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DRUM! Back To Basics

THE DRUM!

GLOSSARY OF ELECTRONIC PERCUSSION

By Norman Weinberg

The world of electronic percussion is full of terms and acronyms that can be confusing to the player trying to add technology to his or her musical arsenal. Every electronic percussion rig contains a number of individual elements that fall into three main categories: controllers, sound modules, and audio systems. These devices create a symbiotic relationship that forms a musical marriage between the parts. We're going to take a look at each of these three areas and see if we can demystify the jargon.

CONTROLLERS (CREATING THE MIDI DATA)

CONTROLLER: The controller is the instrument that you are playing. A controller reads the physical movements of the musician and turns those gestures into sound. Electronic percussion controllers can be based on acoustic instruments such as a drum, a conga, or even a vibraphone. Controllers can also take on interesting shapes and designs such a drumKAT, Zendrum, or Monome. (if you're not familiar with these instruments, run a quick Google search). Most controllers will begin this magical musical process by generating MIDI data.

MIDI: MIDI (rhymes with "city") is an acronym for Musical Instrument Digital Interface. MIDI is the digital language that is used for communication between different devices. MIDI messages consist of a number of different commands that, in total, can create an entire musical performance. MIDI messages are sent on one or more MIDI channels.

◀ MIDI: *A standard male MIDI plug connector*

MIDI CONTROLLER: *The Kat DK-10 is a common controller or "sound source" for a MIDI module.* ▶

MIDI CHANNELS: There are 16 different MIDI channels. Each channel can be used to send messages to a specific sound-producing device or portion of software. For example, if you're playing an electronic kit and you're using a drum machine for a sound source, you're likely to send messages over a single MIDI channel. But, if you want each pad in the kit to play a different instrument (such as bass, saxophone, synth, guitar, etc.), then you'll likely have each pad send MIDI messages over unique MIDI channels. For example, channel 1 might carry the bass while channel 2 is dedicated to the saxophone sound. The most common MIDI message is the MIDI note-on message.

Octave	Note Numbers											
	C	C#	D	D#	E	F	F#	G	G#	A	A#	B
-1	0	1	2	3	4	5	6	7	8	9	10	11
0	12	13	14	15	16	17	18	19	20	21	22	23
1	24	25	26	27	28	29	30	31	32	33	34	35
2	36	37	38	39	40	41	42	43	44	45	46	47
3	48	49	50	51	52	53	54	55	56	57	58	59
4	60	61	62	63	64	65	66	67	68	69	70	71
5	72	73	74	75	76	77	78	79	80	81	82	83
6	84	85	86	87	88	89	90	91	92	93	94	95
7	96	97	98	99	100	101	102	103	104	105	106	107
8	108	109	110	111	112	113	114	115	116	117	118	119
9	120	121	122	123	124	125	126	127				

▲ MIDI NOTE-ON: *Each note has its own MIDI number, which corresponds to a computer code.*

MIDI NOTE-ON: The MIDI language supports 128 different notes, or pitches, and each note is assigned a number. Note number 60 is assigned to "middle C." So note number 61 is the C# above middle C while note number 50 is the D below middle C. When you strike a pad, the computer code inside the controller generates a Note-On message for a particular MIDI note number. For example, when you play the bass drum pad, the controller may create a Note-On message for note number 36. A large button on a Zendrum might generate a Note-On message for note number 67. Keep in mind that a particular note number and its corresponding pitch doesn't always have to be an actual pitch. Depending on the way the sounds have been programmed, sending a particular MIDI note number might actually create the sound of a murmuring brook, a passing motorcycle, a nightmarish scream, or an entire symphony. Every MIDI note number contains a command for MIDI velocity.

Similar to the MIDI note numbers, the MIDI language is capable of generating 128 different velocity levels. Velocity is very closely aligned to volume, with the weaker strokes usually sending lower velocity values while stronger strokes generate higher values. Once the controller has generated a MIDI Note-On message with a MIDI note number and a MIDI velocity, you've got to have a way to turn a note off.

