FX without FX

(or, "Avoiding the DSP Blues")

a mini-tutorial for Yamaha EX series synthesizers

(#3 in the series)

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1. Introduction

1.1 The EX synthesizers offer a dizzying array of high quality Insert Effects, along with global Reverb and Chorus. However, when in Performance mode, you can't use Insert Effects for all of the 16 Voices in your Performance. The Insert Effects can also rob DSP resources that may arguably affect the timing of the sequencer in dense passages.

1.2 This mini-tutorial describes a few techniques for accomplishing various effects on the EX5/7/R without actually using the Insert Effects or global Reverb or Chorus. While written for the EX, these techniques are quite general in nature, and you can use them for many other synths as well, especially a synth with two or more outputs (i.e. stereo or better).

2. Overview

2.1 For the purposes of these examples, we're going to create a two Element AWM "Effects Voice", using two identical WAVES on the EX. We'll then use these two Elements, along with some programming tweaks to each, to simulate the equivalent of having a single Element Voice with "real" Insert Effects added. You'll lose some polyphony using two Elements versus one, of course, but you'll gain DSP by having a big sound *without* the use of actual effects. We'll also create a single Element "Reference Voice", so that you can do some comparisons as you go along to see just how big and fat you've made your two Element "Effects Voice". In order to keep things relatively short and sweet, note that I won't be detailing the basic steps involved in operations such as saving Voices, scrolling through parameters, etc. Please refer to your owner's manual, if necessary, for these details.

2.2 All set? Let's go...

3. Creating the "Reference Voice"

3.1 First, we'll create the single Element "Reference Voice", against which we can compare our "Effects Voice". Perform the following steps:

a) Find a convenient Voice location for your "Reference Voice", and initialize the Voice by hitting **JOB>>Init Voice**. Jump into Voice Edit Mode.

b) Choose a favorite WAVE for an AWM Voice. This WAVE should be a fairly basic sound with no "built in" modulation, though reasonably rich in harmonic. It should also be one with which you're familiar. I'd strongly suggest WAVE number 4, the "Grnd2" Piano. Avoid excessively "fat" sounding WAVES, or those that already have a lot of movement. This will make it easier to hear the results of your work.

c) Leave everything else in the Voice "as is", including the Filter and Amp envelopes, so that you're left with a basic sustaining sound. You want to avoid a short envelope here so that you have plenty of time to hear the movement added to your "Effects Voice".

d) Give the Voice a name like "Reference", then save it.

e) Note that these basically "Init Voices" will have a tad of Reverb added by default, but there is no Chorusing or other effects, so that's OK.

3.2 Next, we'll create our two Element "Effects Voice".

4. Creating the "Effects Voice"

4.1 Create the two Element "Effects Voice" as follows. This is the Voice where we'll be creating our "effects":

a) Copy your "Reference Voice" to another Voice location.

b) Get into Edit Mode, and rename the Voice to something clever like "EffectsVoice".

c) Copy Element 1 (all) to Element 2 within this Voice: Hit **JOB>>Copy Voice**, and then select your "Effects Voice", Element 1 (all) as the source, and Element 2 as the destination.

d) Go back to the OSC screen, and switch the WAVE for Element 2 to "Grnd2" (or whatever you previously chose) in order to match Element 1.

e) Save the Voice.

4.2 All right. Now we're ready to start making some fat, "effected" sounds without the use of actual effects. You may want to make a few, or even several copies of your "Effects Voice", such that you can have individual examples of everything we do below, but I'll leave that up to you. I'm going to try to list these "effects" in a logical order that makes some sort of sense, but you're free to jump around. Here goes...

5. Detuning Effects

5.1 Detuning is probably the easiest, and most well known "fattening" technique. Used in the varying amounts, it can give you anything from a subtly "larger" sound, to Honky Tonk Pianos, humongous Brass sections, massive String ensembles, and insanely wide synth leads.

