TRANSONIQ HACKER

The Independent News Magazine for Ensoniq Users

Everything You Always Wanted to Know About VFX Pitch Tables

Jim Johnson

.. but may not have known to ask. This might seem to be a rather limited topic and I guess that when compared to subjects like sequencer applications or effects processing, it is pretty slim; yet I would never attempt to cover those subjects in a single article. And that's exactly what I'm going to do for pitch tables today, starting with several unusual applications, tricks for creating them, and finishing up with some of the techno-details that hard-core hackers may find helpful. I'll also talk about some changes to the pitch table software that Ensoniq plans for the next release of the VFX-SD ROMs, which should make some people extremely happy.

The most obvious use of pitch tables in the VFX is to create alternate tunings for the entire instrument: just tuning, Pythagorean tuning, 19-tone tuning—the list goes on. If you're interested in alternate tunings, you should dig up *Tuning In: Microtonality in Electronic Music*, by Scott R. Wilkinson, and published by Hal Leonard Books. The November 1986 issue of *Electronic Musician* also had several articles on alternate tunings, which serve as a good introduction.

Alternate tunings generally involve the use of the system pitch table, since you'll normally want every note in a piece to come from the same set of notes. Unfortunately, the system pitch table cannot be directly programmed in the VFX; it must be copied from a program pitch table, as described on page 9-6 of your Musician's Manual.

If you're not interested in alternate tunings, the VFX pitch tables can still come in handy. In this case, though, you'll want to stay away from the system pitch table, which changes the tuning of the entire instrument, and concentrate on the program pitch tables. Since any of the four voices in a program can either use or ignore the program pitch table, it can be used to create effects such as unusual detuning, automatic harmonization, and others.

Here's a fairly simple example that shows how you could use a pitch table to cause the detuning between two voices to change on different keys. Start with the VFX BASIC voice, and then create a "blank" pitch table by setting PITCH-TABLE (in the Program Control page) to ON. Now enter the following values for C4 through G4+ (G#4 in traditional terminology):

C4: C4 and 00	C4+: C4 and 86
D4: D4 and 08	D4+: D4+ and 05
E4: D4+ and 93	F4: F4 and 12
F4+: F4+ and 01	G4: F4+ and 89
G4+: G4+ and 00	

Now press the *CALCULATOR* button, set the KEY-RANGE to C4—G4+, and press EXTRAPOLATE. Finally, set up two voices with identical parameters, and then set the PITCH TABLE setting (on the Pitch page) for the second voice to CUSTOM. Play a few notes or chords, and you'll hear that different notes have different amounts of animation, which is a very pretty effect, at least to my ears.

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Of course, you don't have to use the values given above for this effect, but there are a few considerations you should observe. First, the detuning for each key should be less than 15 cents, either positive or negative. Second, the number of notes that you use as the basis for the extrapolation should not be a multiple or a divisor of 12 (an octave). If it is, then notes that are separated by an octave will have the same amount of detuning. Finally, the first and last notes in the range should have the same amount of detuning. I don't know why this is, but I do know that if this rule isn't observed, the result is not what you'd want: many of the detune values are very large (20 cents or greater).

The automatic harmonization trick is equally simple, only useful in certain situations, but really neat if you can find a use for it. Setting two oscillators to a fixed interval has been part of the synthesist's bag of tricks since the late '60s, but as any music teacher can tell you, fixed intervals are not terribly musical in most situations. Ideally, the interval should change depending on the key played, so that the second oscillator stays in the proper key. With the VFX's pitch tables, this is a snap.

As with the detuning trick discussed above, automatic harmonization makes use of two identical or compatible voices, one of which uses the custom pitch table. The difference is that the cents settings are left at zero, and the note values are set to form some diatonic interval with their normal value. The unfortunate thing here is that such pitch tables will only work in a single key; you'll have to create the table specifically for the key in which you wish to play.

As an example, here's a pitch table that causes the second voice (the one using this table) to play a diatonic third above the first, in the key of C Major only.

C4: E4 and 00	D4: F4 and 00
E4: G4 and 00	F4: A4 and 00
G4: B4 and 00	A4: C5 and 00
B4: D5 and 00	C5: E5 and 00

Once again, use the EXTRAPOLATE function to copy this range to the entire pitch table. This sounds especially good with organ waveforms; or try it with a trumpet voice on the bottom, and a clarinet voice on the top. As you've noticed, I haven't specified any alternate values for the black keys, since these aren't used in C Major. Set these to whatever makes you happy.

Of course, there's no need to use the same diatonic interval on every key. You could set all of the C's to play an octave, while the G's play an interval of a third, or something like that. The possibilities are endless, and some of them are even useful. One of the VFX ROM programs (TRANS-TINE) uses a pitch table to make one voice play the same octave in all octaves of the keyboard. In that program, this adds an extra "shimmer" that is consistent across the entire keyboard. I've use the same trick on a voice tuned a few octaves below its normal value to beef up the low end of a sound in the high end of the keyboard, without becoming overpowering at the bottom of the keyboard.

You've probably noticed that I've mentioned the EXTRAPOLATE function several times. This is a very important feature that you really should become familiar with if you intend to use pitch tables at all, because it can save a lot of work. If you wish to use alternate equal-tempered scales, such as 19-tone temperament or the moderately well-known Carlos Alpha scale, then the INTERPOLATE function can be used to divide any arbitrary interval on the keyboard into a set of equal steps. As an example of how to use this, here's what you'd have to do to create a Carlos Alpha scale.

For those not familiar with Wendy Carlos' album *Beauty in the Beast*, a Carlos Alpha scale is based on a minor third which is split into four equal intervals. Theory tells us that the ideal pitch ratio for a minor third is 6/5, or 1.2:1, and a little math (the details of which I will not get into here—see the references mentioned earlier) tells us that this results in a difference of 315.6 cents between any pair of keys that are four apart. So, to create the Carlos Alpha scale, first tune the "base" key (for example, C4) to its nominal value (C4 and 0 cents), then tune the key that is four above that (E4 in this case) so that it is three semitones and 16 cents (D4+ and 16 cents) above the base value. Now use INTERPOLATE with a range of C4—E4, and this key range will be set up as a section of the Carlos Alpha scale. Finally, press the EXTRAPOLATE button to duplicate the scale segment throughout the pitch table, and you'll be ready to play along with Wendy.

One note about this procedure for the picky among us: Even though the technique mentioned above will work, a more accurate scale can be created by interpolating over a wider range of notes. In this case, eight minor thirds spread over a range of 32 keys requires a pitch ratio of (1.2)^8, or 4.2998:1, which results in a pitch difference of 2525 cents, or 25 semitones and 25 cents. Using this difference as the basis for interpolation will result in fewer cumulative errors in the final pitch table.

The VFX pitch tables are stored as part of a program in the same data space normally occupied by voices 5 and 6. The tables each contain 88 entries each for the note and cents values for each key, for a total of 176, yet the voices are only 83 bytes long. This meant that Ensoniq had to pack the pitch table values (which are, fortunately, only seven bit numbers) into the last two voices using a scheme that is simple in concept, yet potentially difficult to work with, especially if you're a beginning programmer. Here's how it works: Beginning with the first byte of voice 5, the seven-bit pitch table values are simply placed end-to-end in the eight-bit bytes that make up the last two voices. Note values are followed by cents values for each key. This means that most note and cents values will be split between two bytes. Reading the pitch table values is therefore not something you can do by simply looking at a listing of the data; you'll need a special routine to extract each value, and a corresponding routine to stick it back in. To save other programmers the trouble of figuring a way to do this, here are a pair of procedures (written in Turbo Pascal) that I used to extract a single note/cents pair in Turtle Beach's Oview/VFX editor/librarian. You'd need to create a similar pair of procedures to in-

(Continued on page 4)

Front Panel

RND (♪♫♪)

News From Ensoniq

The EPS/EPS-16 PLUS SL-2 library has been changed from Male Rock Vocals to Basses (Electric and Synth). SL-2 is available in February. The Male Rock Vocals will be released at a later date. We're sorry for any inconvenience this may have caused.

EPS-16 PLUS racks, OEX-6's, and FLASHBANK™ memory are all shipping now. See your local Authorized Ensoniq Dealer or Repair Station for these items.

News from the Hacker

Well, you've probably heard that the postal monopoly is going to raise Third Class mail rates 25% and are wondering how this is going to affect your Hacker subscriptions. For now it looks like we can probably counter most of the effects of this increase by going to a lighter paper—which is what we've done. This will allow us to maintain our current subscription prices.

As long as we're changing the paper we figured this was a good time to do a little tweaking on our general appearance—nothing drastic, but we hope you like it. We haven't really made many changes since we first went slick about three years ago and were getting a little tired of the old look. (And the serif font for the text allows us to cram a few more bytes into each issue and still be readable...)

Attention all Hacker writers! As long as we're changing everything around we'd like to add a few more photos of our contributors. Please send us a recent photo and we'll get copies made and return your originals. While you're at it, we'd like to update your bios, so please include a few sentences about yourself. We also need updated lists of what Ensoniq equipment and computer systems you have access to.

Attention all Canadian subscribers! As you probably know, the Canadian government has decided to shakedown U.S. magazine publishers. As things look right now (subject to all sorts of changes and clarifications), in order to enforce the GST (Goods and Service Tax) Canadian Postal officials may seize incoming publications without GST registration numbers. Unfortunately, if you register to get a number you're subject to having to *bring* your financial and fulfillment records to Canada "on request," (in addition to collecting the tax and maintaining records and posting bonds, etc.). Much of this depends on whether or not Canadian subscribers are "solicited" —which includes such things as renewal notices. The upshot of all this is we may have to stop sending renewal notices to Canadian subscribers. We will try to continue getting your issues to you and we're not even sure whether Canada will even deign to notice little ol' Hacker, but if there is some sort of interruption—this is why.

Special thanks to Joe Paschall of Ensoniq for rushing out the info needed for us to put together a patch form for the SQ-1. The blank form appears in this issue. (Minus the drum sound programming—you're on your own here.) Let's see some Hackerpatches!

Error Alert: In Sam Mims' article on VFX Questions and Answers in Issue #67, the last sentence in the third answer should say to turn the MIDI LOOP parameter ON rather than OFF.

TRANSONIQ-NET

HELP WITH QUESTIONS

ALL ENSONIQ GEAR - Ensoniq Customer Service. 9:30 am to 6:30 pm EST Monday to Friday. 215-647-3930.

HARD DRIVES & DRIVE SYSTEM - Rob Feiner, Cinetunes. 914-963-5818. 11 am - 3 pm EST.

EPS QUESTIONS - Erech Swanston, Maestro Sounds. 718-465-4058. Call anytime. (NY) If message, 24-hr callback.

VFX QUESTIONS - Sam Mims, Syntaur Productions. 818-769-4395. (CA). 10 am to 11 pm PST.

SEQUENCING - Larry Church, Danlar Music, 503-692-3663. Call anytime.

SQ-80 QUESTIONS - Michael Mortilla, 805-966-7252 weekends and after 5 pm Pacific Time.

EPS & EPS-16 PLUS QUESTIONS - Garth Hjelte. Rubber Chicken Software. Pacific Time (WA). Call anytime. If message, 24-hour callback. (206) 242-9220.

ESQ-1 AND SQ-80 QUESTIONS - Tom McCaffrey. ESQUPA. 215-830-0241, before 11 pm Eastern Time.

ESQ-1 QUESTIONS - Jim Johnson, (503) 684-0942. 8 am to 5 pm Pacific Time (OR).

EPS/MIRAGE/ESQ/SQ-80 M.U.G. 24-HOUR HOTLINE - 212-465-3430. Leave name, number, address. 24-hr Callback.

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MIDI USERS - Eric Baragar, Canadian MIDI Users Group, (613) 392-6296 during business hours, Eastern Time (Toronto, ONT) or call MIDILINE BBS at (613) 966-6823 24 hours.

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NEW PRODUCT RELEASES

L.B. Music is proud to announce that **L.B. Music Sequences** has developed a new demo disk for the VFX/SD and Korg T-Series workstations. The company known for its EPS sequences has developed a *"Quick Play System"* disk for these new workstations. The disk will play a series of songs that thoroughly demonstrate the capabilities of the machine. The disk sets all track volumes and instrument placement making it extremely easy for the end user. All you need to do is load the disk and push play. For a free demo disk and song list, call or write: L. B. Music Sequences, PO Box 261, Clifton Heights, PA 19018. Phone: (215) 626-8890 or (215) 533-7122.

VFX Pitch Tables *(continued from page 2)*

```
Procedure Yank_7(var value, where:byte; TheTable:VFX_Pitch_Table);
var a_byte,a_bit: byte;
begin
  a_byte := (where*7) div 8;
  a_bit := (where+1) mod 8;
  case a_bit of
    0: value := TheTable[a_byte].by and $7F;
    1: value := TheTable[a_byte].by shr 1;
    2..7: begin
      value := (TheTable[a_byte].by and (not(lo($FF shl (a_bit-1)))) shl (8-a_bit));
      value := value or ((TheTable[a_byte+1].by and lo($FF shl (a_bit))) shr a_bit);
    end;
  end; { of case }
end; { of Yank_7 }

Procedure Yank_Pitch(index:integer; var note,cents:byte; table:VFX_Pitch_Table);
begin
  while index > 87 do Dec(index,12); { just in case }
  while index < 0 do Inc(index,12);
  Yank_7(note,index*2,table);
  Yank_7(cents,(index*2)+1,table);
end;
```

sert values in the table; this is left as an exercise for the interested reader.

The cents value in the pitch table is stored as a value between 0 and 127, which the VFX's display routines scale to a range of 0 to 99. This means that the VFX actually has slightly better tuning resolution than its front panel display provides. If you're a serious user of alternate tunings, you might want to make use of this extra resolution, in which case you'll need to find (or write) external editing software that lets you get at all seven bits of the cents value. You'll also need to translate tuning values into notes and 128ths, instead of cents.

Unfortunately, the VFX does not provide direct access to the system pitch table via system exclusive communication, which is a real drag, since it means there is no easy way to change it. Fortunately, there is a hard way to do this (which is better than none). Basically, what you need to do is first send a dummy program to the VFX that contains the new system pitch table, then copy this to the system pitch table (using remote button commands), and then restore the original program—either by pressing the Compare button (if the original program was unedited) or by sending the edited program back to the VFX. Again, this is messy, but at least it can be done; and if your sequencer supports sysex commands, then you can do it from within a sequence, though the whole procedure is too slow to be done while a song is playing.

On the bright side, Ensoniq has recognized the importance of being able to change the system pitch table quickly, so they've added a function to the next revision of the VFX-SD (only) software that lets you do just that. In this version of the VFX-SD software (which has not been assigned a version number as I write this—it will be something above 2.1), an EEPROM (RAM) cartridge can be set up, by the user, as a special "pitch table" cartridge. If the system pitch table is set to CUSTOM, and if a pitch table cartridge is in use, then selecting a program from the cartridge (either manually or via a program change) will not set the VFX to play that sound; instead, it simply copies the program's pitch table to the system pitch table. This lets you change scales in real-time, simply by selecting a program! If the system pitch table is set to NORMAL, then the cartridge works in the usual manner. This seemed like a bit of a kluge to me when I first heard of it, but after a little thought, I realized that it is a very workable solution to a problem that no other manufacturer seems to have even considered.

