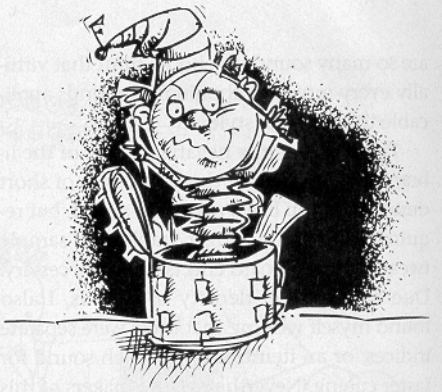

Getting Started With Electronic Percussion

Part II—Trigger-To-MIDI Converters

BY NORM WEINBERG

IN THE JUNE/JULY ISSUE OF *DRUMS & Drumming*, this series on the basics of electronic percussion took a long hard look at input devices. As a quick and simple review, input devices are pieces of electronic gear that sense a physical impact (by either vibration or pressure) and turn it into electrical signals. Under this general umbrella come the pickups or triggers attached to acoustic drums, the pads of an electronic kit, the surfaces of a multi-pad or even the playing area of a mallet controller. Once the impact is converted into an electrical spike, the input device's job is over. Then, another piece of electronic wizardry steps into the music making process.

Meet the trigger-to-MIDI converter. The converter's main function is to generate MIDI data when it "sees" the electrical signal from the input device. Trigger-to-MIDI converters, like input devices, come in a variety of shapes and sizes. At times, they are dedicated converters such as the Aphex Impulse, KAT midiK.I.T.I., or the Roland PM-16. Quite often, though, the trigger-to-MIDI converter is included inside another piece of hardware.

Let's say that you have a multi-pad

ILLUSTRATION: SCOT HALPIN

like the drumKAT, Octapad II, or the PortaKit. The playing surfaces of the multi-pad are the input devices, and the converter is what takes up the rest of the space inside the box. Since these multi-pads make no sounds on their own, they must generate MIDI data in order to send messages to an external sound generator such as a drum machine, synth, or sampler. So, electronic drum kits also contain trigger-to-MIDI converters which translate the signals from the pads into MIDI information that can be sent to other devices in an electronic music system.

Even though trigger-to-MIDI converters are pieces of hardware, their actual abilities (what MIDI data will be generated) is determined by their software. Here's a little analogy: The computer I'm using right now is a piece of hardware, but the word processor running on this computer is software. As I type, certain combinations of actions on the computer's keyboard let me print the symbols for y, Y, ¥, or Á, all from the same key. It's even possible to use this key for performing an action which tells the computer to display all the paragraph returns and tab stops used in this article.

To perform this little magic trick, someone has written a software program with instructions that read something like this: "When the 'y' key is pressed, print that letter on the screen. When the same key is pressed along with the 'shift' key, print 'Y'. If this key is pressed along with the 'option' key, print '¥'. If this key..." In reality, it's not quite this simple, but the concept is accurate. The software program assigns a certain input action (pushing a key) with a certain output action (printing a symbol on the screen).

Trigger-to-MIDI converters work much the same way. Let's look at a few real-life situations and see how they operate. One of the most popular trigger-to-MIDI converters ever made was the Roland Octapad. For now, let's ignore the pads on the surface, and deal only with the additional trigger inputs included on the back of the unit.

The original Octapad could read trigger spikes plugged into any of the eight trigger-input jacks on the back of the box. When a trigger spike was "sensed" by the Octapad, the software would generate MIDI data. Choices of MIDI data: which MIDI note number, which MIDI channel, the MIDI velocity amount, and how long before a note-off message would be sent (commonly called duration).

In other words, the desired MIDI information would be pre-programmed by the performer. When the Octapad saw a trigger spike at that particular input, the internal software then would be instructed to send that particular chunk of data. Each of the eight inputs could generate its own unique set of instructions, just as each button on this typewriter keyboard is programmed to send different data to the screen. Since the Octapad also had eight playing surfaces of its own, it was really an integrated box, containing both input devices *and* a trigger-to-MIDI converter.

Another Roland product, the PM-16, is a dedicated trigger-to-MIDI converter since it doesn't have any on-board input devices. This box includes more sophisticated software instructions that give the trigger spike added versatility. On the PM-16, you can program a wider variety of MIDI data in addition to the MIDI note number, channel, velocity, and duration.

