

MUSIC TECHNOLOGY: 20 THINGS YOU MUST KNOW

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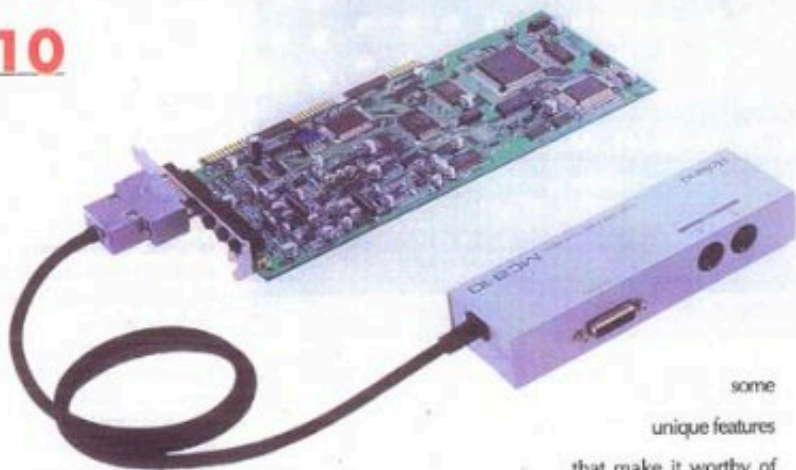
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Soundcard Secrets

Roland **RAP-10**



Until soundcards came along, IBM-PCs could only speak with a puny beep. Now they can sing: A typical soundcard provides both a MIDI-controlled synthesizer and digital audio recording/playback on one plug-in circuit board. Roland's RAP-10 offers an unusual level of integration between these two resources, making it especially musical and a good choice for our fourth Soundcard Secrets article. Below, Roland's Kurt Heiden explains how to get more music out of your RAP-10.

Which soundcard would you like to see us delve into next? Please write and let us know. —Editor

If you've ever heard a General MIDI file played through a wavetable synthesizer like the one in the Roland RAP-10, you know how much fun a wavetable soundcard can be. Still shopping for a wavetable soundcard? The RAP-10 provides

some unique features that make it worthy of serious consideration. Those features include the ability to synchronize .WAV and MIDI files, apply signal-processing effects to both the digital audio and synthesizer sounds independently, "scrub" the digital audio, and modify the synthesizer's instrument sounds while the music plays. We'll cover all of these things and more as we journey to the inside of the Roland Audio Production card.

I Sync I Can

One of the RAP-10 features that's most useful to songwriters is its ability to synchronize digital audio (.WAV) files and MIDI sequence (.MID) files. This means that while your MIDI file is playing you can record a saxophone, trumpet, vocal part, or just about anything that plugs into the microphone or line inputs of the card. When you play it back, you'll hear the

By Kurt Heiden

MIDI file playing all of its instruments from the RAP-10 synthesizer, while the vocal (or whatever you recorded) plays back fully synchronized with the MIDI file the same way you heard it when you recorded it (see Figure 1). Unlike systems that merely trigger .WAV files on playback, the WaMi sequencer locks the audio and MIDI data together, allowing you to start playback anywhere in the song — even in the middle of a .WAV file — and hear all the parts correctly. The Roland Audio Tools software saves these files as WaMi (.WAMI) files (since Wave + MIDI = WaMi).



Fig. 1 The WaMi Sequencer only looks like a normal audio mixing console. The first two channels (columns) control the .WAV digital audio; the next nine are for the MIDI synthesizer's sounds. (To see MIDI channels 10 through 16, click the two right-pointing arrows at the top.) The padlock symbol on MIDI channels 1, 2, and 3 indicates that the corresponding set of controls will move together.

A fun way to get started with WaMi is to import a .MID file of a popular song, available online or commercially, and add vocals to it. If you've got a MIDI sequencer, you can start constructing a song by recording the different instrumental parts into the sequencer, saving the sequence as a Standard MIDI File (.MID), and then importing it into the WaMi Track Sequencer (Figure 2) and adding the digital audio tracks. If you decide later that your MIDI tracks need to be tweaked, you can go back to your original sequence, make the changes, and re-import the file into the WaMi — the digital audio tracks will still be there.

