the emotion of V'ger's dialogue.

Do you have a favorite sound you've created?

One from that same picture would be the sound of the Enterprise's engines. I had gotten a prototype of the Prophet-10 and I used it to do a heavily poly-moded filter feedback/frequency-modulated texture, which I think ended up being the alien preset on the Prophet-5. I had to be able to manipulate the sound and have it accelerate and decelerate. And at one point I had to make it go into a time warp. The story line actually said the engines went into an antimatter imbalance—what the heck does that sound like? I tried all kinds of outboard things like echo and reverb, but I found that by adding a little bit of square wave frequency modulation, I got this jittery effect that did it. Part of the inspiration for that was the visuals in the movie, which were like visual echoes of everything streaming away in one direction. I've used that same engine sound on all three Star Trek movies now. I've developed sketch pads that I use for various continuing projects. I can call up transporters, engine sounds, phasers, and various boops and beeps, telemetry, and machinery that uses sequencer memory, and all that's on tapes, too.

Does keeping track of all those tapes drive you nuts?

No. I've just got a box full of tapes. I try to keep them labelled as to which project they pertain to, and I've been dating them. I did

> ## "A creative person who doesn't know the equipment can only give you abstract terms. Your job as a programmer is to interpret the situation and what he's saying, trying to come up with a solution that makes him happy."
> ### —Alan Howarth
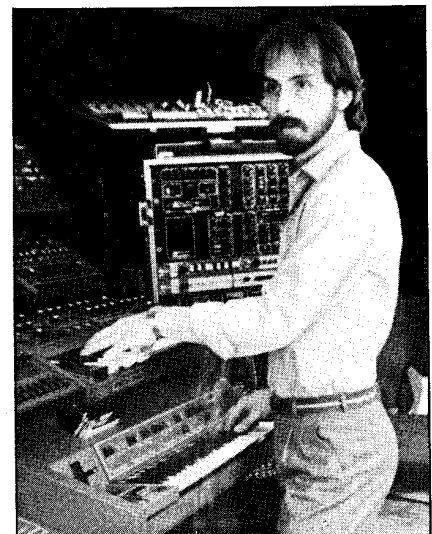
start encoding the program number in my log sheets, so that if this is transporter effect 15A, I know that it came from Prophet-10 upper and lower presets 13 with this much whatever on this note. Initially, I didn't do that, but I learned real fast that if I didn't I was wasting time. It would be wonderful if all that stuff were saved immediately and automatically. Maybe through MIDI someday. . . .

How frequently do you use outboard gear for sound effects?

All the time. I use Eventide Harmonizers, the Sequential Pro-FX, a Moog Vocoder, an EXR psycho-acoustic projector, and a Lexicon 224 digital reverb. I find the Pro-FX helpful since they're programmable and getting back to effect number 13 is no problem. I've only recently gotten the 224, which is great for gated reverb and reverse reverb effects.

How much trouble do you have fitting sound effects into the soundtrack?

It's always a problem. The priorities for a soundtrack go like this—dialog, music, sound effects. You have to hear what they're saying, the producer and director love the music, and the sound effects are utilitarian. Except on movies like *Star Wars* and *Star Trek*. For normal films, where you'd be hearing a bus go by, they normally just record the bus going by as it happens. The sound effects are obviously more involved for a science fiction film. The classic problem is when the composer doesn't take into account what's going to be happening with the sound effects. And most composers don't. They'll fill up all the bases by putting cymbal crashes, timpani, and gongs on a frame where there might also be a great explosion sound effect. That's because they aren't considering the effects. So you're competing with the score. Some composers will take sound effects into account, and leave you room. Maybe even integrate the effects with the music. Another example of what can happen goes back to *Poltergeist*. We came up with this frightening ensemble of whispering voices to go along with the girl's voice. When we ran the stuff without the music, everyone loved it. But when we put the music in with it, Jerry Goldsmith had played the scene tenderly, picking up on totally different emotions. The sound effects and the music clashed and the sound effects lost out, because the producer and director had heard this great 110-piece orchestra playing this wonderful music and fallen in love with it. We had a clash in interpretation because we weren't communicating.

Let's talk about how you would program an explosion on an analog synthesizer.