GATE TIME: Gate time is the amount of time a note is allowed to sound before it turns off. You can picture a physical gate with the sound moving through it. When you create an event, the gate opens. When the gate value is reached, the gate will close and the sound will stop. Gate times can be expressed in absolute values such as 6.2 seconds or as relative values such as 55 percent.

The most basic percussion controllers will let you program the MIDI channel, the MIDI note number, and the gate time. More advanced controllers often have special features that make them more flexible. Note alternate and note stack are the most common of these special abilities.

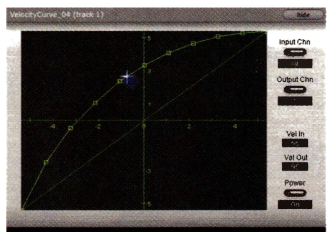
ALTERNATE: If your controller allows for this ability, you can program your surface to send a different MIDI note (perhaps even over a different MIDI channel) for a series of strokes. For example, if you set up a four-note alternate in your controller, you'll be able to play a repeating pattern of different notes.

STACK: Another trick is the ability to play more than one MIDI note (perhaps even over different MIDI channels) on a single strike. When this feature is available, you could play a number of sounds with a single stroke (bass drum, bass guitar, cymbal crash, and synth stab, for example).

Electronic drums don't feel exactly the same as an acoustic instrument. That's to be expected, of course. Certain features of electronic kits allow you to adjust the way the pads will respond to your playing style.

THRESHOLD: A controller that has a threshold adjustment allows the player to set the minimum amount of force that will cause a sound to play. Any strike below the threshold will not "be seen" by the controller, while any strike above the threshold will be recognized.

SENSITIVITY: A pad's sensitivity is closely related to its threshold. When you set the sensitivity to a lower value, you're making the pad more sensitive to lighter strokes. If you have a very light touch, you might want to lower both your sensitivity and your threshold.



▲ VELOCITY CURVE: *Adjusting VC affects playing output dynamics.*

VELOCITY CURVE: Since we're dealing with electronic percussion, the strength of your playing (your physical dynamics), don't always have to match the volume of sound your strokes produce. By calling up a particular velocity curve, you can adjust how the strength of the sound relates to the strength of your stroke. Some velocity curves have a natural relationship between more powerful strokes and more powerful sounds. Other types of velocity curves follow an inverse relationship or a relationship that provides wide dynamic sound within minimal physical dynamics.

MIDI INTERFACE: A MIDI interface is the box that connects your electronic instruments to your computer, smart phone, or tablet. MIDI interfaces can be very basic with a single MIDI-In and MIDI-Out jack, or they can contain multiple inputs and outputs for more sophisticated electronic music rigs.

MIDI-OUT: A MIDI-Out connection carries the MIDI messages from the device you're playing to another device.

MIDI-IN: A MIDI-In connection brings MIDI messages into your device from another device. For example, when you connect your electronic kit to the MIDI interface of your computer, you'll connect a MIDI cable from the MIDI-Out jack of the drum kit to the MIDI-In jack of the interface. If you want to send MIDI messages from your computer to your drum kit (to store extra patches, for example), you'll connect a cable from the MIDI-Out of the interface to the MIDI-In of your drum kit.

SYNTHESIS (RESPONDING TO THE MIDI DATA)

In today's electronic percussion rig, virtual synthesis has nearly replaced hardware synthesis (think about a software synthesizer inside your computer rather than a dedicated box sitting on a shelf). While it's true that many electronic drum kits still include their own dedicated hardware sound modules, many electronic drummers are connecting their pads directly to their computer either through USB or with a MIDI interface. DAWs and Plug-ins are the waves of the future.