You can layer up to three sounds at once by actually telling the converter to send three sets of note-on instructions per input. To give the performer even more flexibility, the PM-16 can alter its MIDI messages based on the strength of the trigger. Trigger-to-MIDI converters determine the velocity level from the strength of the trigger signal. As an input device is struck harder, the electrical signal gets stronger. You can program the PM-16 to send pitch bend messages, and even to send different note numbers, based on the velocity of the stroke. This means that you could make a synth's sound bend further down as you struck the pad harder (called dynamic bend), or make a drum machine fire entirely different samples when struck at different volumes (called dynamic pitch). Pretty cool, huh?

Here are a few other tricks that trigger-to-MIDI converters can perform. The Aphex Impulse can layer up to four sounds by generating four note-on messages. These four sounds can be instructed to fire all at once, or stack up as the playing volume increases (playing soft fires one sound, playing at a moderate level fires two and three, and playing loud fires all four).

The drumKAT can alter its duration by velocity (softer hits play shorter sounds, louder hits play longer sounds). A special function called "alternating mode" tells the trigger-to-MIDI converter to send three different note-on messages on an alternating basis. It's also possible to tell the drumKAT that a particular trigger signal is going to send a message to start a sequencer, act as a sustain pedal, or send a program change message.

Continued on page 80

Definitions

Dedicated Unit. A box designed for one specific task. A dedicated trigger-to-MIDI converter contains no input devices and no sounds.

Dynamic Bend. The ability to control the rise or fall of a pitch through changes in the performer's dynamic contrasts.

Dynamic Pitch (also called Dynamic Note Shift). The ability to control the MIDI note number through changes in the performer's dynamic contrasts.

Layer. Triggering more than one sound at a time. If a single pad will play a snare drum sound, a cymbal crash, and a scream, then those three sounds are "layered."

Mask Time. A setting which determines the minimum amount of time between trigger spikes. Useful for eliminating false and double triggers.

Minimum Velocity. Adjusts velocity to a user-defined minimum setting. If the minimum velocity is set to a value of 80, for example, then any velocity reading below this level will be boosted to this value.

Multi-Pad. An input device with more than one playing surface.

Note-Off. A MIDI message which turns a sound off.

Note-On. A MIDI message which turns a sound on.

Pitch Bend. A command which tells an instrument to slide the pitch of its note gradually up or down.

Program Change Message. A command instructing an instrument to call up a particular sound, program, or patch.

Retrigger Limit. See "Mask Time."

Sensitivity Level. A control setting which lets the performer adjust the trigger level to an optimal value. Higher values make the input device more sensitive, lower values make it less sensitive.

Velocity. A way of measuring how hard/fast a MIDI device is ....struck on a scale of 0 to 127.

Velocity Curve. A setting which lets the performer adjust the machine to her or his individual playing style. A player with a light touch might use a different velocity curve from that of a heavier hitter. •

Electronic Drummer

Continued from page 61

Theoretically, just about any type and amount of MIDI data can be generated by a trigger-to-MIDI converter. Since the "brain" inside the converter consists of a chip with a set of instructions, giving the unit a new set of instructions will alter the available features. Which features to include is a decision made by the manufacturer, the designer, and/or the programmer.

In addition to just generating MIDI data, trigger-to-MIDI converters usually have a few additional features designed to make your electronic life easier. These goodies include setting a sensitivity level or threshold for each trigger, a minimum velocity level, retrigger limits (also known as mask time), or even selecting a global velocity curve. Most trigger-to-MIDI converters also will send program change messages to external devices whenever a certain patch is called up into memory.

Okay, so you grab your favorite stick and strike an electronic playing surface. The input device reads the physical impact and creates an electrical spike. This spike travels down a length of cable until it arrives at the input of a trigger-to-MIDI converter. The converter "sees" the spike and generates a chunk of MIDI data. This data is then routed to the MIDI-OUT port of the converter and travels down a MIDI cable until it reaches the sound generators, which we'll cover next time. •

Reviews

Continued from page 78

groove. For instance, if he plays an eighth-note rock beat that has occasional sixteenth-note bass drum strokes, he counts in sixteenths rather than eighths. That way, when he does play the sixteenth-note bass drum pattern, it is likely to be more consistent.

By first giving a brief explanation of each groove, Erskine demonstrates numerous variations on jazz, funk, and Brazilian rhythms. Accompanying the video is a well written booklet, complete with notation of each example, personal comments, and a glossary of terms.

Throughout the video, the camera shows Erskine from his left side with his entire drum set in full view. From this angle, viewers can clearly observe Peter's amazing left-hand technique in action. Overall, the subject matter and the production quality of the video is excellent. Hats off to Peter Erskine and DCI for a job well done.

—Greg Rule