Obviously it's a noise effect. One way to grit it up would be to add noise modulating the filter. That makes for nice thunder and lightning effects—taking white noise into the filter with a really hard attack and long release. You have to play with the attack time and sustain level to fit your needs. You need to modulate the filter, because if you don't it tends to just sit there. If you really want a *ka-bang*, you can MIDI a bunch of instruments together and get them all doing their own unique frequency band explosion. Combined, you get a very complex explosion.

Do you have any favorite MIDI combinations?

I like to get everything going at once, but one of the crucial factors about MIDI combinations is that you have to remember the mix between the instruments. If you don't the sound is gone. That's one reason why I've got extra mixer modules on my Pro-FX. I'm looking into an automated console, so I'll have that covered a little better, but it's still very important to keep track of how you mix the various instruments, whether they be doing brass, strings, piano, or whatever.

Do you have a favorite recipe for getting brass sounds?

One thing that I find very useful for brass and even darker-sounding brass is to add filter modulation using either a sine or a triangle wave on the same frequency as oscillator 1. This starts to make the filter open up in tandem with the oscillator frequency. The first place I had seen it done was in the ARP 2600 patch book. I think they intended it to be used for a vibrato thing, but then the idea of putting it into the audio range hit me, and it produced a nice effect.

Ed Walsh

WHAT WAS THE most outrageous sound you were ever asked to program on an analog synthesizer?

I can think of a couple of things. One time this guy wanted me to come up with strings. I asked him which instrument he had in mind —I have one of everything. He wasn't sure, so I started out on the old modular Oberheim, but that wasn't it. We went through every box I own and came back to the Oberheim. I hadn't touched the settings on the Oberheim, but he decided it was perfect after hearing all the other instruments. The weirdest thing this same guy wanted me to do was to make the sound of snow hitting the roof. I said, "Describe the sound to me." And he said, "What do you mean? I want snow hitting the roof!" As if that were an obvious sound. I ended up doing muted noise-generated pitter-patter sounds. I told him it was *heavy* snow.

The old cliché is that people want sounds they've never heard before or that have never been done before. When someone asks you for those sounds, you have to tell yourself that's why you've been hired and somehow do something that fits the bill.

How do you get that kind of sound?

Nowadays, the best way to do it is to MIDI a whole bunch of things together. Of course, when you do that and add a couple of Harmonizers, a couple of delays, a Marshall Time Modulator, and whatever else you can grab, you get this incredibly involved sound. And maybe you've done all this at the beginning of the session and no one is sure they want the sound. In fact, they say they'll never use it. So the session goes on, and they come back later and say, "Hey, let's stick that sound at the end of this tune!" But by now the sound is history; you've got to spend the next two and a half hours trying to remember what it was.

You don't routinely load settings into

memory as a session progresses?

I save as much as possible. All the synthesizer programs get saved, and I try to jot down notes as I go. But in the course of even a commercial, I might go through 11 different tracks just coming up with sounds, not including the drum machine stuff. So that's a lot of stuff to keep track of. The problem is remembering the settings of all the outboard gear and how it was connected to the synthesizers.

One of the situations you run into a lot as a programmer is where you get a great piano player who has no idea how to play a string part, and he's playing the synthesizer while you're coming up with the sounds. You might come up with the best string sound in the world, but the guy plays it like he would a piano and says it doesn't sound anything like strings.

Do you have a favorite recipe for getting brass sounds?

It varies depending on the desired thickness of the sound. If the guy I'm working for wants something really bitey, with a sharp attack, I would definitely sync the oscillators and possibly work the harmonics with the second oscillator. I'd use zero on the attack parameters of the VCA. I'd concentrate most of the *fffft* in the sound on the VCF. Rather than detuning the oscillators like most people do, I'd rather have a good thick fundamental and run it through a Harmonizer to stretch it out a bit.

Continued

> "The weirdest thing this guy wanted me to do was to make the sound of snow hitting the roof. I said, 'Describe the sound to me.' And he said, 'What do you mean? I want snow hitting the roof!' As if that were an obvious sound."
>
> *—Ed Walsh*

How would you deal with a producer telling you to make that brass sound punchier?

The first thing I'd do is try to keep the sound intact and run it through compressors. If I see the reaction isn't there, I'll grab some more EQ. If that doesn't do it, I would MIDI in another machine. With the MIDIed stuff, I end up using the Prophet and a DX7, using each instrument to create a different part of the sound. I end up doing that same kind of thing for just about everything these days. Even rhythmic pads will end up being three instruments combined. Maybe a DX7, a sampling machine, and something analog all MIDIed together. I think all the machines individually are getting overused. But MIDI allows you to stretch out and get sounds that aren't clichéd.