So there you have it—just about everything that can be said about pitch tables in the VFX. Of course, there are several applications that I didn't cover, but I do want to leave room for a few articles on other subjects. ▬

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"Dirty" Hammond B3
Farfisa Organs
Accordions 1 & 2
Vox Organ
Cello & Contra Bass
Solo Violas & Violins 1 - natural vibrato
Solo Violas & Violins 2 - no vibrato
String Section 1
String Section 2
String Section 3
String Section 4
String Section 5
String Quartet
Pizzicato Violas & Violins
Harps 1-4
Harps 5 & 6
Classical Guitars 1 & 2
Steel String Guitars 1 & 2
Jazz Guitar & Acoustic Bass
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Trumpets 1, 2 & 3
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Saxophones 4 & 5
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Exotic Winds 2
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English Horn/Oboe D'Amore
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Baritone Horn & Euphonium
Sax Sections
Brass 5 & 6
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Drum Kits 3 & 4 - Gated Kit/Power Kit
Drum Kits 5 & 6 - Live Kit 1/Live Kit 2
Drum Kits 7 & 8 - Live Kit 3/Live Kit 4
Drum Kits 9 & 10 - Electronic/Synth Kits
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Latin Percussion 2
Exotic Percussion 1
Exotic Percussion 2
Assorted Kicks
Assorted Snares
Assorted Toms
Assorted Cymbals & Gongs
Assorted Hi Hats
Acoustic Kicks
Acoustic Snares

Acoustic Toms
Acoustic Hi Hats
Acoustic Cymbals 1 - Rides
Acoustic Cymbals 2 - Crashes
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Orchestral Percussion 2
Rap Percussion 1
Rap Percussion 2
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606/909/303 Kits
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Sequential Studio 440 Kit 2
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Linndrum Kit 1
Simmons SDS 5 Kit
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Xylophone
Mallets & Steel Drums
Glockenspiel & Bells
Bells 2
Tympani & Kettledrum
Triangles, Finger Cymbals & BellTrees
Tibetan Bell
Sound Effects 1 - Domestic Animals
Sound Effects 2 - Wild Animals
Sound Effects 3 - Cartoon FX
Sound Effects 4 - Car FX One
Sound Effects 5 - Car FX Two
Sound Effects 6 - Transportation FX
Sound Effects 7 - X-Rated
Sound Effects 8 - Military and War FX
Sound Effects 9 - Household FX
Sound Effects 10 - Industrial FX
fairlight II Soundtrax 1
fairlight II Soundtrax 2
fairlight III Brass 1
fairlight III Brass 2
fairlight III Orchestra
fairlight III Reeds
fairlight III Strings 1
fairlight III Strings 2
fairlight III Vocals
fairlight III Percussion
fairlight II Orchestra hits
fairlight II Orchestra hits 2
fairlight III Orchestra hits
fairlight II Soundtrax 3
fairlight II Soundtrax 4
fairlight II Soundtrax 5
fairlight II Soundtrax 6
fairlight II Soundtrax 7
fairlight III Snare Drums
fairlight II Sound FX
Prophet 5 Strings
Prophet 5 Brass and Bass
Prophet VS -1
Prophet VS --2
Prophet VS/T8/2000
D-50 1
D-50 2
D-50 3
D-50 4
M1-1 – Cloud Nine & Christmas sounds

M1-3 – Lunapad and Barbarians
M1-4 – Celestial and Stratos
M1-5 – Ambrosia and Atlantis
M1-6 – Galadriel, Lothlorien & Gandalf
M1-8 – Orchestras 1 and 2
M1-9 – Orchestras 3 and 4
M1-10 – Bottlebell, Metal Hit, & Windbell
DX-1 – DX Rhodes and Bass sounds
Oberheim 1 – Xpander Bass & Brass
Oberheim 2 – Matrix 6-1
Oberheim 3 – Matrix 6-2
Oberheim 4 – Matrix 12
MiniMOOG - 1
MiniMOOG - 2
MiniMOOG - 3
Jupiter 8
Super JX/MKS-70
Juno 60/106
Prophet 10 - 1
Prophet 10 - 2
Korg DW-8000
ESQ-1
SQ-80
Kurzweil 250/1000
Arp Oddysey
Arp 2600
Mellotron 1 - Strings
Mellotron 2 - Flute & Choir
Chamberlin
Modular MOOG
MOOG Source and Taurus Pedals
Memory MOOG
PPG Wave - 1
PPG Wave - 2
PPG Wave - 3
Vocal Ensemble 1
Vocal Ensemble 2
Vocal Ensemble 3
Vocal Ensemble 4
Vocal Ensemble 5 - Chamber choir
Voxes & Vocoder
Rock & Roll Composition Set
Jazz Composition Set
New Wave Composition Set
New Age Composition Set
Rap Composition Set
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Electric Bass 3 & 4 - Factor Basses
Electric Guitar 1 & 2 - Rock 1
Electric Guitar 3 & 4 - Rock 2
Electric Guitar 5 & 6 - Heavy Metal
Electric Guitar 7 & 8 - Jazz
Electric Guitar 9 & 10 - Funk
Chapman Stick
Synclav Hits 1
Synclav Soundtrax 1
Synclav Soundtrax 2
Synclav Soundtrax 3
Synclav Soundtrax 4
Orchestra Hits 1
Orchestra Hits 2
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Let's see what's in the mail today. Ah, a package from the Hacker. I love getting packages in the mail! Open the package and what do I find? Six EPS disks from Greytsounds for review. Well, let's pop the disks into the old EPS and see what we've got.

Power on, "Please Insert Disk"...I can handle that. "Loading System"—"Tuning Kbd—Hands Off"...if you insist. Mixing board on. Amp on. Ready to go.

The first sound is called "Steinway 1933" - weighing in at a substantial 1585 blocks. As you might guess from the size, this piano has been multi-sampled. The sampling is nice and clean and the loops are seamless. All of this combines to make an instrument that works well across the entire keyboard. The upper octaves are bright and meaty - not tinny like most of the piano samples I've heard. To my ears the lower end sounds a bit too EQ'd - not a bad sound, maybe less realistic than it might be. I guess that's the trouble with sampled pianos - everybody has their own idea of how the ultimate piano should sound.

The next disk I looked at has three sounds; "Rock Organ," "Pluck Organ" and "Perc Organ." These are your basic B-3 organs, naturally. The first sound, Rock Organ, has a good feel to it. The patch buttons bring in what I think is supposed to be a "dirty" Hammond sound, but to me it just sounds like irritating noise. Pluck Organ isn't bad but there's a click in the loop; the same is true of the Perc Organ. As with the Rock Organ, the patches tend to be somewhat weak. (So that I won't have to keep repeating myself, let me say here that, for the most part, patch variations on these sounds are either not very creative or non-existent.)

"Strings" is the next sound. This is another hefty one - 1505 blocks. The sound was sampled well, but the loop isn't very good. It's a clean loop - no click or pop - but there's such a substantial change in volume from loop start to loop end that sustained notes pulsate drastically. This puzzles me since their ad in the Hacker says these sounds are edited with "Alchemy" and "Sound Designer." I'd think that there could be a better loop than this with that kind of software.

On to the next disk which contains four "CMI Hits." These are big, complex orchestral splashes. The samples are clean and bright and rich in texture. As is the case with this type of sound, these hits are useful within only about a two octave range. In the appropriate context these sounds would work wonderfully.

The next disk contains three drum sounds. "Add-One Kit" is a standard drum set, "Add-One Kit #2" is an electronic set and "Add-One Toms" features three Toms - two acoustic and one electronic. In general, these are excellent sounds. The acoustic drums are full and punchy and the cymbals sizzle with lots of highs; the electronic drums are huge and exciting (except for the cymbal, which is rather cheesy). The patches on all three are pretty standard: dry, backwards, phased and stereo.

The sounds on the last disk are titled "Rap Perc 4 and 5." These feature a wide variety of percussive sounds from acoustic to electronic to stacked. All are superb. Clean and crisp.

A quick glance at the Greytsounds ad in the Hacker shows that I reviewed only a small portion of the 200+ available samples. Assuming that the people at Greytsounds sent their best sounds for review, I would give their sounds a high rating but with a word of caution. I'm surprised to find that among sounds that exhibit first-rate sampling techniques, there are also those which don't. My suggestion - try their "$9.95 fully functional demo disk" which will also get you full credit for that amount on your first order of 3 or more disks. A good deal and a great marketing practice! ▬

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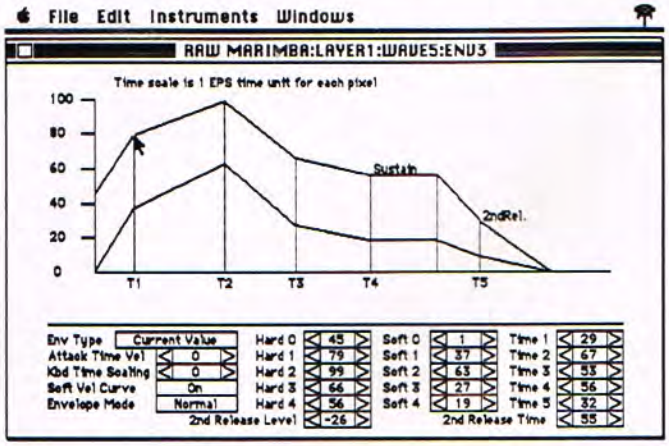

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Curing the Clickety-clacks

David B. Libby

One of the most annoying things about my trusty SQ-80 wunderkeyboard is the clicking of the individual keys as they are played. At first, I was too excited by the new and exotic sounds emanating from my speakers to be terribly concerned about it. Besides, Ensoniq itself handed down the final verdict—clicking of keys was normal. Now, I am so used to the clicking that I could almost ignore it.

However, from time to time, when somebody new shows up to listen to me demoing the instrument, instead of admiring my nimble-fingeredness or the multitimbral sounds, they ask, "What's that clicking sound?"

Arrgh! So, here we go again, into the innards of the old SQ-80! This may or may not apply to other models.

Before you put on your rubber gloves, a note of caution should be sounded. This kind of modification is not for the faint of heart or weak of pocketbook. If difficulties were encountered Ensoniq might not care to come to your rescue at any price. The services of an independent technician might be required and parts availability would be a sticky difficulty. I am a Certified Techno-head, but I did find this to be a simple matter, involving no electronic manipulation.

I found that it was easiest working with the SQ-80 right side up with the front overhanging the workbench edge. Needless to say, support the case securely. Then, unplug all cords and go to work.

A quick look at the bottom of the keyboard case shows a number of screws. The first row towards the front holds the keyslip in place. There is no need to remove these screws. There are eight screws in the second row, the leftmost two of which (as viewed from the top) hold the disk drive. Remove the other six screws in a row under the keys. These are self-tapping screws, which are threaded into plastic, so be gentle! Upon re-insertion, the plastic may strip out completely, which is not necessarily catastrophic, but may require further kludging to reassemble securely.

There are four right-hand screws in the third row, which hold the back of the key assembly. Remove them. Now you are ready for the top side.

Using your Torx driver (you've done this before, right?), remove the four Torx screws from the top of the machine. Swing the top panel open. Remove the screws from the front edge of the zinc-lined RFI shield. Now, carefully lift the key assembly out of the case. There is a ribbon cable plugged into the bottom of the assembly. Unplug it, noting the orientation. I found the maroon marking on the cable lined up with the "1" pin on the board.

A quick look at the mechanics of the individual keys is in order at this point. The SQ-80 does not utilize any contacts as such, rather it relies on a proximity effect. Start by removing a spring from the back of any key. This is done by slipping one jaw of a pair of needle-nosed pliers into the center of the spring and grasping the spring firmly. Now lift the spring up and free it from its upper and lower constraints (undo it, Jack!).

You should be able to see a slot of sorts at the pivot point at the back (and top) of the key. Slip an appropriately-sized screwdriver into this slot, and, while gently lifting the back of the key, use the screwdriver to release the key.

Lift the key off and note the underside. You will see a metal plate. Look at the circuit board where the key was and you will see a rectangular coil etched in copper foil. I'm no engineer, but this is the general theory—the coil's electrical response is altered by the approach of the metal plate. In this way, the keyboard assembly's processor can tell where the key is at any moment relative to where it started and also how fast it got there. This is why you must patiently wait for a calibration of the keyboard every time you power-on. Every key must be measured in its normal resting position.

Note also the little urethane foam disk attached to the metal plate of the key. This is the clickculprit! Ensoniq refers to this pad as the hard stop. This device limits normal key travel, stopping the further approach of the metal keyplate to the coil. However, a firmer aftertouch will compress this foam pad, allowing a bit closer approach and a corresponding further effect upon the coil. This extra effect is used to activate the aftertouch.

This pad exhibits a peculiarity of urethane foam, in that a skin is formed on the surface in manufacture, much like pudding in the fridge. It is this skin slapping against the circuit board that produces the clicks.

My first reaction was to slice the offending skin off, but that did not help the clicking much. Besides, the thickness of the pad seems to be very critical (I measured it at 1/8"). A thinner pad triggers the aftertouch every time a key is pressed, a thicker pad never allows any aftertouch at all.

I felt the solution was felt. I tried el cheapo felt stick-on pads from the local Wal-store, but a firmer, quality piano felt, although more difficult to obtain, is what is recommended.

Remove all keys, keeping their order to simplify later reassembly. As you remove each key, use an Exacto knife to carefully slice off the urethane pad. This is not a critical operation. Next, cut a narrow (1/2" or so) length of 1/8" thick felt to run the width of the key assembly. It is best to place this strip so that the pad is about in the same place front-to-back-wise on the circuit board as the original individual foam pads. Fastening is accomplished with any silicon adhesive.

Reassemble. Weren't that easy? Now play. Ain't it beautiful? ▬

Bio: David is a CET and a Glenn Gouldophile and can be reached on CompuServe at 72557,643.

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Synthesis and the SQ-1

Clark Salisbury

In this installment of our continuing SQ-1 series we'll be dealing with acoustics, synthesis theory, and the basics that you will need to know to become a successful sound programmer. And, as usual, we'll being doing enough hands-on stuff to keep things interesting. But let's start with some of the basics of sound.

Principles of Sound

Simply put, sound is a fluctuation in air pressure and having both a positive and a negative component. This pattern of positive and negative fluctuations in the air are much like the ripples on the surface of a pond. We can think of these as "sound waves."

Within these sound waves is all the information necessary for us to determine what kind of a sound we are hearing and where it's coming from. If we could separate these sound waves into their component parts and understand how these parts work together, we'd have a pretty good basis upon which to develop a theory of synthesis that will serve us in our quest to create new sounds on the SQ-1 (or any other synthesizer, for that matter). Fortunately, understanding sound in terms of its components isn't that tough.

The Characteristics Of Sound

Think of sound in terms of four basic components; pitch, timbre, direction and ambience.

Pitch tells us whether a sound is high or low, or whether a note is a "C#" or a "Bb." Timbre is the textural character of a sound. It is timbre that allows us to distinguish whether the "C#" is being played on a piano or on a violin. Of course, sound does not exist in a vacuum, so we must also take into account the direction that a sound is coming from, and the space, or ambience, surrounding a sound.

Pitch

Pitch is perhaps the easiest of these components to recognize. It is pitch that gives us melody and harmony. But how is it that we are able to distinguish between various pitches?

If sound waves are consistent and repetitive, we will perceive the sound as pitched. In other words, if the vibrations occur regularly, (for example 440 times every second), we can say that the sound has a pitch—in this case a pitch of A above middle C. We express the speed at which a sound wave vibrates in terms of its "frequency"—literally, how frequently a sound wave repeats itself over a given period of time; a single second. We have a term for this—"Hertz" (usually abbreviated to Hz). Therefore, when we say a sound wave has a frequency of 440 Hz, we are saying that the sound wave is repeating at a rate of 440 times every second. The range of human hearing is generally thought to be from 20 Hz to 20,000 Hz (commonly abbreviated to 20 kHz—20 kilohertz), although I think these numbers are a bit optimistic for most of us, particularly in the upper ranges of hearing.

Now 20 kHz may seem like a lot of Hertz to deal with, but it's not really, especially when you consider that a linear change in a sound's pitch corresponds to a geometric change in a sound's frequency. In other words, the pitch that we call A above middle C has a frequency of 440 Hz. But at one octave higher (the next A up on the piano keyboard), it has a frequency of 880 Hz (440 Hz x 2), at two octaves up you get 1760 Hz (440 Hz x 2 x 2), then 3520 Hz (440 Hz x 2 x 2 x 2) at three octaves up, and finally the highest A on a piano keyboard is 7040 Hz (440 Hz x 2 x 2 x 2 x 2). And this is only about an octave and a half lower than the highest pitch that humans can (theoretically) hear.

Going down in pitch, starting with A 440 Hz, the next lower A is at 220 Hz; another octave down yields 110 Hz, then 55 Hz, and finally 27.5 Hz. At these frequencies we are again running up against the limits of human hearing and, as a matter of fact, what we are hearing in the low A on a piano is primarily overtones. Frequencies that are much lower than this will be perceived more as individual vibrations rather than as a smooth pitch.

Timbre

When we hear the sound of a flute, it is obvious to us that it is a flute and not a guitar. How is it that we can tell the two sounds apart? Primarily, it is timbre that provides our ears with the clues necessary to distinguish between different kinds of sounds. Timbre is the basic textural substance of a sound. Is the sound dark or bright? Is it fat or thin? Is it "woody" sounding or "nasal" sounding? So what is timbre, actually?