5.2 There are a number of places in the EX to accomplish Detuning. You can start on the PARAM tab of the PITCH screen with the "Detune" parameters for the two Elements. Note that the same "Detune" parameter is also found on the MIX tab of the OSC screen. While on the PARAM tab of the PITCH screen, you could alternately adjust the "Fine" parameter, if finer control than Detune is necessary (I was a bit surprised, but the "Fine" *is* a finer control than Detune).

5.3 Make sure that you adjust the Detuning of one Element to be a positive number, and the other one to be negative, and in equal absolute values (such as +3 for Element 1, and -3 for Element 2, etc.). This will ensure that your pitch "center" will remain in tune with the rest of your tracks/synths/band.

5.4 Specifically, try the following with the "Grnd2" WAVES:

a) Use +2 and –2 for the "Fine" parameters for Elements 1 and 2. This will give you a much "fuller" Piano voice, without getting to the point of sounding like a Honky Tonk.

b) Change the "Fine" parameter back to 0 for both Elements, and change the "Detune" parameter to +2 and –2. This yields a typical Honky Tonk Piano effect. (See, the "Fine" parameter really is finer than "Detune"!)

c) Kick up the "Detune" parameters to +4 and –4 for a *really* raunchy detuned Piano sound.

5.5 Experiment with different amounts of detuning with different WAVES, and compare the sound to your "Reference Voice".

5.6 Many synths have a "Random" detune parameter for even more interesting and unpredictable sounds. The EX has something similar, a "Random EG" parameter (on the left of the PARAM tab of the PITCH screen). Using this parameter won't do a thing, though, until you've specified a Pitch envelope on the EG tab of the PITCH screen. If you want to emulate the standard "Random" function found on other synths, you can do the following:

a) Change all "Fine" and "Detune" parameters back to 0.

b) Create "flat" pitch envelopes for each of your two Elements, one positive and one negative – Go to the EG tab of the PITCH screen. For Element 1, specify +2 for every "Level" of the envelope. Edit each of the "Times" to be 50 (this is necessary for the "Random EG" to have an effect). For Element 2, specify –2 for each "Level", and 50 for each Time.

c) Go back to the PARAM tab, and set the "EGDpth" for both Elements to +10. You now have a typical Honky Tonk.

d) Now for the crazy part: Edit the "EGRndm" parameter for both Elements to be 7, and give it a try. You now have a sound that, with each note played, has wildly different amounts of Detune. Back the "EGRndm" values down to 1 for a tamer, but interestingly variable sound.

5.7 Well, it may be pretty standard fare, but you've learned to create some finely controllable and interesting Detuning effects without using an Insert Effect or Chorus. Prior to moving on, change all your "Detune", "Fine", and Envelope settings back to zero, unless you've made multiple copies of your "Effects Voice".

6. Opposite Pitch Bend Attacks

6.1 This is a relative of the Detune effects described above. Having two Elements, one with a Pitch Envelope that bends *down* to center pitch, and another that bends *up* to center pitch, can be interesting and useful.

6.2 Create the Opposite Pitch Bend Attacks effect in your "Effects Voice" as follows:

a) Edit your "Effects Voice", and go to the PARAM tab of the PITCH screen. Ensure that the "Fine" and the "Detune" parameters for both Elements are set to 0. Set the "EGDpth" parameters to +25.

b) Go to the EG tab of the PITCH screen. For both Elements, set the "Dcy1 Time" to 50, and the "Rel1 Time" to 25. Leave all other Times set to 0.

c) For Element 1, set the "Hold" and "Attack" Levels to +2. For Element 2, set them to –2. Leave all other Levels set to 0.

6.3 Play the Voice using the Grnd2 WAVES, and you'll briefly hear a detuned attack, followed quickly by the standard "in tune" Piano sound. This effect is sometimes useful for "cutting though the mix", without calling too much attention to the sustaining portion of a sound.

6.4 Combine this effect with a tiny bit of standard detuning, if desired.

7. Stereo FX without the Effects

7.1 A lot of huge, wide sounds can be created with various Stereo effects. A number of these effects can be accomplished with Voice programming on the EX. One word of caution: If your work will at some point be mixed to mono, be sure to preview your work in mono to ensure that your Stereo effects won't cause unwanted anomalies in the mono mix.