What combinations work well for certain popular sounds?

If it's a date like a film score or a commercial where you have to come up with a thick sound, say strings, I'll use the OB-X with the modular Oberheim 8-voice. That sound is too thick for a lot of pop music records, so I end up using the DX7 in conjunction with a Mirage, Emulator, or Fairlight. That masks the looping you might have on the sampling machine. You also get the complex attack of the sampled sound combined with the smoothness of the synthesizer.

Are there any tips you can give people for learning to fit sounds into a track so they don't mask each other out?

I was a firm believer in using the synthesizer to do everything. Now I think that unless you're using Moog filters or something, you need to use outboard equalization. When I work with the Pointer Sisters, their vocal harmony sound takes up a lot of midrange. So when I do horns and strings, I notch out a lot of the frequencies around the 1.5 - 2kHz frequency range where they sing. That way, the pads I play don't mask the vocals.

You prefer to do that with outboard EQ?

Yes. I feel that way because nowadays, you don't have the luxury of time. These people want you to get done fast. It's faster for me to notch out frequencies using a parametric equalizer, especially when I'm dealing with three or four synthesizers to a single sound. That's why it's so hard to store what I do in memory. I'd need programmable outboard gear.

How often do you use presets that you've come up with before?

Very seldom. The only time I ever use presets is to store something where the producer is unsure of the sound he wants. I try to make every project special. I might use the same vibes sound on the Fairlight, but I'll chorus it differently and maybe tweak its wave shape. Unless someone asks for something particular, I try to give them something different.

How do you treat a new instrument? Will you take it on a session to learn it?

I made that mistake once. I got this new piece of gear—I think it was the Prophet, when it first came out—and luckily it had presets. Somebody liked a preset sound and wanted me to change it. It was one of those

sounds that used the poly-mod section, and I had no idea what to do. You don't want to keep manuals in your pocket, so I've learned that lesson. If you want to keep your reputation, you're better off learning the box first, and then bringing it on sessions when you're confident with it.

Michael Boddicker

WHAT WERE SOME of the more outrageous directions you've been given as a programmer?

One producer gave me two pages of music that had numbered bar lines with squiggly lines through it labelled synthesizer sound. I asked him what he wanted, and he waved his arms. That was it! I swear I worked on 12 pictures with him and that was the only music I ever had to play. So I would come up with these different ambience sounds. For example, I'd take a deep high string sound and put it through a Space Echo and shift the speed of the echo against the note. But probably the most outrageous direction I've ever gotten came from producer/songwriter Allee Willis. She asked me to get the sound of flattened pingpong balls taped to the underside of pigeon wings. *And she was dead serious.* She wasn't goofing around. It stopped me dead. I accomplished it by getting this popping bubble kind of sound out of an ARP 2600, with an inverted envelope generator modulating the resonant filter. Then she said it had to be a sound you could play a melody on. I put a sine wave in at the amplifier and slowed the tape machine down to half-speed and played sixteenth-notes. She loved it. Of course, nowadays you'd do the part with a sequencer, but back then I had to play it. If you could have seen how serious she was . . . I think I laughed. I could not imagine what the sound could be, and I had to really do some searching. At first I thought it should be white noise, so I made this white-noise fluttering sound. She said it had to be tonal, so you could play a melody with it. That shot my first theory down, after I had spent a half hour looking for that sound.

You very effectively synthesized a big band for Manhattan Transfer [on "Wacky Dust," from Mecca For Moderns (Atlantic, 16036)]. Can we talk a bit about how you did some of the sounds?