Timbre can be thought of as the product of a sound's overtones —the frequencies of individual elements contained within a sound—and the amplitude envelope (volume contour) of each of these overtones. When you play a note on a guitar, for example, the complex sound you hear will be composed of a number of individual frequencies. The one that you hear as being the pitch of the note ("A" at 440 Hz, for example) is called the "fundamental" —it is the fundamental frequency of the note that you've played. The other frequencies contained within the sound are called "overtones," because they are generally higher in pitch than the fundamental. These overtones are not generally perceived as having their own pitch, but taken together make up the tone of the sound you hear, in much the same way that you perceive the mixture of red and yellow as "orange," and not "red/yellow."

Overtones may or may not have a harmonic relationship to the fundamental frequency. If they are harmonically related to the fundamental, they are called "harmonic overtones." If they have little or no relationship to the fundamental, they are called "non-harmonic overtones." Some may even be lower in frequency than the fundamental; these are called "sub-harmonics." So when you play a note on a piano, it is the combination of the fundamental frequency as well as all of the overtones (along with each of their respective amplitude contours) that give you your impression of the tone of the piano.

As I've said, the harmonic overtones have a harmonic relationship to the fundamental frequency of a tone. This relationship is easily described in terms of simple multiplication. Since the fun-

damental is the first harmonic in our series, we call it harmonic number 1. The second harmonic, then, has a frequency of 2 times the first, or fundamental, harmonic. Likewise, the third harmonic has a frequency 3 times that of the fundamental. For example, if our fundamental frequency is 55 Hz, the 2nd harmonic has a frequency of 2 times the first, or 110 Hz. And the 3rd harmonic has a frequency of 3 times the first, or 165 Hz.

There's more to it than just this, of course. A sound's timbre is determined not just by the presence of overtones, but specifically which overtones are present, how loud each overtone is in relationship to the fundamental, and how each overtone changes over time (does it swell in volume, does it decay abruptly, does it go flat in pitch, etc.). Fortunately we won't need to understand the specifics of how to add overtones together to create sounds (a process known as "additive synthesis," discussed momentarily), because many of the complex waves containing complex series of overtones are already contained onboard the SQ-1 in wavedata ROM. But it will be helpful to understand the theory.

Additive Synthesis And The Sine Wave

The simplest waveform is the sine wave; it has, theoretically, no overtones at all—just a fundamental frequency. It has a very pure sound—like a mellow flute or whistle. There's a couple of nifty tricks we can do with sine waves, but first we'll need to create a simple program in the SQ-1. We can think of this as an "Initialization Program"—it will have most of the basic parameters that we'll be dealing with initialized to straightforward values. This should give us a good mutual basis from which to do some experimentation. So let's create our "Init" program.

First, select ROM program #34 on the SQ-1—it's called "Organ 4." Press the [Edit Sound] button, and you should find yourself at the "Edit Voice=" page. If not, press the bank 0 button and, if necessary, scroll until you reach this page. Continue scrolling until the voice that's showing (probably "Voice 1") begins flashing, and change this to read "Edit Voice=ALL" (using the slider or up button). The lower line of the display should be showing all three voices on showing that they are all active and selected for editing.

Press the "Pitch" button (the bank 1 button) and scroll if necessary until the value next to "Oct=" begins flashing. While I said that we could use the data slider to accomplish the octave change, I didn't mention using the up/down arrow buttons. The reason for this is that when you are editing a group of voices at one time as we are here, moving the data slider will set the value for the current parameter to the same thing for all voices before affecting any change. In other words, if you have two voices tuned an octave apart—say, one at '+1' octave and one at '+2' octaves, moving the slider will set them both to the same octave before changing the octave. You'll end up with both voices at '+3', or '-2', or whatever value you settle on. If, however, you use the up/down buttons to change values, both values will be incremented/decremented the same amount. Using the previous example, we'd end up with our voices tuned to '+2' and '+3', or '-1' and '+0'. They'd be tuned higher or lower, but they'd still have the same relationship to each other—they'd still be an octave apart. Since what we're after here is to get all three voices tuned to the same octave ('+0' in this case) we need to use the data slider.

At any rate, what we have accomplished so far is to set all three voices to the same octave. Next, scroll once to the right to select the "Semi=XX" parameter and use the short-cut (pressing the up and down buttons simultaneously) to set its value to '0'. I know this might seem strange, as the value showing is already set to '0', but remember—you're only seeing the value set for one of the three voices and we want to make sure that all three voices are set to '0'. And for the same reason, our next move is to scroll once more to the right to select the "Fine=XX" parameter and use the short-cut to set its value to '0' as well.

Next, we'll want to move to the filter menu, so press the "Filter" button (the bank 4 button), and if you're not already there, scroll to the filter mode page—this is the page that shows "Filter 1=XX" on the upper line of the display, and "Filter 2=XX" on the lower line. Use the data slider to change values here until the display shows "Filter 1=3LoPass Filter 2=1LoPass." Do this even if the display is showing these values already—remember, we're only seeing values for one of the three voices, and we want to make sure that they're all set to the same thing. Now scroll to the right until you see "FC1=XX" in the upper line of the display. Set the value here to '127'—all the way up. Continue to scroll to the right until you reach the page showing "FC2=XX" on the upper line and set this value to '127' as well.

Next, we'll want to move to the "Output" menu—press the bank 7 button. Scroll to the page that shows "Vol=XX Boost=XX" on the upper line of the display. Select the volume parameter and set it to a value of '75'—the display should show "Vol=75."

Finally, let's return to the "Wave" menu—press the bank 1 button. We should still be at the "Edit Voice=XX" page, so scroll to the right until you reach the "Wave=XX" page. The display should be showing "Wave=WAVEFORM" on the top line, and either "ORGAN VARIATION," "PIPE ORGAN," or "BRASS ORGAN" on the bottom line. Scroll to the bottom line to select it for editing (it should begin flashing) and use the data slider to set it to "SINE."

At this point, we should have all three voices set to play sine waves, with plain vanilla settings for the synthesizer processing functions (other than the effects processing, which we have left unchanged from the original organ program) and all tuned to the same octave. Listen to the sound—fairly boring, right? Not to worry, though. We'll be doing some fairly interesting things using this sound as a starting point. For now, name this sound "INIT" and save it to memory somewhere.

Now play the lowest "A" on the SQ-1 keyboard—it will produce a sine wave with a frequency of 55 Hz. This is one octave higher than the lowest note on the piano keyboard. To hear a sine wave at the frequency of 27.5 Hz, simply move to the "Pitch" menu (press the bank 1 button), select "Oct=XX," and hit the down button once, so the value reads "Oct=-1." The lowest "A" on the keyboard is now playing a pitch of 27.5 Hz—pretty low, eh?

Anyway, the sine wave is important in that we can think of complex waves as being combinations of sine waves, each at a different frequency and amplitude (volume). If most of the sine waves within a complex wave are harmonically related, we'll hear that particular wave as having a specific pitch and timbre. If most of the sine waves contained within the waveform are not

harmonically related, we'll hear the wave as being unpitched. Let's try an experiment.

Set the "Oct=XX" parameter to a value of '+0'. This will reset all voices to the '+0' octave. Now move to the "Wave" menu, and scroll to the "Edit Voice=XX" page. Select voice 2 for editing—that is, scroll until the word "ALL" on the "Edit Voice=XX" page is flashing, and hit the down button twice. The display should be showing "Edit Voice=VOICE2." Now move to the "Pitch" menu and increase the value of the octave parameter by one. Play a note. The sound you hear doesn't appear to be any higher in pitch; rather, it seems to have gotten brighter. When you're dealing with very basic waves you tend to hear the upper pitches as harmonics of the fundamental frequency rather than as separate pitches. This is particularly the case when the upper frequencies are harmonically related to the fundamental, as is the case here—we have tuned voice 2 to the frequency of the the second harmonic—an octave above voice 1. Now let's go a step further.

Head back to the "Wave" menu, and select "VOICE 1" as the "Edit Voice." Now return to the "Pitch" menu. Let's set the pitch of voice 3 to a higher pitch than either voice 1 or voice 2, but keep voice 3 harmonically related. Try setting it to "Oct=+1" and "Semi=+07" ("Semi" stands for "semitone." A semitone represents a pitch change of a single half-step—the distance between two adjacent keys on a piano keyboard). This tunes voice three one octave and 7 semitones (an octave and a fifth) above the pitch of voice 1. You will notice, if you play the keyboard of the SQ-1, that the sound is now brighter yet—and you still don't hear the the voices as producing three separate pitches.

This process of adding sine waves together forms the basis of a kind of synthesis known as additive synthesis—literally adding simple tones together to create more complex ones. Of course in the real world, there's a lot more to an acoustic sound than the three simple overtones we've worked with here. A complex timbre, such as that from a guitar or a violin, can be made up of hundreds of these overtones, each one swelling and decaying individually. To recreate these sounds using additive techniques, we'd need tens, if not hundreds, of sine waves, each dynamically controllable, as well as a rather thorough knowledge of acoustic sound theory. Even if we layer three sounds together on the SQ-1, we come up with a paltry nine sine waves to use for sound creation. Not enough for serious additive synthesis when taken by themselves, the sine waves are generally more helpful for adding sparkle or meat to an already complex SQ-1 sound.

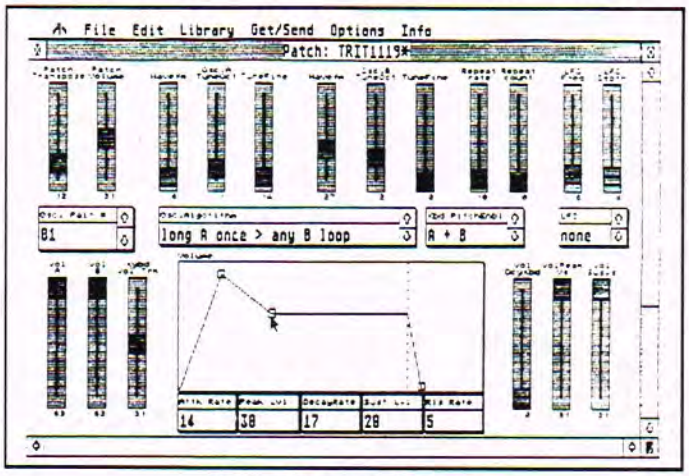
The SQ-1, however, provides another method for creating complex, musically satisfying textures. Stuffed into the memory chips of the SQ-1 are a total of 121 waves—some of these are simple waves, like the sine wave we've been working with, but many are very complex waves indeed, including the Transwaves, which can change harmonic character dynamically, and a number of sampled waves, including string, brass, reed, bass and percussion waves. This selection makes it easy to create beautiful and striking sounds on the SQ-1 without having to suffer the tedium of additive synthesis. So stay tuned—we're just starting to get to the good stuff. ■

Editor/Librarian Profile for Dr. T's XOR

Doug Szlompek

I guess I'm one of those people that the editors of technical music magazines keep whining about. That's because I just don't feel the need to buy any new synthesizers. I know my Mirage is considered to be 8-bit scum by those with golden ears, but with a little aural excitation and reverb, as well as my 8-output modification (from Chris Brandin, which allows for separate processing of each voice), it sounds just fine to me. With Soundprocess running it even plays the latest fad sounds. Besides, I've invested so much techno-time in learning the language of my machinery that I want some payback.

When I traded in my old Alpha Syntauri (an Apple II based, wavetable synth system) for a new Mirage, about 5 years ago, I was ecstatic; my dreams had come true. Compared to what was affordable before, this was a real breakthrough. Since I picked up the Apple II editor software at the same time, the limitations of the Mirage's 2 digit display never really hit home. This changed, however, after I acquired Soundprocess. Initially, my enthusiasm for the Mirage as the universal synthesizer was renewed. What more could one ask for? Now that sample-table synthesis had become the rage (Roland D series, Korg M1, etc.), my trusty Mirage could do this as well. My enthusiasm tempered a bit when I began to actually create new sounds. The tedium involved in editing parameters using the Mirage's primitive interface was unacceptable and not fun. I'd rather spend my time playing music. Thankfully, Bob Spencer was more patient than I and produced quite a nice library for the instrument. I always felt the need for an editor, though, and I began writing one from scratch. But this proved to be far too much work and fell by the wayside. Then came Dr.T's XOR-universal editor/librarian program. XOR (system eXclusive



Patch edit screen (partial).

ORchestrator) is basically one shell program under which multiple editor/librarian "profiles" run. Profiles for each individual synth are programmed using a language called EOR. This marvelous, assembly-like language is a sys-ex hacker's dream, but that is another article. Because of the complete sys-ex documentation at the end of the Soundprocess manual, creating an XOR profile was relatively straightforward for a technoid like myself.

This profile is a full featured editor/librarian, allowing on-screen editing of all Soundprocess parameters. Wavesamples and single page waves can be moved from bank to bank or within a bank by dragging with the mouse. Programs in a bank can be listed on the screen and clicked on for instant playback with the mouse.

The profile is divided into 5 data modes: program, patch, small wavesample (16 page), large wavesample (32 page) and wave (1 page). All 5 are needed to make up a sound bank. Each mode has its own editing screens and library. In Dr.T's XOR, sliders are used to set variable numerical values, scrolling textboxes contain other types of changeable data and, of course, envelopes control those parameters which might be better visualized when displayed along a time axis. The program mode assigns patches to keyboard split configurations (called programs by Soundprocess) and assigns programs to channels for multi-mode (MIDI mode #4). Patch mode is for manipulating and configuring the various parameters of each patch, ie., volume, filter envelopes, pitch, waveform types, etc. The three waveform screens are mostly used to move the "wavesamples" and "waves" from bank to bank or from/to the Mirage or the library. The single page "wave" edit screen has the additional function of harmonic wave creation, which I'll get to in a minute. In each of the 5 modes, the various patches, waveforms or whatever can be configured into banks which can be either stored on computer disk or sent to/from the Mirage. Additionally they can be stored in a library along with some descriptive words ("percussive," "spacy," etc.). The library can sort its entries alphabetically, as well as by these descriptive words. There is space within a Soundprocess patch's data area for an 8 character title. This is the only title which can be sent back to the Mirage and saved on its sound disks. Names for programs, banks, wavesamples and waves may be added and stored in XOR only. These names may be up to 16 characters long. In many cases, if you are using sounds programmed by Bob Spencer or the Triton disks, they have already thought up a title for the bank, program or wave. It is probably logical to use these whenever possible. (Actually, I find that dreaming up a name is oftentimes more difficult than designing a sound.)

My favorite feature is the harmonic wave create screen. The ability of Soundprocess to be a rudimentary additive synthesizer always seemed to have a lot of potential, but I was usually thwarted by the Mirage's user interface. Well now it comes alive! The 10 harmonic level sliders, lined up alongside each other, give a nice graphical representation of the desired frequency spectrum. Move the various sliders with the mouse, click on "calculate wave" and in 1/2 second the sound can be heard by pressing the right mouse button or played on the Mirage. Trying to find the desired sound is usually done by trial and error. Lower harmonics tend to give mellower textures, while higher fundamentals produce bell-like timbres. Of course, set-up of the patch's filters, etc. are vital to complete the sound. This really is a simplistic additive synthesizer in that there are no provisions for pitch envelopes nor envelopes on each of the individual harmonics. It is the changing of a sound's timbre over time that usually makes it distinctive. In Soundprocess, we can do this by stacking different patch waveforms and delaying their volume envelopes so that one sound blends into another. Of course, the filter envelope plays a major role here, as well. The limitation of only 10 harmonics does not seem to be as severe as the absence of individual harmonic envelopes. Additional games can be played with the patch's waveform octave setting, effectively increasing the upper harmonic numbers. One other feature of this screen can produce plenty of movement and some really wild sounds. The Soundprocess sys-ex protocol allows manipulation of the LFO table. I probably cheated when I did this, but I noticed that file size for a 1 page wave was the same as the LFO table and so I added the provision to treat the LFO as a wave. By sending a wave to the LFO in the Mirage, crazy pitch modulation is possible. I have obtained some magical and possibly musically useful sounds by playing around with this. God bless Mark Cecys for giving us these simple synthesis tools.

There are various levels on which this profile can be used. In its simplest, the librarian and bank store features of XOR can be ignored. After all, Soundprocess is based around memory consuming wavesamples. A full sound bank takes about 100K bytes. If you have a hard drive or don't mind segmenting your banks and library on multiple floppies then it is possible to use the computer as your library. This is necessary, to make use of the titling features. However, there is an additional trade-off, time. Transferring these big wavesample banks via MIDI often takes minutes and several types of data must be "send bank"ed to complete a Soundprocess sound bank. So, you may just want to get the appropriate data types from the Mirage, manipulate them and return them for storage on a Soundprocess sound disk.

The Triton Soundprocess "System Disk" must be first booted in order to enable sys-ex communication. The operating system present on some of Bob Spencer's sound disks does not do sys-ex., but you may load his sound banks in after the "System Disk" boot.

