

Advanced Audio Effects in GarageBand

by Jeff Tolbert

GarageBand ships with plenty of fantastic effects and several useful presets for those effects. But the wonderful thing about audio effects is the vast range of things you can do with them, many of which you probably wouldn't stumble upon just by randomly moving sliders. This article will help you create three of these less obvious effects: pumping drums, ping pong delay, and a comb filter.

I'm assuming at the outset you have some experience with GarageBand and its effects. If you don't, check out two ebooks I've written to get you started: *Take Control of Making Music with GarageBand*

[http://www.tidbits.com/takecontrol/garageband-](http://www.tidbits.com/takecontrol/garageband-music.html?14@@!pt=SYNTHTOPIA)

[music.html?14@@!pt=SYNTHTOPIA](http://www.tidbits.com/takecontrol/garageband-music.html?14@@!pt=SYNTHTOPIA) covers GarageBand basics, using loops and introductory song composition; the latest, *Take Control of Recording Music with GarageBand*

[http://www.tidbits.com/takecontrol/garageband-](http://www.tidbits.com/takecontrol/garageband-recording.html?14@@!pt=SYNTHTOPIA)

[recording.html?14@@!pt=SYNTHTOPIA](http://www.tidbits.com/takecontrol/garageband-recording.html?14@@!pt=SYNTHTOPIA), is loaded with information on recording Real and Software Instruments and the basics of using GarageBand effects.

Pumping Drums

One cool trick is to create a super-funky “pumping” drum effect. What this effect basically does is to overuse an Audio Units compressor in such a way that it only allows the main body of each drum hit through before immediately clamping down and squelching the sound for a moment. Then the compressor enhances the quieter parts, emphasizing the quiet high-hat hits and the tail of the snare drum sound.

For this example I used the AUDynamicsProcessor, the loop Modern Rock Drums 02, and a tempo of 120 BPM. Here are some compressor settings to get you started (see Figure 1):

- Compression Threshold: -80 dB
- Head Room: 33.3 dB
- Expansion Ratio: 30
- Expansion Threshold: -87 dB
- Attack Time: 0.005 Secs
- Release Time: 0.087 Secs
- Master Gain: 6.0 dB