Note: You must (obviously, I hope!) be running the Left and Right outputs from your EX through a two channel sound system to hear these effects.

7.2 First let's try a bit of simple left-right panning. Edit your "Effects Voice" and go to the MIX tab on the OSC screen. Set the "Detune" parameters to +1 and –1 for Elements 1 and 2, respectively. Listen to your Voice with the Grnd2 WAVES; it's pretty standard Honky Tonk like Piano fare. Now, pan Element 1 hard left by setting "Pan" to L63. Pan Element 2 hard right with R63. Instant huge ballad-like stereo Piano sound. The "Detune" parameter was used to create a difference in the left and right channel output. Let's try some other differences…

7.3 Now let's make a difference in the *tone* of the two Elements. Change the "Detune" settings back to 0. Go to the DCF tab on the FILTER screen, and for Element 1, change "Freq" to 70 and "Gain" to 235. This will dull the tone of Element 1, and boost its Gain a bit to make up for the volume lost in cutting the higher frequencies. Play your Voice, and you'll hear the nice, subtle Stereo effect caused by hearing two somewhat different sounds from each channel. Add a bit of Detuning back in to increase the sense of Stereo for a really lush sound.

7.4 There are obviously a lot of other things you can do to alter the sound coming from the left versus the right channels, so experiment away! Try using two different, but related WAVES for Elements 1 and 2, as well; two different Piano WAVES, two different saxes, a trumpet and a trombone, etc. will all work well.

8. Stereo 2: Scaling & Random Pan

8.1 Before leaving the subject of Stereo effects, let's look at a couple of little known and hard to find panning parameters: Scaling Pan, and Random Pan. Go to the PARAM tab on the AMPLITUDE screen. Note that the "Pan" parameters are available on both the MIX tab on the OSC screen, and the PARAM tab on the AMPLITUDE screen. We'll need to be on the AMPLITUDE screen, though, to be able to access some additional Scaling and Random Pan parameters.

8.2 **Scaling Pan**: Disable Element 2, leaving just Element 1 to sound, by hitting the "2" button in the "ELEMENT ON/OFF" group. For Element 1, scroll the "Pan" parameter hard left with the jog wheel, or enter –64 on the keypad, to get "scl" to appear. Move over to the right and set the "Pan KeyFollow" parameter to the maximum value of 15. You now have a Stereo Piano of sorts (with just a single Element), in which the low bass notes come from the left channel, the high treble notes from the right channel, and everything else from somewhere in between. Very nice stuff for Pianos, and great for other things as well, including lead synth Voices.

8.3 **Random Pan**: Re-enable Element 1, and disable Element 2. For Element 1, scroll the "Pan" parameter hard right with the jog wheel, or enter +64 on the keypad, to get "rnd" to appear. Move over to the right and set the "Random Depth" parameter to the maximum value of 127. Give it a play, and you hear a wildly different pan setting for each note you hit. Probably not what you want for a realistic acoustic Piano Voice, but great for electronica and other lead synth applications! Keep in mind that this is another example in which only one Element is necessary for the effect.

9. Delays

9.1 Delays can create anything from a subtle "thickening" of a Voice, to wild echo effects, depending upon the length of the Delay. For maximum effect in the following examples, I'd highly recommend leaving Elements 1 and 2 panned hard left and right as in the Stereo FX section above. You may also wish to start with the Stereo FX example in which the tone of Element 1 has been dulled a bit. Go to the WAVE tab on the OSC screen.

9.2 Adjust the "Delay" parameter of Element 1 only. As you adjust the parameter from 1 up through 10 or so, you'll hear a distinct enhancement of the Stereo image effect.

9.3 As you adjusting the "Delay" value up from 10 through about 20, you'll begin to hear the two Elements as two distinct, separate instruments. Values over about 30 yield very distinct separate hits, while getting above 50 puts you significantly into the echo range. Adjusting the "Delay" parameter to the maximum value of 127 will yield a Delay of well over three seconds!