The WaMi Track Sequencer shows the MIDI file on the bottom as a blue line. Above that are W-1 and W-2, the two tracks of digital audio. This is the best screen in which to see how your WaMi file is assembled. Notice that each .WAV file has a precise start and stop point along the MIDI file's timeline. These .WAV files play back at whatever point they were recorded during the MIDI file unless you specify otherwise. Why would you want to? Take a look at Figure 2. The .WAV file "melody1a" (represented on the screen as the block with "05" inside) is actually played four times in the song. At about 25 seconds into the song, it enters in the W-1 track, followed almost immediately by another repetition in the W-2 track. Playing two copies of the same bit of audio with a slight offset adds a doubling, "slapback" echo effect to the sound. If W-1 and W-2 were panned hard left and right, the slight offset would add an interesting stereo dimension. Melody1a appears again about 35 seconds into the song, this time doubled by "melody 2a" (block 06), for a harmony effect. The final time it's heard is about 1:21 into the song,

when it plays by itself. Using the same recording four times not only saves memory, it also takes the pressure off — you don't have to try to duplicate a perfect performance every time the same line appears in the song.

Digital Audio Layering

Roland Audio Tools can handle 16 digital audio events in a WaMi file. However, you can actually layer sounds in the Wave Composer applet to get many more than that. This is especially helpful if you want to sing a harmony or background part to go along with your lead vocal. By layering digital audio tracks in the Wave Composer, you can keep digital audio track 2 open for additional vocals, a guitar solo, or other acoustic mischief. If you're recording sound effects as digital audio, you can use Wave Composer to layer several sound effects on top of each other to create a more complex sound.

Here's a quick way to do this: Load up the ATMIDNIT.WAM file, then go to the Wave Composer. The 15 squares at the top of the screen represent the 15 .WAV files used in this WaMi file. Click number 5, then click the bottom horizontal line in the large black composition area. Now click number 2, then the second line up from the bottom. Next click number 3, then the third line from the bottom. Increase the view size by selecting 16X. Drag number 2 to 1.312 seconds. Drag number 3 to 3.875 seconds. Now click the "composition format" button (the one with the question mark on it) and be sure that you're composing at 16-bit, mono, 44.1kHz, then click the OK button. (16-bit resolution gives the smoothest dynamic response, mono is used here because we're working with a mono file, and the 44.1kHz sampling rate gives the best frequency response.) Click the "Composition Build" button (the one with the blue horizontal lines on it), then OK, and you'll have combined those three separate .WAV files into one new .WAV file that you can now save to hard disk or include in the Session Manager for use in your WaMi file.

Scrub-a-Dub

The Waveform Editor in Roland Audio Tools provides several important editing features, but one feature that sets it apart from other editors is the ability to "scrub" a .WAV file. (Scrubbing is a term derived from the days of analog tape, when the recording engineer would slowly rotate the tape reels back and forth, dragging the tape across the playback head. At such slow speeds, it's much easier to find the precise spot where an individual sound starts.)

With the ATMIDNIT.WAM file loaded, go to the Session Manager. Choose number 7, "scat1a" to bring up the Waveform Editor. Click the button that looks like four red lines with a green triangle in it. Now click anywhere in the waveform and drag the mouse. You will hear the .WAV file play at the speed you drag the mouse. By moving the mouse right or left, you can play the sound forward or backward until you find the exact point you want to use to edit the file. With a little practice, you should be able to zoom in on an individual word (or syllable in this case).

Now the fun starts. Try reversing a single syllable by highlighting it and pressing the Reverse button. (It's the one at the top center of the screen with the arrows pointing left.) That should wake up the audience! If the Reverse button is "grayed out" (inactive), you'll need to go into the AUDIO.INI file and set "VirtualBoundary=1" under the "[audio]" heading to activate it. [Ed. Note: See the Winter '95 M&C for many more digital audio editing tips.]