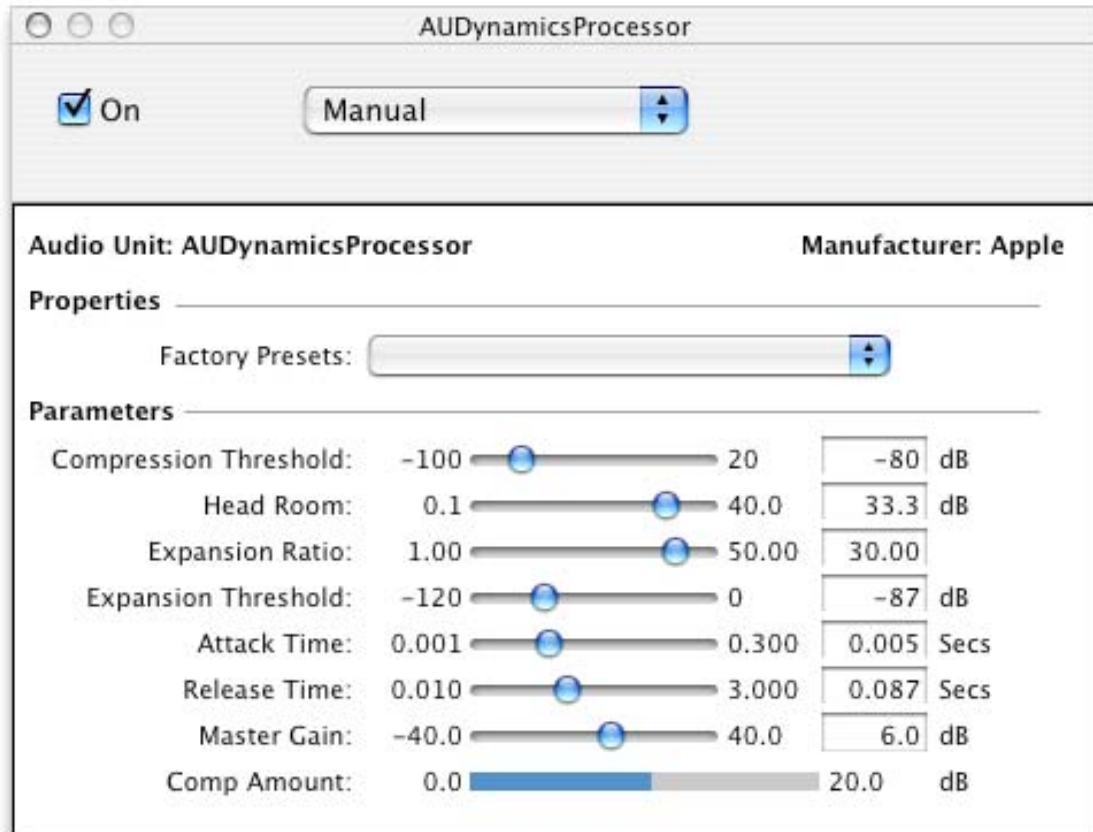


Figure 1: Starting settings for the “pumping drums” effect.

Play with the sliders to get the effect you want. The following guidelines will help:

- The Compression Threshold should be fairly low for the effect to work. However, if you set it too low you’ll squelch everything. At the same time, if you set it too high you won’t end up compressing anything and you won’t hear the effect.
- Head Room affects how “hard” the compression is. You probably want it fairly high or all you’ll hear are the initial attacks of each drum hit. You can almost set this slider visually—play with the slider while you watch the Comp Amount readout. If the entire bar consistently fills with blue you’re maxing out the compression—in other words, you aren’t giving yourself any headroom. I like to set it so the Comp Amount only fills about halfway.
- Expansion Ratio and Expansion Threshold are fairly enigmatic, and honestly, I’m not sure quite what they do. Suffice to say that if the Expansion Ratio is set to 1.00, it doesn’t seem to matter what you do with the threshold control. If the ratio is set relatively high, moving the threshold closer to zero can have some very strange repercussions. I generally set the ratio high and the threshold low and leave it at that.

- Set the Attack Time so you can hear it clamping down on the bass drum. If you set it too low, it will start compressing the initial attack, and the bass drum will sound a lot quieter. For the pumping effect, you want the attack to come through before the compressor kicks in.
- Set the Release Time fairly low. If you set it too high, you won't get the "breathing" effect, especially noticeable in the high hat.

For even more control, you can use the AUMultibandCompressor to set different compression levels on different frequencies. This way you can compress the bass drum and the high-hat separately. For example, you may want the pumping effect on the bass drum only, leaving the high-hat more natural sounding.

Ping-Pong Delay

GarageBand's delay and echo effects are somewhat limited. Even the more complex AUDelay is far more stripped down than some of the delay effects found in more full-featured digital audio software. One of the missing elements is the capability to create what's known as "ping-pong" delay—called by that name because the echoes bounce back and forth across the stereo field.

That doesn't mean we can't achieve the effect, however. Perform the following steps to create an extremely simple, faux ping-pong delay:

1. Create a track containing the loop or recording you want to delay. You don't want a part that's too complicated—the effect adds several more layers of complexity, and if the part is too intricate it may end up as mush.
2. Name this track "Original."
3. Set the pan for this track somewhere in the middle of the stereo spectrum.
4. Duplicate the track by choosing Track > Duplicate Track (or press Command-D). Make sure Control > Snap to Grid is toggled on. Option-drag the region from the original track into the new track so the two regions line up. Rename the track "Delay Left."
5. Open the Track Info dialog and add AUDelay in one of the effects pop-up menus.
6. Click the Effect Edit button (marked with a pencil) and set the sliders as follows:
 - Dry/Wet Mix at 100%
 - Delay Time wherever sounds appropriate (see the note following this tutorial to synchronize the delay with your song)
 - Feedback at 50%
 - Lowpass Cutoff at 15000 Hz
7. Pan this track all the way to the left and turn the track level down about 20%.
8. Duplicate the track you just created and copy the region into this track as well, again making sure all three regions line up. Rename this new track "Delay Right."