This profile is available free to registered XOR users and is presently located in the "User Upload" area of the DR.T section on the MUB-BBS (Mac users at Berklee 617-739-2366). Although I programmed this profile for use on my Atari ST, XOR profiles are also allegedly compatible with the IBM and other future XOR versions

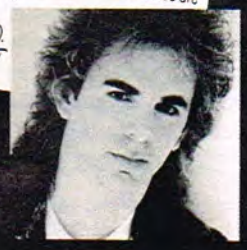
I have spent considerable time programming and testing this profile. It has been a labor of love, a relatively small contribution to the substantial group of aftermarket enhancements for the beloved Mirage. Perhaps it is a bit of payback for the many hours of joy made possible by people like Mark Cecys, Dick Lord, Bob Spencer, Chris Brandin, the Transoniq Hacker staff and the many others who have helped make the Mirage the unique tool it is. ■

[Ed. – XOR runs around $300 at local music dealers and is currently available for the IBM and Atari ST. Mac & Amiga soon to follow.]

Bio: Doug Szlompek, a.k.a. "Sinehead Doug," is a musical technoid who tries to strike a balance between creating music and "pin-heading" around with the hardware. He makes his living as an electronic engineer working in the computer graphics department at NBC News.

Voice Crystal™

Jonathan Cain of The Babies, Journey & Bad English Album: "Bad English" (Epic)
"Analog, Digital, to Special Effect; if you're looking for any sound Voice Crystal has them. Just listen to our #1 Bad English Album, Voice Crystal sounds are all over it."



Keith Emerson
Emerson, Lake & Palmer and "3"
Album: "To the Power of 3" (Geffen)
"Pioneering (the first portable?) Moog Synthesizer console in '69 proved a demanding feat. Towering to 7 feet, a ladder was sometimes necessary to change patchcords. It also weighed approx. 1 ton. The road crew hated me.
I now carry a Voice Crystal in my top pocket, got rid of the ladder, and my road crew loves me."
Cheers,

Russ Freeman
The Rippingtons
"A lot of sounds out there are interesting, but the bottom line is; can you make records with them. With Voice Crystal cartridges you can. I'll definitely be featuring some of the sounds on our next GRP Rippingtons Album, 'Welcome to the St. James Club.' Thanks for making synth programming easier!"

Rob Mullins
Album: "Tokyo Nights"
"Voice Crystals give the musician the best sounds for both the live and studio situations. It is simply the best sound library on the market."

Jan Hammer
Miami Vice TV Show and many Movie sound tracks.
"I use Voice Crystal patches because they are the most musical in their character. They fit my ideas like a glove."

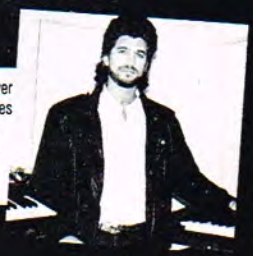
John Lawry
Keyboards for Petra
Album: "Beyond Belief" (Word)
Solo Album: "Media Alert" (Word)
"Great sounds for the working musician."

Troy Luccketta Drums for Tesla
"I do the drumming for Tesla, but when I write music, I use the Voice Crystal sounds."

Tom Coster, Tom Coster, Jr.
Album: "Did Jah Miss Me!?"
"With touring, studio work, and teaching, there just isn't time for programming, so I rely heavily on outside sources for sounds. Voice Crystal provides me with the sounds I need. The sounds are musical, contemporary and available for all my keyboards. Voice Crystal has truly become a powerful 'voice' for my music."
formerly of Santana

Larry Oakes Keyboardist/Guitar for 1988 Foreigner Tour and 1989 Bad Company Tour and Gold Album: "Dangerous Age" Lou Gramm
"Voice Crystal sounds are fat and meaty, just the way I like 'em. Whether duplicating or originating their superior quality is always inspiring."

Marc LeBrun Keyboardist/LA Session Player on Tour with Diane Schuur & Tom Jones
"Whether I'm playing in the studio or live on stage Voice Crystal makes my keyboards sound great!"



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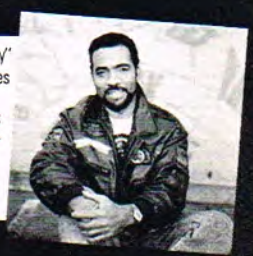
Gene Sisk Keyboardist for "Eddie Rabbitt" Country Western artist; #1 Country Western Album on Billboard Charts (Capitol Records)
"Voice Crystal has the sounds I want to hear, and the sounds I want to create."

Kevin Gilbert Keyboardist for Giraffe
1988 Yamaha Sound Check Winner
"Having a vast library of sounds this good allows me to focus on my songs."

Bobby Lyle Album: "The Journey"
"The new Voice Crystal cartridges give me a whole new array of dynamic sounds to color my music with. I'm looking forward to making them an intergral part of my sound for the 90's."



Steve Reid Producer/CBS Records
The Rippingtons and Super Tramp
"One of the most demanding things about producing is finding the right new sounds for each project. With Voice Crystals I've found an endless variety of fresh sound for my synths and samplers. Keep it up guys!"

Mark Stich
Keyboardist for Angela Bofill
Album: "Angela Bofill/Intuition" (Capitol)
"I was given only a few weeks to prepare for the 1989 Good Friends National Tour. With no time for programming my own sounds, I turned to Eye & I Productions and Voice Crystal sounds. From Fat Analog sounds to complex Digital Timbres Voice Crystal really came through for me. Thanks Guys."

Terry Wollman Music Director for The Byron Allen Show Nationally Syndicated, NBC, CBS, ABC TV
"Working with Voice Crystal gives me a spectrum of sounds to choose from and leaves me free to compose and play music."

Freddie Ravel
Keyboardist for Sergio Mendez & RAVE'L
Album: "Midnight Passion" (Polydor)
"I use Voice Crystal because they bring new life to my synthesizers and samplers."
Album release Jan. '91

PROGRAMMERS • MARK WIENS • MICHAEL ABOWD • COSMO WATTS • CRAIG LEWIS • PAUL CUNNINGHAM • DAVE GOULD • KEVIN GILBERT • LLOYD TRAMMELL • JAMES NEWMAN • PHILLIP MEDLEY • SCOTT HARRIS • JOHN GREENLAND • JOHN BECHDEL • ROB MULLINS • DAVID SPARKS • PHIL LEWIS

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The ESQ1 Sequencer Internals Revealed– Part 5 (Performance Data)

Joe Slater

Hello again! We continue this series of articles by finishing the discussion on the format of the one sequence MIDI dump data from the ESQ1 sequencer. For the most part, the information given should also apply to the SQ-80 sequencer (but I don't have one of those). WARNING: The accuracy of the information revealed here has not been confirmed by Ensoniq, so be forewarned!

The previous article described the performance data format of the one sequence dump. Knowing the format and using a computer program, we can do many things to this data that the ESQ1 cannot. First let's look at an artificial musical but realistic sequence. Here's an 8-bar 4/4 sequence dump of the performance data:

Hex Data	Time	Interpretation
F5 01	1.1.-1	Delay 1 Tick
27 A0 00	1.1.00	Track 1 Note C4 ON Vel=82 Len=0
18	1.1.00	Delay 24 Ticks
7F 00	1.2.00	Track 1 Note C4 OFF
F5 A7	1.2.00	Delay 167 Ticks
F5 60	2.4.23	Delay 96 Ticks
F5 60	3.4.23	Delay 96 Ticks
F5 60	4.4.23	Delay 96 Ticks
F5 60	5.4.23	Delay 96 Ticks
F5 60	6.4.23	Delay 96 Ticks
F5 60	7.4.23	Delay 96 Ticks
F3	8.4.23	END

The above sequence was created by playing Middle C for 6 beats on track 1 for 2 bars. Then STEP EDIT with track 1, PUNCH IN at [1.2.0] was performed. Then EDIT SEQ, ADD 6 bars at bar 3 was performed. We now have an 8-bar sequence with track 1 playing a Middle C quarter note at the beginning. A functionally equivalent sequence could be:

Hex Data	Time	Interpretation
F5 01	1.1.-1	Delay 1 Tick
27 A0 98	1.1.00	Track 1 Note C4 ON Vel=82 Len=24
F4 02 FF	1.1.00	Delay 767 Ticks
F3	8.4.23	END

As we can see, there is much clean-up (i.e., compression) that could be performed. In all fairness, delay compressions are sometimes performed with some ESQ1 edit functions, such as QUANTIZE. But I know of no edit function that can produce the above "cleaned" shortest possible version. So we see one possible programming exercise is to compress the sequence, freeing ESQ1 memory for other purposes.

When I was confined to using the ESQ1 sequencer, a personal problem I had was creating a legato solo (monophonic) track using a polyphonic patch and the QUANTIZE function. Consider the following 1-bar 4/4 sequence dump of the performance data:

Hex Data	Time	Interpretation
F5 01	1.1.-1	Delay 1 Tick
27 A0 19	1.1.00	Track 1 Note C4 ON Vel=82 Len=25
1A	1.1.00	Delay 26 Ticks Implied (F5h)
29 A0 19	1.2.02	Track 1 Note D4 ON Vel=82 Len=25
1A	1.2.02	Delay 26 Ticks Implied (F5h)
2B A0 19	1.3.04	Track 1 Note E4 ON Vel=82 Len=25
1A	1.3.04	Delay 26 Ticks Implied (F5h)
2C A0 11	1.4.06	Track 1 Note F4 ON Vel=82 Len=17
11	1.4.06	Delay 17 Ticks Implied (F5h)
F3	1.4.23	END

The intent was to play four legato quarter notes, middle C, D, E, and F. However, the latter notes are consistently late on the beat. But the track is monophonic, in that no two notes are playing at the same time. But wait! I can use the QUANTIZE 1/4 function to perfect this track! This produces the following:

Hex Data	Time	Interpretation
F5 01	1.1.-1	Delay 1 Tick
27 A0 19	1.1.00	Track 1 Note C4 ON Vel=82 Len=25
18	1.1.00	Delay 24 Ticks Implied (F5h)
29 A0 19	1.2.00	Track 1 Note D4 ON Vel=82 Len=25
18	1.2.00	Delay 24 Ticks Implied (F5h)
2B A0 19	1.3.00	Track 1 Note E4 ON Vel=82 Len=25
18	1.3.00	Delay 24 Ticks Implied (F5h)
2C A0 11	1.4.00	Track 1 Note F4 ON Vel=82 Len=17
17	1.4.00	Delay 23 Ticks Implied (F5h)
F3	1.4.23	END

There! Now the notes are precisely on the beat. But something's wrong here. The track is no longer monophonic! If I were to record 7 sustaining notes on the other track(s), one note would undoubtedly end prematurely (Voice Stealing). So yet another programming exercise is to alter Note OFF times to ensure monophonic tracks. Or maybe I should just practice my scales more often...

The list goes on: selective controller removal (remove Pitch Bend but leave Mod Wheel), controller conversions (change CV Pedal to Volume), smooth controller insertion (fade out with gradual Volume decay), Note ON Velocity scaling/conformance (soften that one loud note), Note ON Duration scaling/conformance (make all notes more staccato), selective simultaneous event ordering (see article #4), translating to and from standard MIDI files, etc. In short, most things that can be done with PC product sequencers can be done with this data, short of the ESQ1 sequencer limitations.

I have read in the Hacker one suggestion about using the ESQ1 sequencer in a recording studio, even if you use a PC sequencer at home. The suggestion was to use the PC sequencer to play your tunes and record it in the ESQ1 sequencer and then you

don't have to lug that PC to the studio. All you need is your ESQ1 (and other synths). At first it seems like a good idea, but only if the ESQ1 sequencer limitations don't effect your tunes.

These limitations based on data values we have discussed are: 1) scaled down Pitch Bend amounts, and the possible anomaly of full extension for other MIDI equipment; 2) scaled down Note ON velocities and the loss of Note OFF velocities; 3) tempo range of 25..250; 4) MIDI note range of 21..108; and 4) at most 6 different MIDI Controller messages: 1, 4, 6, 7, 64, and any other (0..95).

It may not seem so, but I am fully appreciative of Ensoniq for the ESQ1. Considering its functionality and price tag, it was a bargain. More importantly, as my first synthesizer it opened up new horizons for my composition skills. That alone makes it invaluable (can anyone relate?). But using the sequencer as a master and for the recording studio demands evaluation based on these limitations.

The next articles will examine the all sequence MIDI dump. In closing this article, the following is sample code (Turbo C for the IBM PC) used to display the performance data of a one sequence MIDI dump:

```
typedef struct {
   unsigned int Note     : 8;
   unsigned int Track    : 3;
   unsigned int Velocity : 5;
   unsigned int Duration : 7;
   unsigned int Event    : 1;
   unsigned int Ticks    : 8;
} EventNoteON;

typedef struct {
   unsigned int Note   : 8;
   unsigned int Track  : 3;
   unsigned int        : 4;
   unsigned int AftTch : 1;
   unsigned int Value  : 7;
   unsigned int        : 1;
} EventNoteOFFAFT;

typedef struct {
   unsigned int Track : 3;
   unsigned int Ctrl  : 5;
   unsigned int Value : 7;
   unsigned int       : 1;
} EventCtrl;

typedef struct {
   unsigned int F1h : 8;
   unsigned int Off64QHiLo;
} Event64Q;

typedef struct {
   unsigned int F4h : 8;
   unsigned int TicksHiLo;
} EventDelayLong;

typedef struct {
   unsigned int F5h   : 8;
   unsigned int Ticks : 8;
} EventDelayShort;

typedef struct {
   unsigned int Beats : 8;
   unsigned int Beat1 : 8;
} TimeSignature;

const TimeSignature TimeSignatures [31] = {
   {1,  8}, {1,  4}, {2,  8}, {3,  8}, {2,  4}, {4,  8},
   {5,  8}, {3,  4}, {6,  8}, {7,  8}, {4,  4}, {8,  8},
   {9,  8}, {5,  4}, {10, 8}, {11, 8}, {6,  4}, {12, 8},
   {13, 8}, {7,  4}, {14, 8}, {15, 8}, {8,  4}, {16, 8},
   {17, 8}, {9,  4}, {18, 8}, {19, 8}, {10, 4}, {20, 8},
   {21, 8}
};

const char *CtrlEvents [8] = {
   "Pitch Bend"         ,
   "Sustain Pedal"      ,
   "Modulation Wheel"   ,
   "CV Pedal"           ,
   "XCTRL"              ,
   "Channel Aftertouch" ,
   "Volume"             ,
   "Data Entry MSB"
};

static int Bar, Beat, Tick, Beats, Ticks;

void ShowClock (void) {
   printf ("[%03d.%02d.%02d]  ", Bar, Beat, Tick);
}

void UpdateClock (int AddTicks) {
   if ((Tick += AddTicks) >= Ticks) {
      if ((Beat += (Tick / Ticks) - 1) >= Beats) {
         Bar  += (Beat / Beats);
         Beat %= Beats;
      }
      Beat++;
      Tick %= Ticks;
   }
}

void ShowPerformanceData (Sequence *Seq) {

   unsigned int   Size;
   unsigned int   Ctrl;
   unsigned int   Value;
   unsigned char *Data = Seq->Data;

   Bar   = 1;
   Beat  = 1;
   Tick  = -1;
   Beats =      TimeSignatures [Seq->Hdr.Time].Beats;
   Ticks = 96 / TimeSignatures [Seq->Hdr.Time].Beat1;

   for (;;) {

      if (*Data < 0x58) {
         Size = sizeof (EventNoteON) - 1;
         ShowClock ();
         printf ("Track %u MIDI Note %03u ON Vel=%03u Len=%03u\n" ,
                  ((EventNoteON *) Data)->Track + 1               ,
                  ((EventNoteON *) Data)->Note + 21               ,
                 (((EventNoteON *) Data)->Velocity * 4) + 2       ,
                  ((EventNoteON *) Data)->Duration);
         if (!((EventNoteON *) Data)->Event) {
            Size++;
            Value = ((EventNoteON *) Data)->Ticks;
            ShowClock ();
            printf ("Delay %u Ticks Implied (F5h)\n", Value);
            UpdateClock (Value);
         }
      }

      else if (*Data < 0xB0) {
         Size = sizeof (EventNoteOFFAFT) - 1;
         ShowClock ();
         printf ("Track %u MIDI Note %03u "              ,
                 ((EventNoteOFFAFT *) Data)->Track + 1 ,
                 ((EventNoteOFFAFT *) Data)->Note - 0x58 + 21);
         if (((EventNoteOFFAFT *) Data)->AftTch) {
            Size++;
            printf ("Aftertouch %03u\n",
                     ((EventNoteOFFAFT *) Data)->Value);
         }
         else
            puts ("OFF");
      }

      else if (*Data < 0xF0) {
         Size = sizeof (EventCtrl);
         ShowClock ();
         Ctrl  = ((EventCtrl *) Data)->Ctrl - 22;
         Value = ((EventCtrl *) Data)->Value;
         if (Ctrl == 0) Value *= 128;
         printf ("Track %u %s %u\n"              ,
                 ((EventCtrl *) Data)->Track + 1 ,
                 CtrlEvents [Ctrl]               ,
                 Value);
      }

      else if (*Data == 0xF1) {
         Size = sizeof (Event64Q);
         ShowClock ();
         printf ("64-Quarter Note Mark Next Offset=%u\n",
```

```
                RevBytes (((Event64Q *) Data)->Off64QHiLo));
        }

        else if (*Data == 0xF3) {
           ShowClock ();
           puts ("END");
           return;
        }

        else if (*Data == 0xF4) {
           Size  = sizeof (EventDelayLong);
           Value = RevBytes (((EventDelayLong *) Data)->TicksHiLo);
           ShowClock ();
           printf ("Delay %u Ticks\n", Value);
           UpdateClock (Value);
        }

        else if (*Data == 0xF5) {
           Size  = sizeof (EventDelayShort);
           Value = ((EventDelayShort *) Data)->Ticks;
           ShowClock ();
           printf ("Delay %u Ticks\n", Value);
           UpdateClock (Value);
        }

        else {
           ShowClock ();
           puts ("*** Invalid Sequence Data ***");
           return;
        }

        Data += Size;

     }

  }
```

Bio: Joe is a proud owner of an ESQ1 (and other related unmentionables). He has been a professional software engineer for 10 years and a composer/musician for 19 years. The composer/musician side (and long hair) is definitely taking over.