Better Living Through Digital Signal Processing

The party really comes alive with the next feature unique to the RAP-10: its ability to apply different amounts of digital signal processing (DSP) effects to each of the two digital audio tracks and each of the 16 MIDI tracks. This means that while your MIDI file and .WAV file play back, you can apply differing levels of effects like reverb and chorus to each instrument. This is useful for giving a sound more "presence" or realism. Electric guitar sounds, for example, are pretty thin-sounding on most wavetable synthesizers. Reverb and chorus can really fatten up that guitar sound to make it sound like it's running through a studio full of processing gear. By applying a different amount of reverb to each sound, you can control its perceived distance from the listener. Adding more reverb will move it away; reducing the amount of reverb will bring it closer.

If you've played around with the WaMI Mixer (Figure 1) or worked with the ATMIDNIT.WAM demo song, then I'm sure you've heard how great independent effects levels can make a music mix sound. Fortunately, all of the changes you make in the WaMI Mixer can be recorded as MIDI events in real time. Here's a great way to hear what a difference the DSP makes: Load the ATMIDNIT.WAM file into the WaMI mixer. When the counter reading in the upper right corner reaches 26 seconds, click the SOLO button on digital audio track 1. Immediately click on the reverb knob in the same track. As you move the mouse down you'll hear the vocals being affected less by the RAP-10's DSP. Another way to do this is to hold down the shift key while clicking the left mouse button. This moves the level of a knob down one "notch." When you have the reverb all the way down, lower the chorus knob in the same way. Now you're listening to a "dry" vocal. Pretty gruesome, huh? You can now apply reverb and chorus amounts as you wish. When you get the level you want, click the SOLO button again to unmute the other channels, including the synthesizer portion of the card.

Try this same procedure on the MIDI channels to hear how the DSP improves instrumental sounds. The right amount of reverb can make a

Table 1 — Sys-Ex Commands for Reverb Types

| | | | | | | | | | | | |
|---|----|----|----|----|----|----|----|----|----|----|----|
| ROOM 1 (simulates the reflections of sound in a small room) | FD | 41 | 10 | 56 | 12 | 00 | 00 | 00 | 00 | 00 | FF |
| ROOM 2 (simulates the reflections of sound in a medium room) | FD | 41 | 10 | 56 | 12 | 00 | 00 | 00 | 01 | 7F | F7 |
| ROOM 3 (simulates the reflections of sound in a large room) | FD | 41 | 10 | 56 | 12 | 00 | 00 | 00 | 02 | 7E | F7 |
| HALL 1 (simulates the reflections of sound in a concert hall) | FD | 41 | 10 | 56 | 12 | 00 | 00 | 00 | 03 | 7D | F7 |
| HALL 2 (simulates the reflections of sound in a larger concert hall) | FD | 41 | 10 | 56 | 12 | 00 | 00 | 00 | 04 | 7C | F7 |
| PLATE (simulates an old style, electro-acoustic device that uses a metal plate for reverb) | FD | 41 | 10 | 56 | 12 | 00 | 00 | 00 | 05 | 7B | F7 |
| DELAY (simulates a conventional delay that produces echo effects) | FD | 41 | 10 | 56 | 12 | 00 | 00 | 00 | 06 | 7A | F7 |
| PANNING DELAY (Same as DELAY, except the echoes alternate between the left and right speakers) | FD | 41 | 10 | 56 | 12 | 00 | 00 | 00 | 07 | 79 | F7 |

huge difference in giving your finished WaMI file a professional quality. To find that magical "right amount," you'll need to experiment with different levels of reverb and chorus for each of the instruments in your mix. When it sounds like you're hearing more of the DSP effect than the instrument itself, back the level down to what sounds best to your ear. Try cranking up the reverb and chorus to maximum on electric guitar sounds for more of a "grunge" sound. Apply moderate amounts of reverb to piano sounds for more realism, or greater amounts for a "new age" effect. Try removing all reverb and chorus effects from some of the bass instruments like "Slap Bass 2" to create a very articulated, snappy bass sound.

