Tweaking for Touch

Feel Even More Real

by Norm Weinberg

A drummer's touch is a serious part of his or her personality and sound. Compare any two topnotch players and you'll realize that their distinctive sounds are produced not only by a particular combination and selection of drums, cymbals, heads, tunings, and sticks, but how the drummers actually strike their instruments. Is touch something that really matters when playing electronic percussion instruments? For that matter, is touch even possible on electronic drums? I would hope so!

Just to make things clear, touch goes beyond feel. In my mind, feel is a description of how an instrument responds physically as you play it. The feel of a snare drum is different than a floor tom because the tom head is larger, tuned lower, and the shell contains more air. For these and other reasons, the floor tom feels distinctively different under your sticks. A cymbal's physical response is much different than playing a drum for obvious (and some not so obvious) reasons. Each of the component instruments in your drum kit has a unique and individual feel. And, your pads are going to feel very different than your acoustic drums.

Touch is a description of how an instrument responds musically as you play it. Touch is what your body does physically to alter to color of your sound. Is the touch stiff and tight or relaxed and fluid? Is the stroke an up-and-down movement or more of a sweeping glance? Is the stroke light or heavy, slow or quick, close to the edge or more towards center? All of these are elements of touch.

I've heard several complaints about electronic drums, and most issues have to do with problems of feel and touch. Manufacturers are doing a good job in making their instruments feel better under your hands, but fine-tuning an electronic kit to respond to your individual touch and playing style is something that goes beyond factory presets. This article will focus on the touch aspect of electronic kits and offer information and ideas for making your electronic rig part of your musical expression.

Key Components. What do you want your electronic system to do? It doesn't matter if you're playing a complete kit of electronic drums or just adding a couple pads to supplement your acoustic kit; first and foremost, the pads have to trigger correctly when you strike them. Without that, nothing else matters much. Secondly, you want each component of your rig to track your playing so that you have a full range of dynamics. It doesn't matter if you play as light as a feather or as heavy as a hammer, you'll need a large dynamic range (not necessarily a large volume range) to be effective. Lastly, you want the sounds to respond to changes in velocity because on electronic drums, you've got control over velocity, and, well, that's about it. We'll look at each of these three components and see

how to make them work for you.

Getting Pads to Trigger Correctly. Here are the most common problems: If you play too soft, the sound doesn't trigger at all. When you play one pad, you hear the sounds from two independent pads. When you play loud, the sound fires twice. When playing fast, some notes fire and others don't. Damn! That's a lot of stuff that can go wrong. Here's what to do.

First, retrain your pads. Most every drum brain on the market has some sort of "auto-train" feature. But, no matter how sophisticated your rig, auto-training only provides a good starting point to begin your tweaking trials. While auto-training your kit, take this advice: When the machine asks you to play a soft stroke, don't play the softest stroke you've ever played in your life. Instead, play a stroke you believe is going to be an accurate example of your actual playing. Apply the same concept when auto-training asks you to play a loud stroke. Now that auto-training has put you in the ballpark, it's time to fine-tune.

If soft triggering is inconsistent, you can fix the problem by making adjustments to the pad type, trigger gain, sensitivity, and threshold. Here's how these controls affect your pads and triggers.

Pad Type - This control is where you select which type of trigger or pad is plugged into a particular input. Depending on the setting, it tells the brain what type of signal to expect. For example, telling the brain to look for a signal from a floor tom acoustic trigger will let the machine know that the signal is going to have a relatively quick response and decay slowly. Telling the brain to look for a snare drum pad will tell the brain that the signal will be much faster and very short.

Trigger Gain - The adjustment of trigger gain is very much like the trim pot on an audio mixer. It's used to boost or cut the level of the trigger's signal. When the gain is at the highest setting, the trigger's signal is boosted. With the gain at its lowest level, the signal is cut. This is a great tool to customize a specific trigger. It is important that your soft strokes are strong enough to be recognized by the brain.