I used an ARP 2600 and an Oberheim Expander Module. Both were heavily modified. Greg Matheson wrote the chart and he and I both played the same instrument at the same time. We had footpedals and footswitches, and the two of us used both hands to play a single trumpet part, changing the amount of spit, the attack—especially the attack—the amount of envelope generator controlling the filter, the cutoff frequency. . . . We'd do a trumpet part with all the inflections for a 2- or 3-bar phrase, and then we'd go back and do a second trumpet, a third trumpet, and maybe a fourth and a fifth. If it was sounding all right, we'd go on to the next phrase. We did the whole tune like that. It took us a long time. There were instances where we'd get the parts done and then they'd decide they didn't like the harmony or

"She asked me to get the sound of flattened pingpong balls taped to the underside of pigeon wings. And she was dead serious. She wasn't goofing around. It stopped me dead."
—*Michael Boddicker*

something, so we'd have to go back and re-do it. I think the trumpets were a single sawtooth into the filter. We put a fast LFO through the amplifier of the Expander and sent a short burst of it to the 2600's filter. And then I'd put an inverted envelope from the Expander in the audio oscillator to get a little pitch-bend on the beginning of the note. The ADSR and AR settings on the 2600 were manipulated a lot. For the muted horns, I used a multiple resonance box custom-built for me by Bob Moog and Don Brownell. I put a highpass filter on the brass, which I almost always do. It really helps cut out the fundamental and make them punchier.

The trombone sound was a kind of duplication of the trumpet sound played in a different range. I did the clarinets with my Minimoog doubled with my ARP Pro Soloist. I ran both instruments through my Moog String Filter to get a more woody sound.

You mentioned using an inverted envelope to pitch-bend the oscillator. Do you still use inverted envelopes for that effect?

I've started using non-inverted envelopes to do that, for a number of reasons. I don't have instruments that are as complex as I used to. I mean with my 2600/Expander Module combination, I had five oscillators, two LFOs, two filters, four envelope generators, and lots of devices to manipulate voltages. These days, I'll be lucky if an instrument has two envelope generators, because instruments have gotten simpler for the sake of

being more readily accessible. So if I use non-inverted envelopes, I can use them for the pitch-bend blip and for the filter as well. Also, I got tired of doing it the other way and I needed to change it. And it sounds good, which is the main criterion for me.

Do you have favorite starting points that you build patches from in a session?

I really try not to. There are two ways I approach it. On my analog stuff, I try not to use any bases, any starting points other than starting from scratch. Even if I happen to turn the instrument on with a sound that's similar to what I'm aiming for, I'll rip that sound apart, and reset everything, so that I'm sure I'm getting a fresh start. It's different with my digital instruments. I have to start from an already existing sound with my sampling machines. But even there, I'll change truncations, adjust envelopes, and all that. I'll also experiment with MIDIing different keyboards together so I'll get completely different effects. With DX7s, I thought they were very slow to use at first. If you get used to making your hand fly across the front panel, you can learn to program it quickly, but it's definitely harder work than programming an analog from the standpoint of the sheer number of buttons you have to push to do anything. So one of the first things I did with the DX7 was to sit down and build a huge library of sounds on it. It would be silly to try to set them up from scratch every time, because it wouldn't be cost-effective on the dates. So I collected all these sounds that are organized into various areas—orchestral sounds, strings, and so on. Decent strings are hard to get on a DX7, but when you combine two of them with an analog instrument you get great strings. So with that instrument, I draw on a library of sounds and manipulate them. I always find myself manipulating, so I'm not using presets.

Do you use memory on analog synthesizers at all?

The only time I'll use memory for an analog synthesizer during a session is to save what I've done in case we have to come back to it at a later date. Especially for anything I do for Quincy Jones. I've started making cassette dumps of the things I do for him, because you never know when he's going to need you to recreate something you did. You'll do something for the Olympics and a year later he'll come back and release it on the back side of "We Are The World." And you'll have to re-do some parts. That means you have to remember sounds that are very complex and treated in the mix so you can't hear exactly what's going on, so you can't start from scratch.

Another example of the value of saving patches from sessions was when I did several episodes of [the TV mini-series] *Space*. I did the main title, but I knew I was going to come back and do several episodes later. We did 24 tracks of synthesizers for the main title which they sweetened with orchestra. I filled up a whole RAM cartridge for my DX7 alone with sounds I knew I'd use again. I knew I'd have to be moving very quickly for the episode dates, because there'd be a whole orchestra present for the sessions. They can just pick up

their instruments, put them to their lips, and play, where I'm scrambling around trying to find a sound. Having things in memory for that really helps.

Do you have any tips for keeping sounds from getting in each other's way?