Automated Mixing Made Easy

The WaMI Mixer is by far the most powerful part of the software included with the RAP-10. This is the place where you can bring in a finished MIDI file, add digital audio to it, and perform automated changes in both MIDI and digital audio sources. It's easy to automate events in your own songs with a few simple mouse clicks. Here's an example: Load the ATMIDNIT.WAM file into the WaMI Mixer. As you watch this file play, keep an eye on the location counter. You'll notice that the fader for the digital audio on track 1 climbs slightly at 2 seconds. At about 4 seconds it moves higher to bring out the first vocal sound. At 8 seconds it rises to the level required to hear the vocal clearly for the rest of the song. This automation was recorded into the WaMI file.

Now it's time for you to record your own changes. Click the small red Record button in the lower left corner of MIDI tracks 1, 2, 3, 6, 7, and 8. Hold down the Control key on your computer keyboard, then click once on each of those same MIDI channels. (You'll notice a small red padlock appear, indicating that the track is locked to another track.) Now click the big red Master Record button that is near the Play button on the right side of the screen. Click the Play button and immediately move the mouse over to any one of the "record-enabled" tracks. Drag the track up and down while the file plays and you will hear the MIDI volumes of all the locked tracks rising and falling with the mouse movements. Those changes are now recorded into your WaMI sequence so you can see and hear them changing when you play the file back.

The benefit of locking the faders together is that since certain



Fig. 2: Here we can see the entire song, displayed as two digital audio tracks and a MIDI track. Notice that certain wave files, such as block #5, "melody1a", are played more than once in the song.

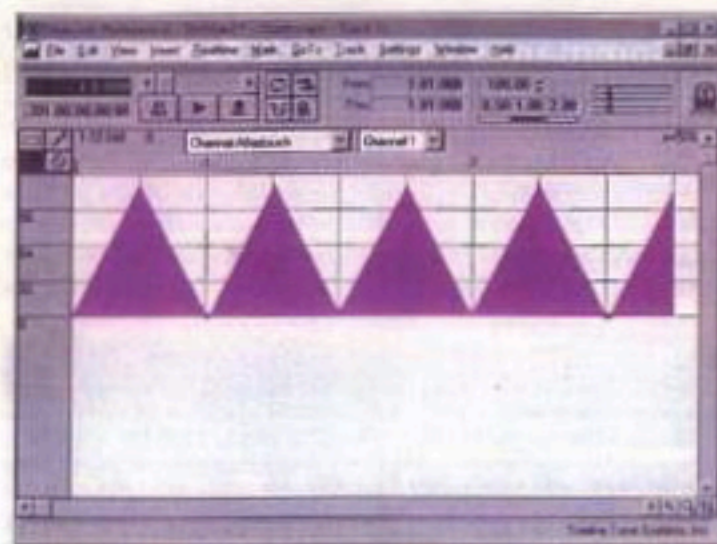


Fig. 3. This window from the Cakewalk Professional sequencer graphs how the RAP-10's filter cutoff can be swept in real time by MIDI aftertouch messages. The peaks of the mountains indicate times when the filter is wide open, producing a bright sound; in the valleys, the sound is dark. Here, the sound is set to be brightest on the second and fourth beats of every measure.

Instruments naturally fall into functional groups in a song — the drums, bass, and piano forming the rhythm section, for example — you can simultaneously control a whole group of instruments, shaping the song at a macroscopic level. This is similar to the way a conductor directs an orchestra, bringing a section up and down with his/her left hand. The great thing about the RAP-10's fader-locking function is that all the grouped faders move proportionately, preserving their volume ratios to each other.