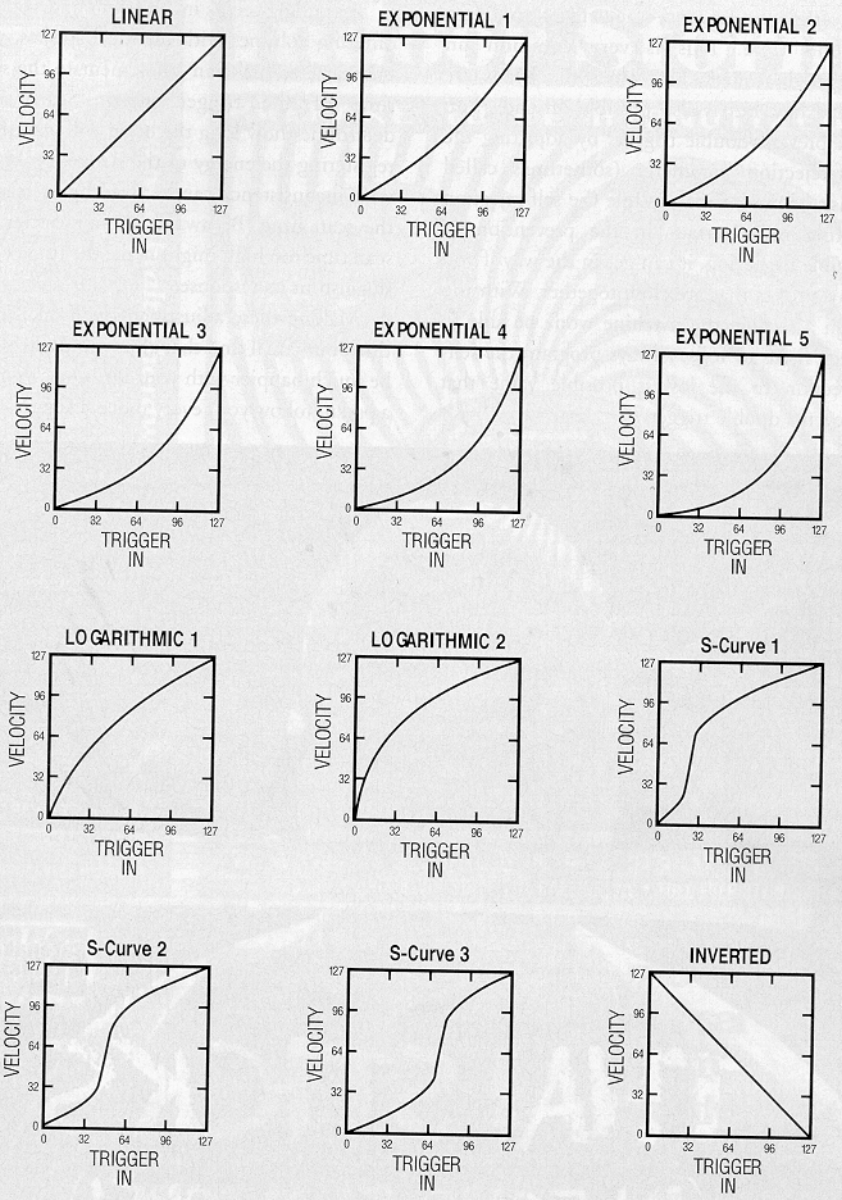

Fig. 1. Twelve of the 15 available velocity curves for the Alesis DM Pro.

Pad Sensitivity - By adjusting the input's sensitivity, you're setting a measurement of how sensitive the trigger is going to be. Warning: some brains use lower values to increase sensitivity while others use higher values. Whether the numeric value is low or high, if a pad is more sensitive, it will respond to a lighter touch.

Threshold - The threshold setting sets the minimum point where a trigger will fire a sound. In essence, it's setting a gate point, where any signal below the threshold will be ignored by the brain and any signal above the threshold will be acted upon.