First off, synthesizers have too many harmonics most of the time. Their fundamentals are really strong, and most of the time the instrument is only equipped with a lowpass filter, so I find myself either EQing on the mixing board or using external gear. That's one thing I still use my modular Moog for, the extra highpass filters. I'm sometimes tempted to make things blend together into one big homogeneous sound, and that works for a lot of things, but there are times when you want more clarity. You want things to pop out. To do that and not be offensive is hard. You can open the filter and make the sound buzz into your face, but I'm not after those kinds of sounds. What I've been trying to do is be aware of what space each instrument needs to live in. Then I try to limit it to that space. If I've got a French horn and lots of cellos and bass, I try to make sure my French horn doesn't have so much fundamental, which a real French horn doesn't have anyway. So I use a highpass filter or EQ. If it's a sound that has to have a lot of warm round low end, I make sure that I get all the noise and stuff out of the high end. I try to make sure there's nothing in the top end that's going to eat up what my flutes are doing. The bow of my cellos could easily eat up the breath of my flutes. If you've got real cellos and real flutes, you don't have to worry about that stuff, but if I'm trying to make sure they sound representative of flutes and cellos, I've got to make sure you can hear some of those breath and bow sounds. I use EQ to make sure they aren't stepping on each other's toes.

Suzanne Ciani

WHAT'S THE MOST outrageous direction you've ever been given?

The one that comes immediately to mind is that I was asked to make a sound more boring. It was for a commercial that needed the sound of boredom. I ended up using a Prophet-5 and made the sound as static and boring as I could. It sounded like the machine was ready to crawl into a corner and hide. But I get so many . . . I've been asked to do the sound of chicken frying. I've been asked to do the sound of a buzz saw singing the "Blue Danube Waltz." For that one I took a buzz saw and put it through a Harmonizer with a keyboard on it. Then I played the waltz on the buzz saw.

Do you have a favorite patch?

There's one on the sounds that I did for Music Data for the DX7 that I really like. It's called Tibet. It's a high chime sound with a lot of depth. It's not a normal chime. Basically I'm staying away from high sounds now. I'm very much into doing stereo string sounds with the Synclavier, where parts of the timbre move differently, so you get a spatial melody happening in the sound itself with the harmonics.

LEN DeLESSIO

"This is the decade of the manual. You look at any session and there's someone with a manual next to them."
—Suzanne Ciani

Why are you staying away from high sounds?

I think there's a tendency in electronics to over-use them. I think it's a very natural thing to do when you're in a world of rapid motion, because high sounds by definition seem to want to move faster than low sounds. There's not enough bottom or midrange these days. The midrange is the most lacking—everybody can get a big bass.

What are you using besides the Synclavier to do interesting midrange things?

I'm using MIDI a lot. I find that it really helps in the midrange, because you can get such a thick texture by combining instruments. You can also get the expressiveness that's so very very important. In the high range, you don't need the expression. It sits up there and there's not a lot of latitude for amplitude variation. But in the midrange, you have that full expressive possibility. I get that by layering up five or six instruments with MIDI and then using velocity and pressure sensitivity.

What's a typical setup?

I'm controlling from the Roland MKB-1000, and that will be going into a Roland MKS-30 [Planet S rack-mount synthesizer] and an MKS-80 [Super Jupiter rack-mount synthesizer] with one or two DX7s, a Prophet-5, a Prophet T8, and a Voyetra.

Do you use outboard gear?

At times. I don't think there's any sound that I didn't record with reverb right on the tape. I use the Lexicon 224. I also have an array of effects like the Eventide Signal Processor, a Harmonizer, a vocoder, and so on. I think effects are an inherent part of the

sound. It comes from the same realm. It's totally appropriate for them to be there. 50% of any sound, for me, comes from the effects. Whether it be some kind of shimmering in the distance, a shadow echo, or a tuned delay. One thing that reverbs can do is give a spatial position to the sound. You might have a horn sound that is very close and then it might be answered by one that's far away. You'll use reverb to give perspective and place the sound in the track so it doesn't fight with the other sounds. You might use some feedback to give rhythmic life. I use reverb on the vocoder because I can't hold my breath forever. Sometimes on the bass I'll use EQ, even though I try to build that into the sound.

Do you have favorite starting point for building patches during sessions?