Prosonus Sound Libraries

Rob Feiner

For: EPS, EPS-16 PLUS
Product: CD Sound Libraries
Price: Varies with disk/membership, call for info.
From: Prosonus, 11126 Weddington St, North Hollywood, CA 91601
(800) 999-6191.

Prosonus has truly succeeded in the area of sound marketing. They've spent a lot of money and expended a tremendous amount of time to achieve the goal of being the best. So, how do they sound, you ask? If I say "flawless," would you believe me? If I said "fantastic, clean, accurate and momentous" would you think me mad? At the risk of sounding intimidating, you'd have to be stone cold deaf not to hear and appreciate the care and quality of recording that went into the construction of these libraries.

When you open up this jewel box, the first thing you're confronted with is the detailed information about the instrument you're about to sample. The sounds are so good and so well laid out that you can construct the whole instrument mapped to the keyboard in a very short time. The samples are recorded digitally, in stereo, and move up the scale every two to three notes depending upon the particular instrument and they are sustained, if needed, by just the proper amount. For example, piano notes are held through enough sustain to make looping possible.

Once you have made it past the jacket notes, very important in planning your sampling session, a nice soft female voice guides you through the process, letting you know which note on the CD is next. "G2, Ab2, A2,... and so on, until you have used enough wavesamples to properly construct your finished instrument.

Dynamics are also an integral part of the CD's. Fortissimo, mezzo forte, piano, pianissimo, mute, open, swells, falls glissandi, are a part of the detail, insuring that even amateurs at sampling can get good results. The hard part is fine polishing the wavesamples in your sampler. The looping and crossfade points are always important but these samples that Prosonus has created have made the hardest part (obtaining the sample) easy. All the samples have been played by professional musicians and I'd hate to see their bill for all of those recording sessions and the union musicians.

Prosonus has gone first class all the way and the money you spend on these collections may be well worth the investment. Don't forget, you can record the samples on a multi-track and layer them with another instrument for a whole new sound. With the EPS you can do several layers, electronically.

I really wanted to find some fault with the Prosonus collection and no matter how hard I looked I couldn't. I went through most of their entire collection and they were all dead quiet, NO noise in the samples. I wanted to nit pick and I was deprived.

However you proceed on your quest to create the ultimate in a personalized instruments, feel confident that if you want to sample on your own, Prosonus is a great way to start!! ▬

Bio: Rob has been playing the keys since age five. When he's not composing, he's an engineer with CBS in NYC. He owns and operates CineTunes, a professional 24-track studio. He has been seen on occasion in Grand Central Station with several keyboards strapped to his body, begging for change. Not a pretty sight.

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Creating a Cymbal Roll on the EPS

Steve Vincent

As with many of my MIDI projects, this article began in a different track than it ended in. I was sampling a friend's drum machine and when it came to cymbals, I thought, "Hey, I'm going to sample the crash cymbal backwards (his drum machine would play sounds backwards or forwards) so that I can more easily turn it into a cymbal roll." Getting some clean raw samples was easy, but I ran into real challenges trying to loop the crash cymbal. Even after volume smoothing and other tweaking, there was still a significant "bump" in the loop, due mostly to the change in timbre over the course of the cymbal "decay" (which was not really decay, since the sound was backwards...I suppose it should be called the "yaced"). So, my original article was going to be about how to build an envelope using a calculator, the sample loop point data, and converting it all into seconds. Then we'd use the chart on page 49 of the EPS *Advanced Application Guide* to convert the seconds into envelope "time" parameters to construct a filter envelope that would compensate exactly and precisely for the oscillation between the high and low frequencies during the loop, as well as an amplitude envelope to compensate for the residual amplitude anomalies. The only problem is, it didn't work. It's great on paper, but it didn't smooth out the loop.

I gave up trying to loop my homemade cymbal samples, but I still wanted a cymbal roll. So I dusted off the factory Essential Sound Disk #4 that came with my EPS, loaded Power Drums into memory, and scrubbed for surgery. The following is a step-by-step instruction manual on How To Create A Low Calorie Cymbal Roll. It's easy!

Best to start with a clean slate, so first clear out all instrument memory. Now load Power Drums from the factory Essential Sound Disk #4 into Instrument #1. Once it's loaded, you'll want to copy just the crash cymbal, Wavesample #38, from Layer 1 to a new Instrument. So, first create a new Instrument (COMMAND, INSTRUMENT, CREATE NEW INSTRUMENT, YES). When doing this kind of work, I usually load the original data into Instrument 1 and create a new Instrument 8, just to have plenty of safe distance between the two. On your new UNNAMED INST, create a new Layer 1 (COMMAND, LAYER, CREATE NEW LAYER, YES). Now go back to Power Drums in Instrument 1 and make sure you are editing only the Crash Cymbal: LYR=1, WS=38. Now, copy WS 38 over to your new UNNAMED INSTR: (COMMAND, WAVE, COPY WAVESAMPLE, YES, TO INST=UNNAMED INST (Instrument 8 should be selected), YES, TO LAYER=1, YES. Play note B6; it should be the crash cymbal.

This would be a good time to extend the playing range of the cymbal, so use the Set Keyboard Range button to spread out the sample across the keyboard however far you want it. Use EDIT, PITCH, to change the root key if you want to move the usable range lower on the keyboard. It is a good idea at this point to delete Power Drums in Instrument 1 since you are now finished mooching off its data and its presence in memory trigonometricaly increases the chances of an unfortunate accident (such as editing the wrong Instrument for 45 minutes before catching your mistake.) So get rid of it and once again experience the adrenaline rush of deleting a 1006-block instrument *on purpose*.

I always like to peek at the WAVESAMPLE INFO to see if there are any goodies. On your new UNNAMED INST, make sure you have chosen WS=1 for editing, and hit COMMAND, WAVE, WAVESAMPLE INFO, YES. WS NAME should read "20 CRA-RID." I left this wavesample name intact so that the original source of the data (Ensoniq) will be known to future generations.

Since you'll want to retain the original crash cymbal in Layer 1 unmolested for some uses later on, make a copy of WS 1 to a new Layer. First, create a new Layer 2: COMMAND, LAYER, CREATE NEW LAYER, YES, "LAYER 2 CREATED." Now go back to LYR=1, WS=1, and copy the wave parameters of WS 1 to Layer 2: COMMAND, WAVE, COPY WS, YES, "TO INST=UNNAMED INST," YES, "TO LAYER=2," YES, "COPY PARAMS ONLY," YES ("WS 2 CREATED"). Layer 2, WS 2 will become your cymbal roll.

Okay, time to set up your first patch for Editing. Roll up your sleeves, and hit EDIT, INSTRUMENT, 00 PATCH = -2------. This sets it up so Patch 00 plays only Layer 2. As long as you're Editing the Instrument, scroll to KEYDOWN LAYERS, and set it for -2345678 (in other words, deselect Layer 1 as a KEYDOWN Layer), and set KEYUP LAYERS=1-------. This is for a patch setup later on.

Now we're ready to make this cymbal roll. First of all, we'll get rid of the crash cymbal attack by moving the sample start point to the loop start point. Make sure you're on LYR=2, WS=2, then hit EDIT, WAVE, scroll to LOOP START, which should read 16346 (62). Next, scroll left 2 pages to the SMPL START page, and set it to the same as the loop start point, 16346 (62). Scroll left one more page to make sure that MODE=LOOP BIDIRECTION.

Next you're going to create a new amplitude envelope to simulate a cymbal roll, starting soft and building to a crescendo. Punch EDIT, ENV 3, and take a short digression by changing ENVELOPE from CURRENT VALUE to FULL ON for a moment, and listen to the nice job Ensoniq did looping a cymbal sample—a very difficult task! Change the ENVELOPE parameter back to CURRENT VALUE and set the following parameters: HARDVEL = 30, 40, 60, 90, 99; SOFTVEL = 20, 30, 50, 75, 80; TIMES = 50, 35, 40, 20, 10; 2ND RELEASE=60, LEVEL=+20 (this gives the "kick" on the cymbal at key-up, prior to the decay portion). Set ATTACK TIME VEL to 45 (hitting a key harder will deduct 45 from Time 1,

which effectively shortens Time 1 to 5, giving a quicker attack), KBD TIME SCALING=+0, SOFT VEL CURVE=ON, ENVELOPE MODE=NORMAL. Now play a note, first using soft velocity, then hard velocity, and notice the difference in volume and attack. You can also experiment with key-up velocity for different amounts of "kick" in the crescendo.

You can now easily create a couple of variations of the cymbal roll. First, let's program a patch to give us a cymbal roll with a smooth envelope—no "kick" in the crescendo. Make a copy of Layer 2 (COMMAND, LAYER, COPY LAYER, YES, COPY=PARAMETERS ONLY, YES). You now have a new Layer 3, which is a duplicate of Layer 2. You need to assign the new Layer 3 to a patch in order to tweak it, so EDIT, INSTRUMENT, 0* PATCH = --3-----. Now lock in this patch by pressing the right patch select button and simultaneously pressing the Instrument Select button. Press EDIT, and select LYR=3, WS=3, underlining WS=3. Now tweak the envelope to get rid of the "kick": EDIT, ENV 3, scroll to 2ND RELEASE=60 LEV+20, and change LEV to +0. This patch will now give you a cymbal roll with a smooth decay at key-up.

Another nice patch variation is a cymbal roll with a crash at key-up. This one is easy: just hit EDIT, INSTRUMENT, *0 PATCH = 12------ (this will work only if you dutifully assigned Layer 1 to KEYUP, and deselected Layer 1 from KEYDOWN). Now the left patch select button will give you a crash at the climax of your cymbal roll when you key-up (performance note: You need to hold the key down until you want the crash to come in; since the crash is triggered by key-up, if you press the key and immediately release it, you'll hear the crash prematurely, before much of a crescendo has built up).

Finally, you might as well give yourself a plain crash cymbal, so we'll assign this to Patch **. Hit EDIT, INSTRUMENT, ** PATCH = ---4----. You can't just use the crash in Layer 1, because it's assigned only to KEYUP, so use the COPY LAYER command to make a copy of Layer 1 to a new Layer 4. First, make sure you're editing Layer 1, then hit COMMAND, LAYER, COPY LAYER, YES, COPY PARAMETERS ONLY, YES. Now, whenever you use Patch **, you should get a nice crash cymbal, no frills.

If you've already got enough crash cymbals and are getting a headache, another variation for Patch ** might be a flanged cymbal roll. To set up the Patch, hit EDIT, INSTRUMENT, ** PATCH = -2-4---- (assuming the new layer is Layer 4). Make a copy of Layer 2 (parameters only), then detune your new copied Layer four cents: EDIT, PITCH, then decrement FINE four notches. Presto—instant Top Gun fly-by! Name your new Instrument something creative and save it to floppy.

Now you've got your very own cymbal roll with at least four variations, and you didn't even have to sample or loop anything! Best of all, it only takes up 108 blocks, so it is truly low-cal for a cymbal. Enjoy your cymbal rolls, but *do not* dunk them in your coffee. ■

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Amplitude Modulation and Woodwinds

Kirk Slinkard

I believe that obsolescence does not exist in synthesizers, but only in the minds of some synthesizer players. The ESQs and SQ-80s, even though they may be thought of as older synthesizers, still have plenty of unexplored ummph. They even have some synthesizing power that doesn't exist in the mighty VFX and SQ-1, which can't hard-synchronize an oscillator, get audio-frequency amplitude modulation or resonate a filter. The ESQ even has more oscillators to work with. This article deals with one of these strengths while trying not to get too technical.

Most of us are probably familiar with the weird sweeps and clangorous sounds that are easy to get with A.M. Here we will be combining two sine waves to imitate different woodwind textures by generating specific harmonics. We can do this by controlling what sideband frequencies the A.M. makes. The A.M. available on the ESQ and SQ-80 accepts two inputs—oscillator 1 is the one that modulates and is technically referred to as the "program" signal, and oscillator 2 is the one that gets modulated and is called the "carrier." The output of the A.M. gives three frequencies—the original oscillator 2 (carrier) frequency, the sum frequency of oscillators 1 and 2 (one sideband), and the difference frequency of oscillator 2 minus oscillator 1 (the other sideband). A "balanced modulator" would remove the carrier. In some cases though, the end result has only two frequencies. For example, if the two inputs are at the same frequency, the the difference output would be a frequency of zero and would not be counted as a generated harmonic. This technique can be used to generate not only inharmonic tones like bell sounds, but also harmonic sounds—like woodwinds.

The two experimental patches ("CARIER" and "PROGRM") are alike in that they start with oscillators 1 and 2 both set to sine waves at the same pitch. The filter tracks the oscillators only to remove background noise. The end result is basically just two sine waves one octave apart—a flute tone. Both patches use the mod wheel and the pedal to change the frequency of an oscillator by an octave each. For our purposes here, don't bother with how they sound as the wheel or pedal are in motion, just think of them as octave switches. (If you have no pedal, change the second oscillator modulator from "Pedal" to "Off" for a one-octave change, or to "Wheel" for a two-octave change.) The difference between the patches is that one ("PROGRM") changes the octave of oscillator 1, and the other ("CARIER") changes the octave of oscillator 2. I like to have these two functions in two separate programs so that quick A/B comparisons can be heard.