9.4 If you happen to be a techno addict, you'll undoubtedly want to create four Element patches, in which Elements 2, 3, and 4 each have different, long delays. You can get some exciting things going here. To expand on this idea, make each successive Element duller or brighter than the last (by adjusting the DCF Frequency), such that the "echoes" get successively duller or brighter. For a really deep exploration of left field, use a different WAVE for each Element, and make each Element a bit lower in volume than the previous one. You'll then have "echoes" played by different instruments! And look, Ma! No Insert Effects!

10. Chorusing without the Chorus

10.1 Simple Chorusing is relatively easy to create with two Elements and an LFO. Go to the LFO1 tab on the LFO screen.

10.2 For Element 1 only, edit the "Speed" parameter to a value of 12, and the "PMD" (Pitch Modulation) parameter to 7. This yields a pleasant light Chorusing effect.

10.3 Increase the "PMD" value to around 30 for a very heavy Chorusing effect.

10.4 Throw in a bit of "Random" spice: Change the "PMD" amount back to 7. Next, set the "Rndm" parameter to 5 to vary the speed of LFO 1 a bit with each note played.

10.5 Adjust the "Speed" parameter to taste, though you'll usually want to stay below 20 or so. Speeds below 10, say in the 4-7 range, can be very interesting.

10.6 This Chorusing effect can sound especially nice for Rhodes Voices.

11. Other Stuff to Try

11.1 Here are a few other techniques to try:

a) Filter modulation instead of, or in addition to, pitch modulation of the two Elements.

b) Use two different LFO pitch modulations for Elements 1 and 2, varying speed, LFO wave, amount etc. This will yield an interesting, somewhat Chorus-like effect with a lot of movement.

c) Use LFO 2 to modulate the speed of LFO 1, using slightly different settings for Elements 1 and 2. This will yield another Chorus-like effect, albeit one that varies in character over time.

d) If you really want to torture yourself, you can imitate a Leslie rotating speaker effect by subtly modulating Filter and Pitch with LFO 1, and then spending a few hours tweaking LFO 2 to modulate the speed of LFO 1 "*just right*". If you can get this "just right", and then do it in Stereo, having LFO 1 for Element 1 and LFO 1 for Element 2 out of phase with each other by just the right amount, you'll be in Heaven. (Note: You can alter LFO 1 phase by adding a very slight Delay on the LFO1 tab. LFO 2 has an actual "Phase" parameter, but can't modulate both Pitch and Filter at the same time with LFO 2, and besides, you want LFO 2 for modulating the speed of LFO 1.)

e) Combine effects from the different sections above. Mix and match!

11.2 Experiment and have fun! Be sure to try these techniques on your Strings, Brass, and Pads for some very fat background tracks. Apply them a bit more judiciously to your lead and solo Voices (except in the case of heavy Delays for your techno sounds, of course!).

12. Conclusions

12.1 Using the techniques in this tutorial, you can make a wide variety of fat, wide, and moving Voices without using Insert Effects or the global Chorus. This can be a lifesaver in Performances, and will help to conserve your DSP resources. You'll pay a bit in the polyphony department, but the EX5 thankfully has a ton of polyphony to start with. There are lots of other places you can go from here, but you hopefully now have a good start on the journey ahead.

Happy FX'ing (without the FX)!

Ski
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Thanks to E! (newguy) and jazzminister at the EX5Tech discussion boards for the inspiration and motivation to write this tutorial. I hope that they and other EX users benefit from the ideas and techniques presented here. This started life as a "micro-tutorial" that I was going to post as a reply to E!'s request, but it quickly grew a bit too large (imagine that!). Yamaha will appreciate the fact that not once did I use the word "patch" to describe that thing they still insist on calling a "Voice"!

A Note from Derek and Ski

This mini-tutorial is brought to you in the hope that it will benefit your EX experience. We hope that it will turn into a series of useful documents. If you have a short topic of your own that you think could help others, we strongly encourage you to write it up, even if it's only a page or so. It doesn't have to be a huge tutorial to be useful. We can help a bit with the writing, if necessary, and we'll format it, publish it in .PDF format, and post it for you.

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