The first thing that came to mind when you said that was the one starting point I have for bass sounds. I always make the bass sounds from scratch. I never keep them. I don't know why. I always start with factory preset 13 on the Prophet-5, the Clavinet patch. I immediately go to the square wave, change it to the sawtooth, and tune it down an octave. Another place I'll start from scratch is with the sampling system in the Synclavier. I've developed a set of sounds that have proven useful over the years, like the backwards cymbal, and I can do a lot of things with those sounds as starting points.

How do you get sounds to fit into a track so they won't get in each other's way?

I like to actually put the parts on a sequencer and while it's running, I'll tweak it. Edit the sound into the track until it fits. With some instruments it's easier than with others, because of their different editing processes. The Prophet is easy to tweak filters and make adjustments on as you go. The DX7 is a little bit harder, so I use the DX-Pro voice-editing software for the DX7, and I have a lot of sounds stored on disk. I'll whip through them until I find what fits in the track. The other thing for getting the sound is using MIDI. If you're going to figure out the blend, the only way to do it is to simply get them all running at once and blend them. It's important to have them running from the sequencer so you can hear the characteristics of the sounds and how they work within the track. The envelopes have to be appropriate for the tempo. If you need the bass to be very long, you can adjust the release time so it's just right.

Has memory made that big a difference to you?

Being able to memorize sounds? Yes, although I edit and make up a lot of sounds. It depends on the instrument. With the DX7, editing isn't as easy. Also, memory is very important with the Synclavier because its editing process is longer. My quote for the year is: "This is the decade of the manual." You look at any session and there's someone with a manual next to them. What we do is organize all the sounds in the sampling machine on specific Kennedy hard disk drives,

and then we use the word processing on the Apple to catalog everything. We have lists of which Kennedy tape they're on, and a little description of where they were used as a reference—"sound for Kamikaze Lover," "sound for Pillsbury," whatever. Then we have a print-out that lists things according to the number of the Kennedy system. And finally there's a master list. On the Prophet, we dump at the end of every session and a micro-cassette is made of all the sequenced patches. And those numbers are entered on the score. So the bass might read, "cassette 4, sound name." Our track sheets also list that information. Our engineer as a rule must ask what the sound is and write it down before they record a note. Everyone shouts out their patch numbers, so there's a lot of bookkeeping we do.

Do you ever bring instruments you are unfamiliar with to sessions?

Yes, I will do that. My philosophy is that I will not hold back on the next thing for the sake of convenience. If I did that, I'd never move forward. So I just kind of deal with it. There's always a backup. I just did a session where I went looking for a sound and was investigating new timbres. I didn't know where I was going to end up, but I knew that when the deadline got tight, I could jump over to the Prophet and the DX and get it right away. Confronting new instruments . . . oh boy. Especially reading these Japanese manuals. I begin to speak li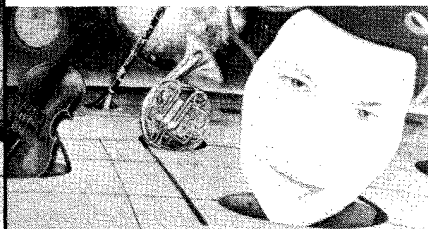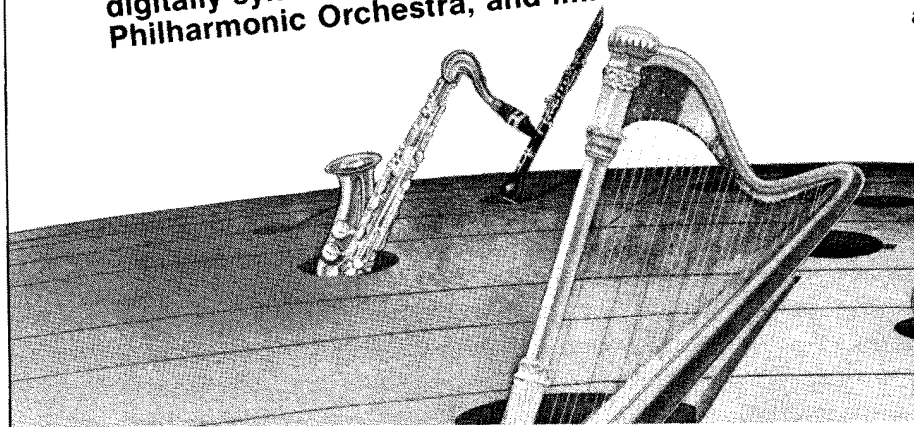ke that. There is humor in all this, you know. ∎