ESQ-1 PROG: PROGRM — **BY: Kirk Slinkard**

	OCT	SEMI	FINE	WAVE	MOD#1	DEPTH	MOD#2	DEPTH
OSC 1	0	0	0	SINE	WHEEL	+24	PEDAL	+24
OSC 2	0	0	0	SINE	OFF	0	OFF	0
OSC 3	-	-	-	-	-	-	-	-

	LEVEL	OUTPUT	MOD#1	DEPTH	MOD#2	DEPTH
DCA 1	-	OFF	-	-	-	-
DCA 2	-	OFF	-	-	-	-
DCA 3	-	OFF	-	-	-	-

	FREQ	Q	KEYBD	MOD#1	DEPTH	MOD#2	DEPTH
FILTER	0	0	+63	OFF	-	OFF	-

	FINAL VOL	PAN	PAN MOD	DEPTH
DCA 4	63	8	OFF	-

	FREQ	RESET	HUMAN	WAV	L1	DELAY	L2	MOD
LFO 1	-	-	-	-	-	-	-	-
LFO 2	-	-	-	-	-	-	-	-
LFO 3	-	-	-	-	-	-	-	-

	L1	L2	L3	LV	T1V	T1	T2	T3	T4	TK
ENV 1	-	-	-	-	-	-	-	-	-	-
ENV 2	-	-	-	-	-	-	-	-	-	-
ENV 3	-	-	-	-	-	-	-	-	-	-
ENV 4	+63	+63	+63	0	0	10	0	0	10	0

	SYNC	AM	MONO	GLIDE	VC	ENV	OSC	CYC
MODES	OFF	ON	OFF	0	OFF	OFF	ON	OFF

SPLIT/LAYER	S/L PRG	LAYER	L PRG	SPLIT	S PRG	SPLIT KEY
OFF	-	OFF	-	OFF	-	-

ESQ-1 PROG: CARIER — **BY: Kirk Slinkard**

	OCT	SEMI	FINE	WAVE	MOD#1	DEPTH	MOD#2	DEPTH
OSC 1	0	0	0	SINE	OFF	-	OFF	-
OSC 2	0	0	0	SINE	WHEEL	+24	PEDAL	+24
OSC 3	-	-	-	-	-	-	-	-

	LEVEL	OUTPUT	MOD#1	DEPTH	MOD#2	DEPTH
DCA 1	-	OFF	-	-	-	-
DCA 2	-	OFF	-	-	-	-
DCA 3	-	OFF	-	-	-	-

	FREQ	Q	KEYBD	MOD#1	DEPTH	MOD#2	DEPTH
FILTER	0	0	+63	OFF	-	OFF	-

	FINAL VOL	PAN	PAN MOD	DEPTH
DCA 4	63	8	OFF	-

	FREQ	RESET	HUMAN	WAV	L1	DELAY	L2	MOD
LFO 1	-	-	-	-	-	-	-	-
LFO 2	-	-	-	-	-	-	-	-
LFO 3	-	-	-	-	-	-	-	-

	L1	L2	L3	LV	T1V	T1	T2	T3	T4	TK
ENV 1	-	-	-	-	-	-	-	-	-	-
ENV 2	-	-	-	-	-	-	-	-	-	-
ENV 3	-	-	-	-	-	-	-	-	-	-
ENV 4	+63	+63	+63	0	0	10	0	0	10	0

	SYNC	AM	MONO	GLIDE	VC	ENV	OSC	CYC
MODES	OFF	ON	OFF	0	OFF	OFF	ON	OFF

SPLIT/LAYER	S/L PRG	LAYER	L PRG	SPLIT	S PRG	SPLIT KEY
OFF	-	OFF	-	OFF	-	-

ESQ-1 PROG: WOODWD — **BY: Kirk Slinkard**

	OCT	SEMI	FINE	WAVE	MOD#1	DEPTH	MOD#2	DEPTH
OSC 1	+2	0	0	SINE	WHEEL	-48	LFO1	+2
OSC 2	0	0	12	SINE	WHEEL	+48	LFO1	+2
OSC 3	-	-	-	-	-	-	-	-

	LEVEL	OUTPUT	MOD#1	DEPTH	MOD#2	DEPTH
DCA 1	-	OFF	-	-	-	-
DCA 2	-	OFF	-	-	-	-
DCA 3	-	OFF	-	-	-	-

	FREQ	Q	KEYBD	MOD#1	DEPTH	MOD#2	DEPTH
FILTER	0	0	13	ENV4	+37	ENV1	+27

	FINAL VOL	PAN	PAN MOD	DEPTH
DCA 4	63	8	KBD2	+63

	FREQ	RESET	HUMAN	WAV	L1	DELAY	L2	MOD
LFO 1	23	ON	ON	TRI	0	0	0	PRESS
LFO 2	-	-	-	-	-	-	-	-
LFO 3	-	-	-	-	-	-	-	-

	L1	L2	L3	LV	T1V	T1	T2	T3	T4	TK
ENV 1	+63	+63	+63	0	32	22	0	0	16	5
ENV 2	-	-	-	-	-	-	-	-	-	-
ENV 3	-	-	-	-	-	-	-	-	-	-
ENV 4	+63	+63	+63	40(L)	32	22	0	0	41	0

	SYNC	AM	MONO	GLIDE	VC	ENV	OSC	CYC
MODES	OFF	ON	OFF	0	OFF	OFF	ON	OFF

SPLIT/LAYER	S/L PRG	LAYER	L PRG	SPLIT	S PRG	SPLIT KEY
OFF	-	OFF	-	OFF	-	-

Now go to the "PROGRM" patch and move the wheel all the way forward. It now sounds less like a flute and more like a recorder, or something like a heavily filtered square wave. This would indicate that it generated an odd harmonic (remember, a square wave has only odd harmonics). Also, the original fundamental frequency was duplicated in this case. If you want to calculate exactly what the harmonics are, it should be fairly straightforward in these examples. Now move the pedal all the way forward (or change oscillator 1's Mod #2 to "Wheel") and listen to it again. It sounds more like a clarinet here, or a square wave with only a little filtering. This would indicate that the harmonics generated are still odd.

Now go over to the "CARIER" patch. In its unaltered state, it has the same flute sound as the other patch—again two octaves of sine waves. But this time when you move the wheel all the way forward, you get a sound more like a double-reed instrument. Actually, one harmonic was added to the flute tone, and it sounds something like a cross between a flute and a double-reed instrument. Now move the pedal forward (or set oscillator 2's Mod #2 from "Pedal" to "Wheel") and listen again. This time it sounds like a bright, nasally double-reed instrument. In this case, the original fundamental frequency was removed and three harmonics are left.

The "WOODWN" (woodwind) patch is just an example of a finished patch using these techniques. With the mod wheel all the way back, you get the clarinet sound. When you move the wheel all the way forward, you get the double-reed sound. If you can get the wheel exactly in the middle, you can get the flute, but this can be tricky. If you are playing an ESQ, you might want to change LFO 1's mod source to "Pedal" to get vibrato.

So by putting two simple sine waves into the A.M. and just switching the octaves of one or the other, you have come up with a useful variety of basic tones. Of course this is only scratching the surface. You could try other waveforms and other octave combinations. I used just sine waves for these patches because they are easy to calculate and they most dramatically demonstrate this effect.

Anyway, this is just to show that the A.M. on these synthesizers is useful for a lot more than just sound effects, bells, and F.M. piano sounds.

Mod you later. ▬

BACK ISSUES

Back issues are $2.50 each. 5 – 20: $2.00 ea. 21 & up: $1.75 ea. (Overseas: $3 each.) Issues 1-9, 11, 13-23, 27, 29, 30, 36, and 38 are no longer available. Subscriptions will be extended an equal number of issues for any issues ordered that are not available at the time we receive your order. ESQ-1 coverage started with Issue Number 13. SQ-80 coverage started with Number 29, (although most ESQ-1 coverage also applies to the SQ-80). EPS coverage started with Number 30. (But didn't really get going till Number 35.) VFX coverage got started in Number 48. The original VFX patch sheet was published in Issue #55. Permission has been given to photocopy issues that we no longer have available—check the classifieds for people offering them.

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Note: The drives listed below are known to be compatible with the EPS and EPS-16 PLUS *at the time of testing*. Changes in firmware or hardware by drive manufacturers may make later versions incompatible (with the exception of **PS Systems** and **Eltekon** whose drives are configured to work specifically with Ensoniq products). Drives *not* included on this list may also work just fine. For up-to-date information about specific drives call Ensoniq Customer Service: 215-647-3930.

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Hackerpatch

By Sam Mims

Hackerpatch is intended to be a place where patch vendors can show their wares and musicians can share their goodies and impress their friends. Patches designated "ESQ-1" will also work on the SQ-80. The reverse is not always true. Once something's published here, it's free for all. Please don't submit patches that you know to be minor tweaks on copyrighted commercial patches unless you have permission from the copyright owner. All submitted patches are subject to consideration for mutilation and comments by Sam Mims–our resident patch analyst. If you send in a patch, *please* include your phone number. Requests for particular sounds are also very welcome.

ESQ Patch: HANBL2

Cyrus Dinshah, Malaga, NJ

This is one of four handbell variations that I have done; it is not a "tweak" of a factory preset.

The Hack: I like this sound, but decided to tone down the detuning a bit by setting FINE of OSC 3 to 04. The stereo motion added by the mod wheel was nice, but a bit fast for me, so I turned down the FREQuency of LFO 2 to 14. You can get a nice variation of this patch by setting the OCT of OSC 1 to +2. On bell sounds, it's usually possible to set the high oscillator to just about any pitched waveform, and indeed this gives other nice alterations of HANBL2. My favorites for OSC 1 are SINE, SQUARE, EL PNO, ORGAN, SYNTH2, 4 OCTS, PRIME, and OCT+5 (with OCT=+2) and SYNTH2 (with OCT=+1).

SQ-80 Patch: STLGTR

Charles R. Fischer

Here's my try at imitating the pedal steel guitar on the SQ-80. As Sam has already mentioned in this column, the way a musician adds expressive bends and vibrato will have more to do with convincing results than any clever programming tricks could do. If you've worked with country music already, you're probably used to hearing the licks that pedal steel players use. If not, grab a Merle Haggard tape and start practicing. The tuning of OSC 2 has a lot to do with the sound quality of this patch. Because it is being synced to OSC 1, it adds an unwanted grittiness you might hear on some notes. By changing the octave and tuning of OSC 2, you should be able to reduce this grit to a less noticeable level. Be sure to add a volume pedal and dial in some reverb, and be warned that reasonable dexterity with the pitch and mod wheels is demanding here.

The Hack: It's easy to add a volume pedal via Ensoniq's CV pedal, with PEDAL=VOL on the Master page. Or, if you use the CV pedal as a modulator (PEDAL=MOD), it's easy to program it to control the volume of this patch. On all three DCA pages, set MOD #2 to PEDAL, with DEPTH=+63. Then, set the LEVELs of DCAs 1, 2, and 3 to 23, 22, and 00 respectively. If you don't have a CV pedal, use key pressure to control the vibrato (MOD=PRESS on the LFO 1 page), and use the mod wheel to control volume. To do this, leave the DCA LEVELs at their original values, and set all three DCA MODs to WHEEL with DEPTH=-30. This gives a smooth fade-out as the wheel is rolled forward. It's a simple matter to port this over to an ESQ-1, at the expense of the picked attack—simply turn DCA 3 OFF.

Bio: Sam Mims is a studio session player and programmer in Los Angeles, and is keyboardist for Richard Elliot. He owns Syntaur Productions, a company that produces music for film and TV and markets sounds for Ensoniq keyboards.

ESQ-1 PROG: HANBL2 — **BY: Cyrus Dinshah**

	OCT	SEMI	FINE	WAVE	MOD#1	DEPTH	MOD#2	DEPTH
OSC 1	+1	0	0	BELL	LFO1	+1	OFF	0
OSC 2	0	0	7	BELL	LFO2	+1	OFF	0
OSC 3	0	0	12	BELL	LFO3	+1	OFF	0

	LEVEL	OUTPUT	MOD#1	DEPTH	MOD#2	DEPTH
DCA 1	0	ON	ENV2	+63	OFF	0
DCA 2	0	ON	ENV2	+42	OFF	0
DCA 3	0	ON	ENV2	+42	OFF	0

	FREQ	Q	KEYBD	MOD#1	DEPTH	MOD#2	DEPTH
FILTER	127	0	32	OFF	0	OFF	0

	FINAL VOL	PAN	PAN MOD	DEPTH
DCA 4	63	8	LFO2	+54

	FREQ	RESET	HUMAN	WAV	L1	DELAY	L2	MOD
LFO 1	22	ON	ON	TRI	10	0	1	WHEEL
LFO 2	19	ON	ON	TRI	10	0	1	WHEEL
LFO 3	16	ON	ON	TRI	10	0	1	WHEEL

	L1	L2	L3	LV	T1V	T1	T2	T3	T4	TK
ENV 1	0	0	0	0	0	0	0	0	0	0
ENV 2	+63	+60	0	0	0	0	39	43	47	0
ENV 3	0	0	0	0	0	0	0	0	0	0
ENV 4	+61	+53	+43	0	0	0	32	32	50	0

	SYNC	AM	MONO	GLIDE	VC	ENV	OSC	CYC
MODES	OFF	OFF	OFF	0	ON	ON	ON	OFF

SPLIT/LAYER	S/L PRG	LAYER	L PRG	SPLIT	S PRG	SPLIT KEY
OFF	-	OFF	-	OFF	-	-

SQ-80 PROG: STLGTR — **BY: Charles Fischer**

	OCT	SEMI	FINE	WAVE	MOD#1	DEPTH	MOD#2	DEPTH
OSC 1	0	0	0	BASS	LFO1	+2	OFF	-
OSC 2	-2	7	0	FORMT2	LFO1	+2	VEL	+12
OSC 3	0	3	20	PICK1	KYBD2	-63	VELX	+2

	LEVEL	OUTPUT	MOD#1	DEPTH	MOD#2	DEPTH
DCA 1	57	ON	OFF	-	OFF	-
DCA 2	56	ON	VELX	+5	OFF	-
DCA 3	34	ON	VEL	+28	OFF	-

	FREQ	Q	KEYBD	MOD#1	DEPTH	MOD#2	DEPTH
FILTER	27	0	24	ENV3	+36	VEL	+20

	FINAL VOL	PAN	PAN MOD	DEPTH
DCA 4	53	8	OFF	-

	FREQ	RESET	HUMAN	WAV	L1	DELAY	L2	MOD
LFO 1	21	OFF	ON	TRI	0	0	0	WHEEL
LFO 2	-	-	-	-	-	-	-	-
LFO 3	-	-	-	-	-	-	-	-

	L1	L2	L3	LV	T1V	T1	T2	T3	T4	TK
ENV 1	-	-	-	-	-	-	-	-	-	-
ENV 2	-	-	-	-	-	-	-	-	-	-
ENV 3	+63	+42	0	39L	0	0	2	26	16	16
ENV 4	+63	+50	+20	10L	0	0	0	44	26	14

	SYNC	AM	MONO	GLIDE	VC	ENV	OSC	CYC
MODES	ON	OFF	OFF	0	ON	ON	OFF	OFF

SPLIT/LAYER	S/L PRG	LAYER	L PRG	SPLIT	S PRG	SPLIT KEY
OFF	-	OFF	-	OFF	-	-

SQ-1 Hackerpatch

Prog: *By:*

NOTES:

WAVE 1 2 3
- Select Voice
- Wave Class
- Wave
- Delay Time
- Wave Direction
- Start Index
- MODSCR
- MODAMT
- Restrk Decay

PITCH 1 2 3
- Octave
- Semitone
- Fine
- ENV1
- LFO
- MODSCR
- MODAMT
- KBD Ptch Track
- Glide
- Glide Time

ENV1 1 2 3
- Initial
- Peak
- Break
- Sustain
- Attack
- Decay 1
- Decay 2
- Release
- Vel-Level
- Vel-Attack
- Vel Curve
- Mode
- KBD Track

LFO 1 2 3
- LFO Speed
- Noise Rate
- Level
- Delay
- MODSRC
- Wave
- Restart

FILTER 1 2 3
- Filter 1
- Filter 2
- FC1 Cutoff
- ENV 2
- FC1 KBD
- MODSCR
- MODAMT
- FC2 Cutoff
- ENV2
- FC2 KBD
- FC1MOD-FC2

ENV2 1 2 3
- Initial
- Peak
- Break
- Sustain
- Attack
- Decay 1
- Decay 2
- Release
- Vel-Level
- Vel-Attack
- Vel Curve
- Mode
- KBD Track

AMP 1 2 3
- Initial
- Peak
- Break
- Sustain
- Attack
- Decay 1
- Decay 2
- Release
- Vel-Level
- Vel-Attack
- Vel Curve
- Mode
- KBD Track

OUTPUT 1 2 3
- VOL
- Boost
- MODSRC
- MODAMT
- KBD Scale
- Key Range
- Output Bus
- Priority
- Pan
- Vel window

Standard Sound Programming

Effects Programming

CONCERT REVERB
HALL REVERB
ROOM REVERB
WARM CHAMBER
- FX-1
- FX-2
- Decay Time
- Diffusion
- Detune Rate
- Detune Depth
- HF Damping
- HF Bandwidth
- LF Decay
- MOD (Dest)
- BY (MODSRC)
- MODAMT

8-VOICE CHORUS
- FX-1
- FX-2
- Chorus Rate
- Chorus Depth
- Chorus Center
- Feedback
- MOD (Dest)
- BY (MODSRC)
- MODAMT

CHORUS AND REVERB
- FX-1
- FX-2
- Decay time
- HF Damping
- Chorus Rate
- Chorus Depth
- Chorus Center
- Feedback
- Chorus Level
- MOD (Dest)
- BY (MODSRC)
- MODAMT

FLANGER & REVERB 1
FLANGER & REVERB 2
- FX-1
- FX-2
- Decay Time
- HF Damping
- Flange Rate
- Flange Depth
- Flange Center
- Feedback
- Flange Level
- Input Invert
- MOD (Dest)
- BY (MODSRC)
- MODAMT

PHASE SHIFTER
- FX-1
- FX-2
- Phaser Rate
- Phaser Depth
- Phaser Center
- Feedback
- ST Cross Fdbk
- Phaser LevelInput Invert
- MOD (Dest)
- BY (MODSRC)
- MODAMT

PHASER & REVERB
- FX-1
- FX-2
- Decay Time
- HF Damping
- Phaser Rate
- Phaser Depth
- Phaser Center
- Feedback
- Phaser Level
- Input Invert
- MOD (Dest)
- BY (MODSRC)
- MODAMT

ROTERY SPEAKER & VERB
- FX-1
- FX-2
- Decay Time
- HF Damping
- Slow Speed
- Fast Speed
- Roter Center
- Roter Depth
- Speed Mode
- MODSRC

DIST & CHORUS & VERB
- FX-1
- FX-2
- Decay Time
- Dist Level
- Chorus Rate
- Chorus Depth
- Chorus Center
- Feedback
- Chorus Level
- MOD (Dest)
- BY (MODSRC)
- MODAMT

CMPRSS & DIST & VERB
- FX-1
- FX-2
- Decay Time
- HF Damping
- Flange Rate
- Compression
- Dist Level In
- Dist Level Out
- Revb-Cmprss Fdbk
- HiPass Cutoff
- LoPass Cutoff
- MOD (Dest)
- BY (MODSRC)
- MODAMT

Classifieds

USER GROUPS

Ohio EPS & EPS-16 Plus Owners - Starting an Ohio EPS user support group to trade samples, information, and knowledge. This group will meet every 4 to 6 weeks in Columbus, Ohio. For more information please contact Tim Elsey, 1002 S 22nd St., Columbus, OH 43206. Phone: (614) 258-0225.