If playing one pad causes other pads to fire, you're having interaction problems (also called crosstalk). There are two forms of trigger interaction that could be to blame. One type is commonly called vibrational coupling, and occurs when two or more pads are mounted on the same stand. The vibrations from one pad flow through the stand and activate another pad, producing a false trigger signal. The other form of trigger interaction is known as audio coupling. Audio coupling occurs most often when triggering acoustic drums are placed too close to each other or too close to pads. The acoustic vibrations moving through the air force the other drum or pad to vibrate sympathetically and produce a false trigger. Adjusting the rejection parameter (also called crosstalk rejection or crosstalk cancel) will take care of false triggers. Be sure to set the rejection to the lowest possible value to stop the problem. Setting too high a level will reduce the pad's sensitivity at low dynamics, and could prevent one of the pads from firing when playing double stops and flams. Depending on the brain, you'll be able to set a general rejection value for a trigger or you may be able to fine-tune each trigger's relationship to the target trigger.

You may want to adjust the rejection settings at different gigs and venues. There might be some serious differences between stage volume and environmental noise and vibrations; both of which can affect your kit's interaction relationships.

Double triggering occurs when the residual vibrations from a

powerful stroke cause the trigger to fire a second time. This is very common on triggered acoustic kits when the heads are tuned low, but is also possible on pads. You can prevent double triggers by adjusting the self-rejection parameter (sometimes called mask or mask time). While the self-rejection setting is important in the prevention of double triggering, it can get in the way if you play strokes that are close together. With too high a setting, the machine won't be able to track flams or rolls. Always program the self-rejection to the lowest possible value that prevents double triggers.

If tracking seems inconsistent and you get differing volumes with identical strokes, you may need to make an adjustment to the scan time of the trigger input. Scan time determines how long the brain will wait until registering the energy of the stroke. Problems with inconsistency can be fixed by increasing the scan time. Be aware that increasing the scan time too high might make the trigger feel sluggish in its response.

Making these adjustments will take some time, but you'll find that after you do it, you'll be much happier with your kit. Once you get a pad to follow your every move, I suggest that you write down your settings on a simple chart. Using your kit's operating system, you can either copy the settings to every other pad in your kit or enter them manually from your charts. If your settings are effective on some pads but not others, realize that each pad has slightly different characteristics. Using your settings as a starting point, you may still have to slightly tweak one or more of the parameters. If you have serious problems with one of your pads, it may be defective or dead. Yes, pads do wear out over time, and if you can't get one to respond like the others in your kit, you'll need to replace it.

Going for Full-Range Velocity. Now that your triggers are following your every touch without false or double triggering, it's time to make some adjustments to cultivate a wide velocity range. Whether the music you play starts at *ff* and gets louder from there, or serves as sonic wallpaper for upscale diners, you'll still want a full velocity range to control and color your sounds. With electronic drums, there's no reason why your softest stroke can't bring down the house or create nothing more than a whisper.

Minimum and Maximum Velocity Levels – This setting is totally independent of the sensitivity or threshold setting for triggers and pads. To illustrate how these values affect your sound, let's say that the minimum velocity is set to 30 and the maximum velocity is set to 50 (MIDI velocity levels range from a value of 0 to 127). In this example, when the brain senses your softest stroke, it will send a MIDI velocity of 30. When the brain senses the strongest stroke, it will send a MIDI velocity of 50. With these settings, you're going to miss out on the low end of your sound module, and you won't get any stronger MIDI value than 50 no matter how forcefully you strike the pad. Obviously, if you're looking for the largest possible dynamic range, you'll want the minimum and maximum values set to their extremes. On the other hand, there are certainly moments when you might want to limit either the low or high values of your MIDI velocities. How about making sure that your crash cymbals always fire with a good deal of bite and power?

Velocity Curve — The velocity curve settings are essential to getting a pad to feel right in your hands. A perfect velocity response will follow your playing smoothly and naturally. Some units have a small number of available curves, some have many, and some even let you design your own velocity curves from scratch.

