Sound Design and Manipulation in Logic Pro

Sampling with Logic's Esx24 sampler

Sampling is a great way to take a single audio file and create something musical out of it. One of the main purposes of logic's esx24 sampler is to let you 'play' audio files via a midi keyboard and then edit your performances as if it's a midi instrument. So sampling is ideal for creating rhythmic ideas from your chosen sample (much easier than manually slicing and looping the audio file!), and for creating melodic and harmonic ideas.

There's a great tutorial on how to use the esx24 sampler here:
http://audio.tutsplus.com/tutorials/production/how-to-create-a-custom-instrument-with-logics-exs-sampler/

More sample manipulation techniques

Time stretching

Time stretching is a way to lengthen or shorten your sample without changing its pitch. To time stretch in Logic, simply hold down 'alt' while increasing or decreasing the samples length. Although the pitch stays the same, you will notice the sound quality of the sample will differ. The longer or shorter you make the sample, the more extreme the change in quality will be. This is because you're stretching out a digital file, and the more you stretch it, the less data there is per second of audio, hence the sound becomes very 'digital' in quality. Time stretching can be a useful technique to put your sample 'in-time' with your project. So if you're working on a track that is 120 bpm, but you want to use a drum loop that is at 130 bpm, you can stretch it so that he sample now matches up with your grid in logic.

Pitch shifting

Pitch shifting is kind of the opposite to time stretching. You can keep your sample at the same length or speed, but change it's pitch. You can do this via logics pitch shifter plug-in. There are different settings that will make the pitch shifter work better for various purposes. For example use the 'drum' setting for rhythmic samples, or the 'vocal' setting for samples with longer duration.

Finding zero crossings

This is a useful technique for looping a sample or for simply shortening it without producing any annoying 'clicks' or 'pops'. The clicks are produced when an unclean slice of the sample is made. To make a clean cut of an audio file, a cut has to be made when the wave form is at a point of zero amplitude, and because the amplitude of a waveform is displayed on a graph, the point of zero volume is when the waveform crosses the x-axis, hence the name 'zero crossing'.

This becomes much clearer when zooming into an audio file in logic.

So first locate the position you want to cut your sample and move your play head to this position. In this example, I want to cut the sample on beat two in bar two.
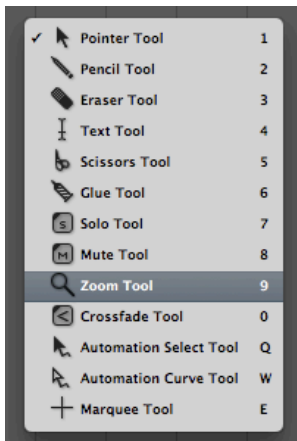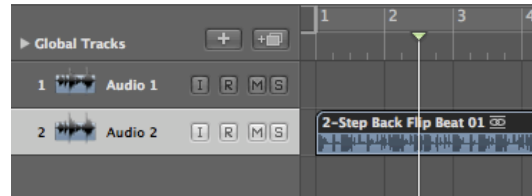
Now switch to the zoom tool and click and drag over the section you want to cut. Repeat this process until the waveform becomes so zoomed in it looks like a bunch of simple curves (like in the image below).
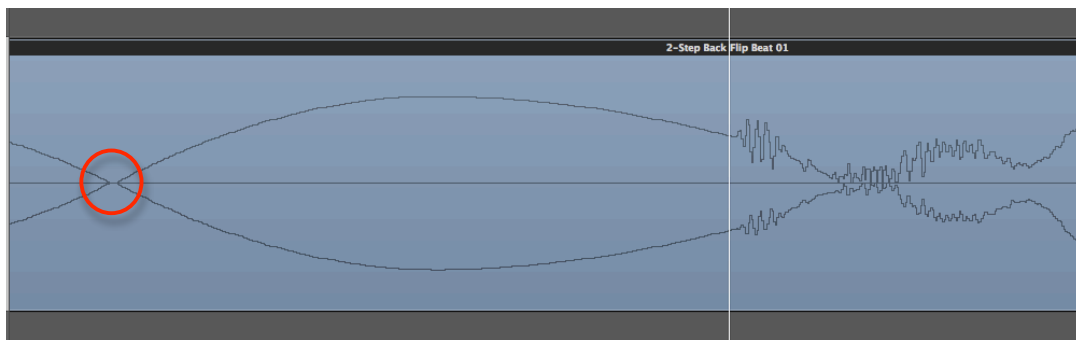
So what you're looking for is a clear point where both lines cross the x-axis, as this is a point of zero amplitude. Remember you are extremely zoomed in at this point, so don't worry about straying a little way from your play head point to find the zero crossing. So the circled area is the best place to make the cut in my example, even though it's a fair way from the play head. So now switch to the scissor tool and make the cut and delete the unwanted section of audio. Now zoom back out and loop your sample. Note: it's best not to use logics loop tool as we have changed the length of the sample ever so slightly, so manually loop it by copying the region.
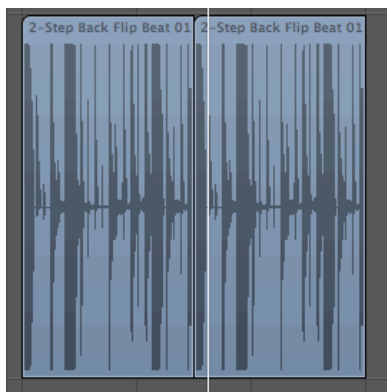
So you should now have a nice clean loop with out any clicks during the transition of regions. Remember that if you're extracting a section of audio from in the middle of a sample, you will have to find zero crossings at both the cut at the start and end of the section.