SAMPLES

Quality EPS orchestral samples. Also M1, D50, Kurzweil and other samples. For demo cassette, sample disk and catalog, send $12 (U.S.) or $14 (Canadian) to Keith Thomas, PO Box 174, Stratford, ONT N5A 6T1 Canada.

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EQUIPMENT

Ensoniq EPS w\2x and 8 output expander $1500. Roland MKB-1000 88 key master controller, with ATA case and stand $900. Cerwin Vega low end cabinets w/ 18's $350. All in excellent condition, call Dave (407) 880-1985.

SQ-80. Perfect condition. Latest model. Many patches: $850. Evenings. 512-328-6105. Brian.

EPS 2X memory expander: $100. (609) 786-3699.

EPS with 4X memory expander and SCSI port. Excellent condition. $1300 (OBO). (609) 786-3699.

EPS with 2X, 4X, and 8-Output expanders. Large library. Excellent condition. Studio use only. $1500. Leave message, 215-926-1620... Anytime!

2X Expander for EPS, $150. Steve Vincent, (206) 565-4701.

EPS 2X expander: $100. Korg DDD-5 drum machine: $225. ARP Odyssey, mint condition, make offer. Eric, 303-938-1028.

10 Free Disc with **Expander** orders. **EPS, EPS-16 PLUS, TX16W.** Best prices. **New EPS "Sampling Made Easy" Video** - 2 hr video, 60 min cassette full of sounds, and 2 disc. Only $39. Wildwood Sounds, 4726 Pebble Creek, Pensacola, FL 32526.

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SQ-80 like new in box, slight home use only. Includes 5 discs, 2000+ patches, 1 EPROM cart., 3 years of the Hacker!, and a new CV pedal. $975. REVOX B-77 10" r-r quality recorder, + a DBX NX-40. Make 90db recordings with no noise! Mint, slight use. $750. Call Roger, (619) 482-2284 (San Diego).

KORG Wavestation. New, truly incredible synthesizer similar to VFX-SD. Costs $2000, asking $1400. Yamaha SY55 keyboard. 5 months old, built-in effects, sequencer: $700. Yamaha RX5 drum machine, awesome! $500. FAX/modem/ Voicemail computer board for PC: $375. Call Mick, (201) 389-2197.

WANTED

Wanted: Ensoniq 4X exp with SCSI for EPS. Send info/data on 4X exp. David Dempsey, 539 W William St., Decatur, IL 62522.

SoundQuest universal editor/librarian Mac, Mac Opcode M3R editor/librarian, MiBAC Jazz. Jeff, (408) 946-6743.

EPS sound effects from popular movies & cartoons needed. Star Trek, Star Wars, etc. Also need helicopter, motorcycle, motorboat, rollercoaster. Also need real spacey meditation type sounds. Thom Taylor, 305 N Main, Nixa, MO 65714. Phone: 417-725-1830.

SOFTWARE

Tired of copy protected software? We patch Mac your software; allows backups, use of mutiple hard drives, archival of key disks. All programs/versions. 100% safe, fast, guaranteed. JMP Design Service, (408) 946-6743.

Vision 1.1 w/docs $150, SQ-80/ESQ-1 Editor/Librarian $45, MasterTracks Pro 4 Mac $150, Alchemy 2.2 w/docs $150, Mac MIDI interface $50. Jeff, (408) 946-6743.

Will trade Leaping Lizards IGUANA program for access to your Mirage library. Prefer Tacoma-Seattle area. Steve Vincent, (206) 565-4701.

"Tsavo Sync Simulator" - a simple program which facilitates control of the Fostex R-8 through Creator/Notator and the Fostex MTC-1 is now "free." ($1.50 for the cost of the disk.) Send SASE to Trey Yancy, 919 East 48 1/2 St., Austin, TX 78751.

Midicaster is still available. The way-cool operating system that turns your Mirage into a very capable System Exclusive data librarian, a 20,000-note sequence player, a disk copier/formatter, and wave-draw synthesizer is still available for a limited time. For more information, or to order, contact the Midi Connection, 9343 SW 3rd, Portland, OR, 97219, phone: (503) 245-3752. And thank you for your support.

PATCHES/SOUNDS

100 free VFX Drum Patterns with **120 VFX-SD** sounds. Satisfaction Guaranteed. $35. Wildwood Sounds, 4726 Pebble Creek, Pensacola, FL 32526.

Soundsource Patchwell - a collection of 40 of the best sounds created for the ESQ-1. These patches were created on this synthesizer over 4 years of recording and playing live. They are patches you can use. For data cassette send $10.00 to Soundsource Patchwell, 17322 Stafford Circle, Yorba Linda, CA 92686 or call (714) 524-0597.

80 NEW SQ-80 SOUNDS! You don't know what your SQ can do until you've heard these sounds! Metallic basses, Oberheims, DXs, booming 808 kick, sounds from the cutting edge! Plus imitations of synths used by Depeche Mode, Genesis, Alphaville, Erasure, Kraftwerk, and the Cure! And if that wasn't enough (and by gosh, don't you think it oughta be?) you also get a huge booklet of programming secrets and tweaking tips allowing you to customize your sounds easily. Send a check for $32.00 to: Tom Shear, Box 388, Day Hall, Mt. Olympus Drive, Syracuse, NY 13210.

I'd like to exchange my sounds for ESQ. I guarantee my programs are higher quality than today's most expensive synths. If your experience with the ESQ is similar, give me a buzz. Yaroslav, 1014 45th St., Suite 3-C, Brooklyn, NY 11219. Phone: (718) 436-1299.

NEW FOR 1991. Volume I for the VFX-SD. 60 sounds, 20 presets, 3 demo sequences and documentation only $40.00. VFX-SD or SQ-80 disk. LATTER SOUND, 307-d Mabry St., Tallahassee, FL 32304. (904) 575-5561.

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SQ-80/ESQ-1 patch library for sale. Original Voice Crystal disks for ESQ/SQ80 $15.00 each. Over 20k patches from Cesium, Patchworks, etc. $10/disk. (408) 946-6743.

Quality samples and patches for your EMAX II, D-70, D-50, Wavestation, M1, DW-8000, DPX-1 keyboards. Available in various formats. Write for free sound list. Reasonable prices. Soundtrax, po box 444, So Lancaster, MA 01561.

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INSTRUCTION/DOCUMENTATION

The EPS Users Guide by Gary Dinsmore is still available. A companion for Ensoniq's own manuals. Price: $20 U.S. Please add shipping & handling: $2 U.S., $6 Canada, $15 Europe, $18 Australia, etc. Send check or money order to: Gary Dinsmore, 1106 51st St. NE, Tacoma, WA 98422 or call (206) 927-6225 for COD costs.

OUT-OF-PRINT BACK ISSUES

M.U.G. will provide Out-of-Print issues for cost of materials and postage. M.U.G. Hotline: 212-465-3430 or write: G-4 Productions, PO Box 615TH, Yonkers, NY 10703. Attn: TH Back Issues. Phone: 212-465-3430.

Photocopies of out-of-print past issues of the Hacker can be obtained by calling Jack Loesch, 201-264-3512 after 6 pm EST.

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HAPPY ANNIVERSARY TO US!

This issue of Transoniq Hacker marks the one year anniversary of Maestro Sounds. We've had a lot of fun, and made a lot of friends, none of which would have been possible without the support of this magazine, and its readers, the ever-loyal Hackers.

In appreciation and celebration, Maestro Sounds is making this one time offer: If you've never contacted us, or if you've contacted us but never purchased anything, cut out this ad and mail it back to us. We'll send you a demo-disk.

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Saraswati says: "Listen." Peace.

The Interface

Letters for The Interface may be sent to any of the following addresses:
U.S. Mail - The Interface, Transoniq Hacker, 1402 SW Upland Dr., Portland, OR 97221
Electronic mail - GEnie Network: TRANSONIQ, CompuServe: 73260,3353, or PAN: TRANSONIQ.
This is probably one of the most open forums in the music industry. Letter writers are asked to please keep the vitriol to a minimum. Readers are reminded to take everything with a grain of salt. Resident answer-man is Clark Salisbury (CS). Letter publication is subject to space considerations.

Dear Hacker,

I recently purchased an **EPS 16 PLUS** and I am having trouble with certain instrument effects. Specifically, when I have a particular instrument selected (e.g., organ) its individual effect (e.g., rotating speakers) takes over all instruments programmed on that sequence, making it difficult for me to continue laying down tracks. Also, the final mix either has everything playing rotating speakers or none at all. I have read over and over again the sections on effects in my manual to no avail. Please help, in plain English, if you can.

Thanks,
R. D. Earle
Columbia, MD

[CS – I agree – the manual is a bit unclear as to the workings of effects in the EPS16+. I think that the important thing to keep in mind is that effects are global – at least at least as far as sequencing is concerned.

There are three effect types in the EPS16+; Instrument, Bank and ROM effects. However, only one effect from one of these categories is available at any one time (in the interest of clarity, we'll consider multi-effects, such as the "Chorus, Reverb + Digital Delay" effect to be "one" effect). The current effect can be changed in a couple of ways. One is by pressing the [Effect Select/Bypass] button, and scrolling through the listing of available effects to find the one you wish to use, whether an instrument effect, bank effect, or ROM effect. If you select a ROM effect ("FX=" set to "ROM XX," with "XX" representing the effect name) or bank effect ("FX=" set to "BANK XX"), the current effect (the one showing in the display) will stay put, unless you manually change it or load a new bank. With "FX=" set to "INST XX," however, selecting an instrument on the EPS-16+ will automatically cause that instrument's effect to be loaded, replacing whatever effect might previously have been active. This is probably what's giving you trouble.

In any case, the effect that's been loaded will be applied to all the instruments/tracks in a sequence. What you will need to do is determine which effect will be most appropriate to all sequence tracks that are to be processed. With multiple instruments, you're often likely to find that the multi-effects are most useful. In a track with bass, drums, and organ, for example, you might want to try using the "Rotary Speaker + Reverb," and perhaps route the organ through bus 1 (rotor and reverb) the drums (except for the kick) through bus 2 (just reverb) and the bass and kick drum through bus 3 (dry). Effect routings for an entire instrument can be controlled from within the sequencer section by pressing "Edit/Track/4," and making the appropriate changes. For trickier routings, you might need to make assignments from within the instrument. With drums, for example, you can select individual wavesamples and control their effects routing from the "OUT=" parameter found in the "Amp" menu.

Once you've chosen an effect to use with your sequence and designed the instrument routings for that effect, you may wish to save the whole she-bang as a bank. You can copy the current effect from "Inst" or "ROM" to the bank by pressing "Cmd/Effect/1," and pressing "Enter" (note that if you have made any edits to ROM effects, such as changing the reverb mix, these effects will automatically be copied to the bank, making this step unnecessary). Once the effect has been moved into the bank it can be saved to disk right along with the rest of the bank. Also, as long as the current effect is a bank effect ("FX=" set to "BANK XX" on the [Effect Select/Bypass] page), selecting instruments on the EPS16+ will not cause their associated effects to be loaded, which should solve your problem.]

Dear TH,

There has been some misunderstanding in the response to my question in TH #64. I'll try to explain it again. When you use the DISC copy function (to copy a whole disk, not one instrument) on the **EPS** you always have to change the disks 2 times. Isn't it possible to change the disk only once when you have the 2X or 4X expander since the internal memory is greater than the information on one disk?

As a reaction to the letter from Mike Shanks in TH #65 I'd like to bring some new ideas regarding the new **EPS 16 PLUS**. Ensoniq's two flagships, the 16 PLUS and the **VFX-SD2** are both very wonderful machines with only one great difference between them; the EPS works with external samples and the VFX with ROM samples. Why not combine them? This isn't even hard to do I figured out. It's already possible to put complete instruments in (EP)ROM (flashbank) in your 16 PLUS. The only thing you have to do is make it possible to to save wavesamples apart. This has enormous advantages.

1. You can use the EPS as a VFX by copying (sampling) all the basic wavesamples in (EP)-ROM.

2. Because the wavesamples are in ROM you don't have to save all the information. Only the parameters and the number for each used ROM-wavesample, so it would only be 4 blocks long.

3. You can use a combination of VFX and EPS by using some layers with ROM-wavesamples information and some layers with new sampled sound.

Don't let me be misunderstood this time! I know that you can do this already but then it takes time (a lot of time). First you have to load several instruments, copy the desired wavesamples to a new instrument and save the WHOLE information again – so actually you have it twice on the same disk.

Sincerely yours,
Patrick Voes
Tongersesteenweg 49
3F30 Hoeselt, Belgium

[CS – I'd also love to be able to save program parameters separately from wave data in the EPS16+. Not only would it help to stretch the usefulness of wave data stored in Flashbank memory, it would be great for sound development work. It would allow one to develop processing templates for common instruments, which would help to cut down development time – one could spend more time sampling and less time tweaking!]

[Ensoniq – The code as it exists now does require you to change the disk twice. We have no current plans to change that function. This would ripple across all EPS products and would necessitate multiple update releases. We will keep it in mind as a part of a future release if we are able to include it along with other updates/fixes.

While we agree that this is a good idea (in theory) you should keep in mind that the VFX has twice the waveform ROM as a 1 Meg EPS Flashbank. And the EPS doesn't allow you to save and retrieve wavesamples by themselves, so this is not a trivial task. Therefore, don't expect to see this feature for the EPS-16 PLUS. We read between the lines as to your desire for a product with both ROM and RAM based waveforms, and agree that it would be a very capable programming environment.]

Dear Sirs,

I own an **ESQ-1** and a **VFX-SD**. I would like to hook them up via MIDI so I can lay down tracks of ESQ-1 sounds on my VFX-SD sequencer, but I'm having difficulty. Could you please assist me with details of the proper set-up procedure. Also, I tried to Sys-Ex dump from my ESQ-1 to my VFX-SD but I keep getting this message: "TARGET SYSTEM NOT RESPONDING," when I try to load it back into the ESQ-1. Help!

Also, I'm having problems in "mixdown" mode for editing sequencer tracks within a song. I followed the directions that the owners manual gives to do this procedure but have failed to mix down either volume or pan levels.

At any rate, I've had my VFX-SD for over a year now and there is still more territory to be explored. The endless possibilities have made this past year a challenge. My compliments to the chef!