▲ MIDI Interface *A simple USB MIDI Interface from M-Audio*

DAW: An acronym for Digital Audio Workstation. A DAW is a piece of software or hardware that is designed to record, edit, manipulate, and play back digital audio recordings. Popular examples of this type of software are Pro Tools,

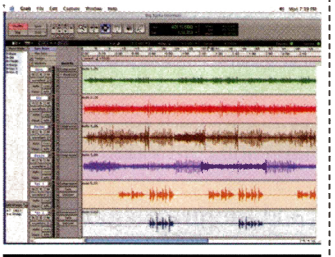
▲ VIRTUAL INSTRUMENTS:
Native Instruments' Abbey Road '60s Drums.

Digital Performer, Logic, Cakewalk, and Sonar. DAWs can also integrate plug-ins and virtual synths.

PLUG-INS: Plug-ins are a classification of small software programs that can be used inside a DAW. Most often these little programs are effect processors that provide echo, reverb, distortion, or pitch correction. Some plug-ins are larger programs called virtual instruments.

VIRTUAL INSTRUMENTS: Virtual instruments are software versions of synthesizers. Rather than being physical, they are recreated inside software. Many virtual instruments were designed to replicate well-known physical machines. Others offer features and flexibility that simply wouldn't be possible on a "real" instrument. Virtual instruments can run as free-standing applications or as plug-ins for DAWs.

OSCILLATOR: On any type of synthesizer, the oscillator is the first step to sound creation. Once a sound is produced by the oscillator, other components of the synthesizer are used to further shape and modify the tone. Oscillators may create musical wave shapes (such as sine wave, square wave, or triangle wave) or play sampled sounds.



▲ SAMPLES:
Samples in Pro Tools

SAMPLES: Samples are nothing more than digital recordings of sounds. A sample can be a single snare drum hit, a trombone glissando, or a looped drum groove. Depending on the ability of your synthesizer, you might be able to play different samples based on your stroke strength. This is an example of multisampling.

MULTISAMPLING: For nearly all acoustic instruments, playing soft or playing loud changes much more than just the volume. The quality of the attack, the exact tone of the sound, and the speed and character of the decay are all affected by the playing dynamic. When an instrument is multisampled, the performer's playing velocity can determine which digital recording will correspond to certain dynamics. Two common ways to achieve this are velocity switch and velocity fade.

VELOCITY SWITCH: A velocity switch would occur when, for example, MIDI volumes of 1–44 play one sample, and velocities of 45–127 play a second sample. Depending on the flexibility of your hardware or software, you may be able to program dozens of different velocity switches.

VELOCITY CROSSFADE: A velocity crossfade occurs when a more gradual change occurs between samples. For example, as you play stronger and stronger, one sample would fade out while another sample fades in. Sounds can fade out completely or fade further into the background. Again, it might be possible to arrange dozens of velocity crossfades within a multisample.

LFO: An LFO is an acronym for a Low Frequency Oscillator. LFOs are often used in electronic instruments to provide vibrato, movement between stereo positions, and changes in tone color. LFOs provide a fluctuation in a sound in order to make it appear more natural or more unique.

ENVELOPES: An envelope in electronic music is not something to hold a letter, but something to hold a sound. In order to describe an envelope, it might be a good idea to think of the volume of a sound over time. A wood block has a very quick and loud attack that decays over a very short time. A cymbal struck with a soft mallet has a slower attack than the woodblock, yet has a much longer decay over time. In electronic music terms, these two instruments have a different envelope.

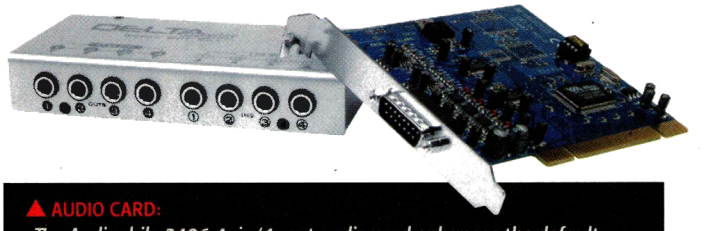
ADSR: The ADSR envelope is the most basic in electronic music. It is another acronym for Attack, Decay, Sustain, Release. The attach portion of the envelope is a value of how quickly the sound begins. The decay portion is the way a sound might change right after the initial attack. The sustain part is how long (and usually how loud) the sound is sustained — think about the sound of an organ or a long tone on a trumpet. The release is a value of how quickly a sound dies out after the gate time is reached.