Look at Fig. 1 on page 101. Here you see 12 of the 15 available velocity curves for the

Alesis DMPro. The horizontal label on the bottom of each box indicates the level of the trigger-input (the strength of the stroke) with lower levels on the left. The vertical label along the left side of each box indicates the MIDI velocity that the DMPro will generate for a corresponding stroke.

Look at the box titled "linear." When this velocity curve is selected, the MIDI velocity will increase as the trigger-in signal increases in a one-to-one relationship. If you compare the linear curve to the "inverted" curve, you'll see that the relationship is reversed. At lower trigger-in levels, the MIDI velocity is strong. As the trigger-in level increases, the MIDI velocity decreases in a one-to-one correlation.

By looking at a few of the other curve settings, you might see one that can better suit your own individual playing style. If you're a heavy hitter, try a curve like "exponential 5." Notice how the MIDI velocity doesn't really start to rise until the trigger-in value is near the midpoint. This means that there will be a large dynamic range available during the upper half of the trigger-in level. If you're a player with a lighter touch, you might try a curve like "logarithmic 2." In this curve, there is a large dynamic range in the lower half of the trigger-in level. The "S-Curve 3" curve might be a good choice for a snare drum. With this curve, weaker attacks play pretty softly and stronger attacks produce a big contrast. Ghost strokes anyone?

Making Your Sounds Respond. Since it's really not possible to translate all of the acoustic aspects of touch directly to electronic percussion, you've got to use the tools that are available. Making sounds respond to your touch is primarily a matter of getting the sound module to respond to changes in MIDI velocity.

Multi-samples – For several years, drum modules have allowed more than one sound to be layered under a note. Instead of simply playing back the same static sound softer or louder, the sound module actually plays back totally unique samples depending on the MIDI velocity. How many different layers can be placed under a pad? It depends on the sound module. Simple modules may allow two to four sounds per note. If you're using a high-end sampler as your sound module, you may be able to place as many as 16 different sounds under a key. Some software samplers have the ability to place as many as 128 different samples under a single key. This way, you can actually fire a unique sample for each and every MIDI velocity. Once the multi-samples are assigned to the MIDI note, you can make adjustments to the velocity switch points and velocity cross-fade levels to better suit your playing and the sound module's response.

Velocity Mapping — The next step is to add velocity-controlled changes to your samples. This is a feature of your sound module rather than your controller, and being a creative problem solver will take you a long way toward your goal. Think about how you want your dynamics to affect the timbre of your sound.

Here are a few basic examples, but remember that you can be as creative as you wish: When you play stronger, do you want the sound to get brighter? Then route velocity to filter cut-off level. This is the most common way of having your velocity control timbral changes. If you're not using this tweak on all your sounds, you're really missing out! As your playing gets stronger, do you want the sound to last longer? Then map velocity to decay time. Mapping the velocity to pitch is an effective way to have dynamics change the sound. Change the pitch by a couple of cents and you've got something nice and subtle. Change it by a few steps and it will be much more obvious. How about getting a little more distortion going? Simply map velocity to the effect send level and add a little distortion or some sort of bizarre EQ to the effect. Mapping velocity to pan position will give the listener the experience of you changing positions in the stereo field. If your module has this feature, try mapping velocity to the attack portion of the amplitude envelope. Playing softer will result in a slightly slower attack and playing stronger will give the sound a little more bite and punch.

Here's another idea: Assign a slow to very-slow LFO to one or more of the sound's parameters such as stereo placement, filter cutoff frequency, pitch, effect send value, etc. Now, mapping velocity to the LFO depth or LFO speed will intensify the LFO's effect in conjunction with your playing intensity. Depending on your style and musical situation, you can program these changes to be as subtle or as in-your-face as needed.

As percussion controllers and sound modules continue to grow in sophistication, they will have the ability to send continuous controller messages that are determined by your playing velocity. For example, stronger playing will generate stronger values of modulation wheel, pan position, breath controller, or data entry controller. If each of the controller values could be filtered by velocity curves, then, well, can you imagine what you could do? Now, go out there and express yourself!