Sean Harrison
York, PA

[CS – As far as the "proper" setup for using an ESQ-1 with a VFX-SD, things are pretty straightforward, Sean. Assuming that you wish to control the ESQ from the VFX, connect a MIDI cable

from the MIDI out jack on the VFX to the MIDI in jack on the ESQ, and that should about do it for setup. From there it's simply a matter of assigning VFX tracks to ESQ tracks, and determining whether or not you wish the tracks to be layered. Let's say, for example, that you want to control 4 tracks on the ESQ, on MIDI channels 5-8, from the VFX sequencer. Create a sequence on the ESQ, and assign the first four sequencer tracks to channels 5-8. Assign the second four tracks (tracks 5-8) to one of the channels already used – channel 8, for example. This is to ensure that the ESQ won't play MIDI data not meant for it, since any data received on channel 8 will be played by track 4, and ignored by the other tracks. For the same reason, you might want to set the ESQ's base channel to channel 8 as well.

At this point, pretty much all control of ESQ voices can be handled from the VFX. If you want a track from the VFX to control track 1 in the ESQ, for example, simply assign the VFX track to send on MIDI channel 5. Set the MIDI status for the VFX track to "MIDI" if you want it to play only the ESQ, or set it to "BOTH" if you want to layer a VFX sound with the ESQ. If the track is set to "LOCAL," it will play only the VFX sounds, of course – it won't send any data out MIDI.

Volume can be controlled on the ESQ voice just as if it were a VFX voice, by selecting the ESQ track, pressing the "Volume" button, and adjusting the slider or up/down buttons. Program changes can be sent from the "MIDI" page in the sequencer section, although any program changes made here will not be recorded into the sequencer. Initial program settings are memorized in the sequence along with volume, panning, and so on, just as they are with the ESQ. Program changes can be inserted in a sequence track by using the event-list editor, or by selecting a program on the VFX while the sequencer is in record mode. Use the "Replace Program" function while in record mode to record program changes in this way.

As far as your problems with mixdown mode are *concerned, I have found that the VFX-SD does not record mixdown or pan settings for a sequence track unless the corresponding song track has been defined. In other words, if you wish to record mixdown information for track three of a sequence which has been chained into song 1, you must be sure to define track three of song 1 by placing a sound (any sound) into the track. Also, I have found that the process works more reliably if you perform some steps in a specific order, which is to select the "Volume" page, begin recording, and then select the track for which you want to record volume changes. Make sure that "Record Mode=Mixdown" and "Edit Tracks=Seq" on the Seq Control page, and see if you don't have better luck.]*

[Ensoniq – Earlier versions of the ESQ-1 software required a two-way handshake between the ESQ-1 and the SYSEX storage device. This was changed to a single-ended system in ESQ-1 O.S. Version 3.0.]

Dear Hacker,

I recently purchased an Ensoniq **SQ-R** when looking for a friend for my Roland U-220. What a match! The U-220 handles all the sampling chores while the SQ-R provides rich analog undertones to highlight the realism of the Roland. The effects section is fantastic and having a total of 52 notes of polyphony is a sequencing dream come true. A combination of the two also brings percussion sounds available to a new dimension. Oh, did I mention using smart-transmit with the U-220's six parts? What a team! For under $2000 you too can sound like an LA studio. If you have the U-220 you're seeing only half the picture. Get yourself an SQ-R and hang on!

Keith Janney
Beckley, WV

[CS – SQ-1 & U-220? IB4 it!]

Greetings Hackerfolk!

Mike Peake and Technosis here. I just opened my **SQ-1**, saw the Hacker (Aug, '90 issue) and thought I'd send an update on what's happening here.

I'm *very* impressed by the SQ-1. After only an evening together, I've hit 10 new killer sounds. Even without a manual session it's easy to get into. I don't want to sound like a commercial (they didn't pay for this or give me a free unit), but I'm impressed.

Thanks to all the Hackerites for their support. I'm entering my fourth year of development – phone number and address remain the same.

Thanks for doing what you do!
Mike Peake
Technosis
3960 Laurel Canyon Blvd #353
Studio City, CA

[CS – Thanks for writing – nice to know that you still do that voodoo, too, dude.]

Dear Hacker,

Just a brief note of thanks to Clark Salisbury for his GREAT article issue #65, titled "Programming Without Pain."

I don't know what percentage of your subscribers are of the KISS persuasion (Keep It Simple, Stupid), but speaking as one overworked and mentally shortcut-prone aspiring MIDI mechanic, I truly appreciate drawing on others clearly worded, time-saving shortcuts.

Thank you, Clark.

Sincerely,
Orion Engar
Sardis, BC

[CS – Me, simple? Hey, I don't even know the meaning of the word, "discontiguous." Thanks for writing.]

To whom it may concern:

Whatever happened to the **EPS** operating system V2.5? It's been a long time since I've heard any rumors about it.

2. Are there any third party developers out there working on alternative OS's for the EPS? It seemed like there was quite a flurry of develop-

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ment for the Mirage. Nothing seems to be happening with the EPS OS. Why?

3. In spite of the fact that "sequencer error Messages" are intended for the software engineers, I would still like to have a list of them and what they mean. It would offer the user some insight as to what he or she is doing wrong concerning the sequencing process. Perhaps this topic could be addressed in an article in the TH?

4. There appears to be a noticeable glitch (hiccup) while selecting different instruments (live and while playing back a sequence) on the **VFX-SD** and **EPS 16 PLUS**. This is not a problem on the original EPS. What's going on?

Thanks,
James Rosand
Port Angeles, WA

[CS – 2) Many of the third-party OS enhancements to the Mirage were designed to fill a need for more and better features in a device with relatively limited functionality – at least in comparison to today's instruments. There were so many things that could be wished for in a Mirage, and such a widespread user-base, that developers were naturally enticed. With the EPS the situation is a bit different. Most enhancements that seemed like profitable undertakings on the Mirage have been included in the EPS as standard functions. This is not to say that there's nothing that one might put on a wish list for the EPS – just that there's seems to be nothing obvious that developers think might appeal to a broad enough base of users to make it profitable to do the development.

4) The hiccup you refer to is an unavoidable result of needing to shut down voices while new effects are loaded into the DSP chip. This was not a problem with the original EPS, as it had no on-board effects processing.]

[Ensoniq – 1) The Version 2.5 O.S. for the EPS is in beta-test. We're sorry for the delay(s) but we'll announce it as soon as it's ready.

3) You'll have to take our word for it. Most of the error messages literally mean the microprocessor has been confused and finally generated a low-level system error. There is virtually no way for you to trace the error back to a specific operation without a real-time microprocessor emulator plugged into the processor socket on the main board.

4) This hiccup is common to all products using effects processors on-board. On the VFX-SD you should be sure that on the SEQ CONTROL page you set SONG STEP EFFECT=SONG, not SEQ to minimize this occurrence. Placing a group of Sound Programs into a Sequence and giving them a common global effect (which will be different than the way they were originally programmed) can also allow you to freely pick from twelve different sounds without changing the effects algorithm.

On the EPS-16 PLUS, if EFFECT=BANK, not INSTRUMENT you can also change Instruments freely without changing effects, again minimizing this occurrence.]

Hacker:

On the 2.0 upgrade disk in the 5-styles file, there is a song called Jazz-chart. My Dad swears that he's heard it but can't think of the name... can anyone help us out?

Jack Hines
Compuserve
72321,357

*[Ensoniq – The song is called "*You Stepped Out Of A Dream,*" by Nacio Herb Brown.]*

Transoniq Hacker,

Recently, I copied some **EPS** samples from a friend. When I got home and tried to load a sample into my EPS, the display read, "disk data corrupted." After a couple of tries I though I might as well delete the sample, but then I thought of copying the entire disk via "copy/back-up/restore/ and it worked! I saved the sample. Have you heard of this kind of problem? And are there any other fixes?

Oh, and by the way, some of these were EPS 16+ samples – so they DO work on the EPS (except the effects, of course).

Bo Pavao, Jr.
Montery, Calif.

[CS – The dreaded "Disk Data Corrupted" problem, while not common, does occasionally turn up and is due to a garbling of data on the disk, usually the result of displeasing the Gods

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of Erasable Media. They can sometimes be appeased if you back up all your data at least twice, and burn a sacrificial data cassette recorder.

Any magnetic disk is subject to failure at one point or another, but this is the first tip I've heard of for rescuing an EPS disk. It gets my vote for the coveted tip of the month award – uh, that is, if we had a coveted tip of the month award.]

[Ensoniq – Disk reading errors can also sometimes be caused by alignment differences between the two disk drives, although it's very rare.]

Dear Hacker,

First a dose of praise, then a couple of questions.

The praise: I'm into my third year as a subscriber and I still think the Hacker is the best magazine of its kind, bar none. The questions and answers in the Interface (as well as the articles) have helped me tremendously in my own hacking, the **ESQ** patches have helped fill out my library a bit. I have enjoyed personal contact with a number of other Hackers through the Hacker Compilation Tape project (by the way, I've distributed 62 tapes to date after about 9 months...) and sample swapping (p.d. only, of course). It has been these personal contacts which have been the most enriching, by far. Experiencing the music of some of y'all out there has been great – all of the contributors to the Compilation Project, Dan Walker's Christmas Tape (GREAT!) and Pat Finnegan's "*Ensoniq Suite*" **EPS** disk (see classifieds, Issue #64) just to name a few. A real highlight was catching a Sam Mims gig in Olympia, WA and chatting with him between sets – a very friendly, humble fellow – and his chops are HOT (now I know why Ensoniq installs a heat sink on the back of their boards...) And recently I have been very inspired by the interview with John Greenland; it's helped me feel good about my MIDI set-up and forget about escalating my system with each new keyboard that comes out and get down to making music. So, thanks Hacker.

Now some questions.

1 – It's been a while since I've seen anything in the Hacker about an OS update for the EPS. Back in Issue #59 (May, 1990), Clark stated in the Interface that "a new OS is due out this spring," and on the same page Ensoniq said, "We are testing a new OS for release sometime soon. Please give us enough time to be sure it is thoroughly debugged." Is a new EPS OS forthcoming? Right after the EPS 16+ came out, I ambled down to a local music store to hear it and the Official Ensoniq Salesperson told me that Ensoniq is not going to come out with a new OS for the EPS, that they've scrapped it. This is someone who has a reputation around here of knowing what's going on with Ensoniq. Was he just trying to get me to forget my EPS and spring for an EPS 16+? (I won't. I 'm committed to my EPS as the center of my MIDI set-up – just bought a 4x for it.) Another Official Ensoniq Salesperson in a nearby town told me that Ensoniq is indeed going to issue an updated OS (2.45?), "Some time." Can you shed any light on the state of the OS?

2 – A technical question: I often run into a problem on my EPS when multisampling into the same instrument. After taking a number of samples, assigning them to their own discrete keyboard ranges as I go, all of a sudden I'll find that only one sample will play and only over a limited range of the keyboard. It's as if I have "covered up" the other samples, when in fact I have been very careful to set the keyboard range of each sample to a non-overlapping range (e.g., in a drum kit). I have not deleted any samples because the WS number appears on the EDIT page when I play its particular range on the keyboard and it definitely takes up memory but no sound comes out.

This happens not only when multisampling into the same layer but also when sampling into separate layers, one sample per layer. (In this last case I have caught myself sampling into layers that have not been made active for the current patch in which case no sound will come out, but it has also happened when the layer is definitely active.) I have even deleted all but one sample and tried to assign that sample to the entire range of the keyboard and have that one sample still play only within its original range assignment or not at all. This also happens sometimes when copying samples from one instrument to another. It usually occurs after at least five samples have been made or copied.

I have not yet succeeded in correcting the problem – have had to start over sampling from scratch, or copying from scratch. Reassigning keyboard ranges has not worked. Is there a bug involved here or am I messing up in the Set Keyboard Range department? Any suggestions for where to look for my error?

3 – The disk drive on my EPS emits a hum or at least a hum emanates from the vicinity of the drive (power supply maybe?). It is consistent; sometimes it grows quieter after the drive has read a disk, sometimes it stops, but it usually is there and usually it starts as soon as I power up the board, before I even boot up. Is this a problem or merely irritating?

4 – I would be very interested in seeing an article written by someone who has installed a SCSI drive on their EPS, discussing their shopping experience, compatibility, set-up troubleshooting and tips on organizing subdirectories. The article in Issue #53 by Bill Lewis was interesting but not specific to EPS and SCSI. (Bill also mentioned a followup article "next month" that never appeared...) Also, is there any way that an EPS can interface with an IBM PC that has a SCSI interface card, in order to use the IBM's hard drive for storage/retrieval?

Thanks for your help,
Steve Vincent
Tacoma, WA

[CS – 2) I had the very same problem when I first began using the EPS. As it turned out, I was inadvertently setting the wavesample range for the entire current instrument, when I meant to set for just a single sample.

The next time you have this problem, take a look at the instrument range parameter – press "Edit," then "Instrument," then scroll to the page that shows you what range of the keyboard the instrument covers. If you want to play the

instrument over the entire range of the keyboard, this should be set to at least "C2 C7." If it's set to something like "E3 F3," my guess would be you're setting the range for the entire instrument, when you mean to be setting it for a single sample.

4) I suppose that, technically, the EPS SCSI should be able to communicate with the IBM SCSI, but for the EPS to directly access any disk (hard or otherwise) the disk will need to be formatted for the EPS. This puts directories and stuff on the disk, allowing the EPS to find its way around the disk. Unfortunately, a disk formatted for the IBM wouldn't be readable by the EPS, and vice versa.

If you were to use a software program as a go-between, you could store some kinds of EPS data on the computer's hard drive. For example, Alchemy (which runs on the Apple Macintosh computer) allows you to retrieve wavedata from the EPS – as well as from a number of other samplers – into the Macintosh. Once the data is there, it can be processed and manipulated in a number of ways, and of course it can be saved to and loaded from hard or floppy disks. Keep in mind, though, that this is only wavedata – none of the synthesis parameters found in the EPS go along with this information. Once the wavedata is loaded from Macintosh disk and sent to the EPS, the sound still must be tweaked; envelopes, LFO's and filters need to be set, processing needs to be handled – it's MUCH quicker and simpler to load a finished sound from floppy disks.

[TH – We do have a couple EPS/SCSI articles on hand and plan to print them as soon as we can squeeze them in. Meanwhile, if you haven't already, check out EPS DOS/SCSI in Issue #45 by Alan Smith of Ensoniq. (Alan's also working on an update to his article.)]

[Ensoniq – 1) As mentioned above in response to James Rosand's question: The Version 2.5 O.S. for the EPS is in beta-test.

2) Clark's answer covers the EPS-16 PLUS, not the EPS, although the theory is the same. On the EPS when you're in EDIT mode and have selected a wavesample, the Set Kybd Range button acts to set the range of the wavesample. But if you press Set Kybd Range from the COMMAND or LOAD mode, it will affect the Instrument range. It can happen that after doing a wave command (such as Truncate) you may use this function, thinking it's working on the wavesample and wind up accidentally changing the entire Instrument.

3) We'd guess that it's probably hum from the transformer – not a major problem but you might want to get it checked out.]

Dear TH:

As a newcomer to the Ensoniq **SQ-1**, I would like to say that Clark Salisbury's new column on programming the SQ-1 is an excellent addition to your magazine.

I have two quick questions for you. First, will we be seeing, anytime soon, Hackerpatch suggestions for the SQ-1?

And second, do you have any idea where I might track down some suggestions for creating a good slap bass sound for the SQ-1?

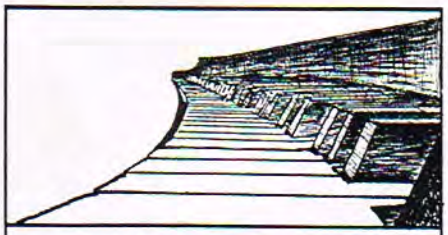
Sincerely,
Michael Harvey
Woodinville, WA

[CS – We'll be covering all the major "food groups" of sounds (including basses) in upcoming months in my series of SQ-1 programming articles, so stay tuned.

[TH – We've been trying for some time now to find someone who could supply us with the necessary information so we could put together an SQ-1 patch sheet. Luckily, Joe Paschall of Ensoniq recently came to our rescue. It appears elsewhere in this issue.]

Current Ensoniq O.S.s

EPS	2.4
EPS-M	2.4
EPS-16 PLUS	1.1
MASOS	2.0
MIRAGE	3.2
ESQ	3.5
ESQ-M	1.2
SQ-80	1.8
VFX	2.1
VFX-SD	2.1
SQ-1	1.0



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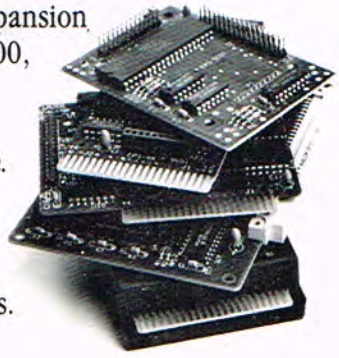

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