AUDIO SYSTEMS (GETTING THE SOUND TO YOUR EARS)

The least expensive audio system is nothing more than a set of ear buds. Plug the jack into your drum brain or computer system, and you're ready to rock. But, what if you want other folks to hear what you're doing, or if you're playing at a large venue? You'll need some sort of higher-end system.

AUDIO CARD: You won't be dealing with an audio card if you're playing a single electronic percussion instrument with its own audio outputs. But, if you have sounds coming from a laptop or desktop computer, you're going to get a higher quality of sound from a dedicated sound card than from the audio output of the computer itself. The audio card can be an actual card that's housed inside a computer, or it can be an external box that is connected to your computer gear by a USB or FireWire cable.

MIXER: If you're playing an electronic drum kit, there's a



▲ AUDIO CARD:
The Audiophile 2496 4-in/4-out audio card enhances the default sounds of your computer or laptop.

▲ MIXER:
The virtual mixer inside FXpansion's BFD2

good chance you'll be working with a mixer to balance the volumes of the individual instruments within the kit. If you want more cowbell, a trip to the virtual mixer inside the drum brain can make that dream a reality. Computer DAW programs use virtual mixers to combine the signals from digital recordings, plug-ins, and virtual synths. Hardware mixers take the audio signals from a number of different physical devices and mix them together so that they can be sent to an amplifier and speakers.

▲ ACOUSTIC TRIGGER:
The Roland RT-10S acoustic snare trigger

AMPLIFIER: An amplifier is a device that takes the audio signals from your sound module, your computer, or your mixer, and increases their strength so that the signals are strong enough to drive a speaker system. Many small speaker systems are self-powered with the amplifier built into the speaker box.

SPEAKERS: The speakers are the boxes that actually produce the sound you're ultimately going to hear. Speakers come in different shapes and sizes. Subs are larger speakers dedicated to reproducing the lowest frequencies of the sound. Midrange speakers are smaller, and take care of the sounds in the middle of the audio soup. Tweeters are the smallest speakers, and are used to make the highest frequencies crisp and clear. Electronic percussion instruments will sound best with a speaker system designed to cover the full audio range from the lowest sounds of the kick drum to the highest sounds of the cymbals.

MISCELLANEOUS TERMINOLOGY (OTHER TERMS YOU MIGHT LIKE TO KNOW)

FSR: An acronym for Force-Sensing Resistor. This is one of the methods for translating percussion performance gestures into electrical signals. If a drum pad is equipped with FSR technology, it will respond to the strength of a stroke by measuring the pressure on a conductive polymer film. FSRs can also register continuous pressure in addition to a single stroke.

RAM: An acronym that stands for Random Access Memory. RAM is computer memory that can be stored, erased, edited, and stored again.

ROM: An acronym that stands for Read Only Memory. This type of computer memory is burned into a chip at the factory and can't be erased or edited.

ACOUSTIC TRIGGER: An acoustic drum trigger is a small device that attaches to an acoustic drum to generate electrical signals that can be read by the device that can generate MIDI information from those signals. You can plug triggers into a TMI box.

TMI: An acronym for Trigger-to-MIDI Interface. A TMI will read the electrical spike from a trigger attached to an acoustic drum or an electronic drum pad and generate MIDI data from that spike.

▲ TRIGGER-TO-MIDI INTERFACE:
The Alesis Trigger iO connects acoustic triggers on your drums and/or cymbals to your MIDI source.