9. Open the Track Info dialog for Delay Right. AUDelay should already be enabled.
10. Click the Effect Edit button and change the Delay Time to twice the setting you used for Delay Left. Increase the Feedback by a few percentage points and turn the Lowpass Cutoff down to about 7500 Hz.
11. Pan this track all the way to the right and turn the track level down a hair lower than Delay Left (see Figure 2)



Figure 2: The three tracks in place for the ping-pong delay.

Listen to your handiwork. You should hear the original signal, followed closely by the two echoes, one on each side of the stereo field. The panning is much more noticeable through headphones.

Note: For certain effects, you may want to synchronize the delay with the song. There's a simple formula for converting beats per minute (bpm) into seconds:

60 seconds / bpm = delay time for one beat (or one quarter note)

So, for 154 bpm: $60 / 154 = 0.3896$ seconds

If you want to use a smaller note value than a quarter note, divide accordingly. For an eighth note, divide the result by two. For a 32nd note, divide by 8.

Comb Filter

Comb filtering occurs when you delay a signal by a small amount and recombine it with the original signal. This results in cancellation of certain frequencies and creates a distinctive, thinned-out sound.

Adding a comb filter to one of your tracks is easy:

1. Solo the track you're working on so you'll be able to hear the effect.
2. Add an AUDelay in one of the effects pop-up menus.
3. Click the Effect Edit button to open the AUDelay parameters.

4. Set the Dry/Wet Mix to 50%, the Feedback to 0 (the middle value on the slider), and the Lowpass Cutoff to 22050 Hz (the maximum).
5. Since you're working with extremely small values, you'll have to set the Delay Time using the text box to the right of the slider. Start with 0.002 Seconds.
6. Hit the Play button and toggle the effect on and off. You can either click the On checkbox in the AUDelay dialog, or click the checkbox next to the effect pop-up in the Track Info dialog. You should be able to hear some frequencies drop out when the effect is on.
7. Play with the Delay Time settings until you get a sound you like. For comb filtering, anything between 0.0001 and about 0.0099 should work (see Figure 3). Different times will affect different frequencies, so feel free to experiment.
8. For an even stronger effect, create a second AUDelay in the other pop-up menu. Use the same settings to double the strength of the comb filter, or try using two different delay times. If the delay times are close but not exactly the same you can get some strange ringing effects.

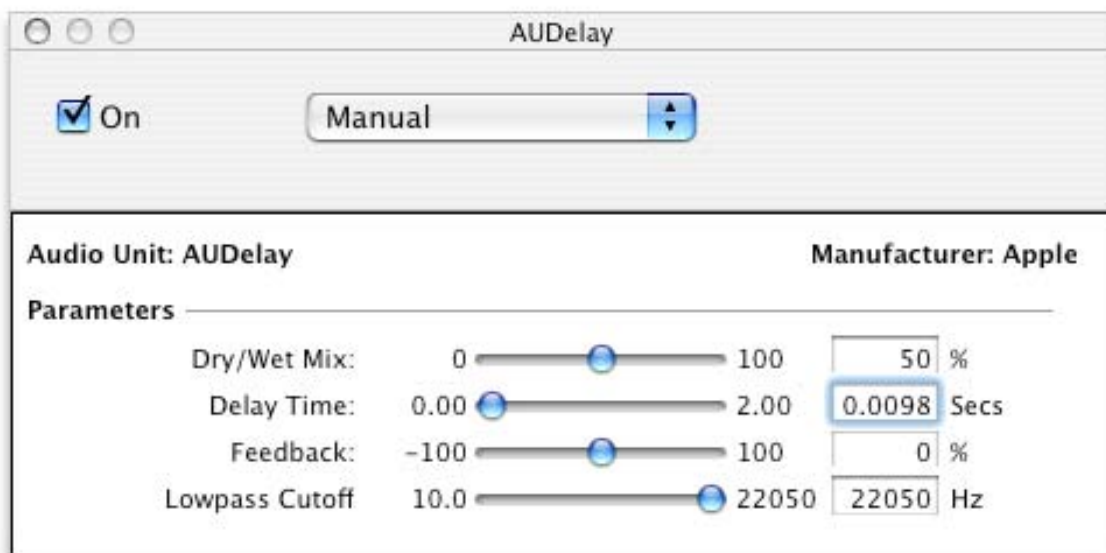


Figure 3: Settings for the comb filter. Delay times between 0.0001 seconds and 0.0099 seconds will work.