Holding the Control key while clicking the mouse also allows you lock the knobs for reverb, chorus, and panning (covered later) together for even more automated recording. Try moving the reverb knob on

track 1 so it points off to the right (about 3 o'clock), and move the reverb knob for track 3 so it points to the left (about 9 o'clock). Hold the Control key and click the reverb knob for tracks 1, 2, and 3. Once again, padlocks will appear, showing that the reverb knobs are locked together. Now move any of the three knobs (by clicking on one and dragging the mouse) to watch all three move together. Of course, if the record buttons for the tracks and the master record are enabled, those changes will occur every time the WaMI file is played back.

For some sonic spice, take a track with a percussion part — something simple, like a shaker playing eighth-notes — and record three sets of knob movements as the song plays. First, wiggle the pan knob back and forth slowly, which will move the sound between the speakers. Next, go back and record slow movements on the reverb knob, which will move the sound forward and back. Finally, use the volume fader to bring the part in and out. Synchronizing your fader movements with the beat of the song can produce some cool techno effects — for example, bouncing the sound between the speakers every other beat, or giving it a big blast of reverb every fourth beat.

Automation is also effective when used more subtly, bringing an instrument's level up slightly during a solo and back afterward, for instance. Subtle movements of the chorus knob on a sustaining string track will add richness and life to the sound.

Synthesizer Secrets

Since the wavetable synthesizer built into the RAP-10 is a member of the Roland Sound Canvas family, you'd expect that it would be possible to shape and customize the internal sounds. You may have noticed by flipping through the owner's manual that there are some veiled references to changing the TVF (Time Variant Filter), but no easy explanation of how to do this. Fortunately, the RAP-10 has some tricks that aren't all that obvious to those skimming the back few pages of the manual.

Before continuing, you should be familiar with entering and editing MIDI sys-ex (system-exclusive) commands in whatever MIDI

Table 2 — Sys-Ex Commands for Filter Cutoff

| | BEGIN SYS-EX | ROLAND ID | DEVICE ID | MODEL NUMBER | COM- MAND ID | MSB | CHANNEL ID | LSB | VALUE | CHECK- SUM | END SYS-EX |
|------------|-----------------|--------------|--------------|-----------------|-----------------|-----|---------------|-----|-------|---------------|---------------|
| Channel 1 | F0 | 41 | 10 | 5E | 12 | 01 | 01 | 04 | 7F | 76 | F7 |
| Channel 2 | F0 | 41 | 10 | 5E | 12 | 01 | 02 | 04 | 7F | 7A | F7 |
| Channel 3 | F0 | 41 | 10 | 5E | 12 | 01 | 03 | 04 | 7F | 79 | F7 |
| Channel 4 | F0 | 41 | 10 | 5E | 12 | 01 | 04 | 04 | 7F | 78 | F7 |
| Channel 5 | F0 | 41 | 10 | 5E | 12 | 01 | 05 | 04 | 7F | 77 | F7 |
| Channel 6 | F0 | 41 | 10 | 5E | 12 | 01 | 06 | 04 | 7F | 76 | F7 |
| Channel 7 | F0 | 41 | 10 | 5E | 12 | 01 | 07 | 04 | 7F | 75 | F7 |
| Channel 8 | F0 | 41 | 10 | 5E | 12 | 01 | 08 | 04 | 7F | 74 | F7 |
| Channel 9 | F0 | 41 | 10 | 5E | 12 | 01 | 09 | 04 | 7F | 73 | F7 |
| Channel 10 | F0 | 41 | 10 | 5E | 12 | 01 | 0A | 04 | 7F | 7C | F7 |
| Channel 11 | F0 | 41 | 10 | 5E | 12 | 01 | 0A | 04 | 7F | 72 | F7 |
| Channel 12 | F0 | 41 | 10 | 5E | 12 | 01 | 0B | 04 | 7F | 71 | F7 |
| Channel 13 | F0 | 41 | 10 | 5E | 12 | 01 | 0C | 04 | 7F | 70 | F7 |
| Channel 14 | F0 | 41 | 10 | 5E | 12 | 01 | 0D | 04 | 7F | 6F | F7 |
| Channel 15 | F0 | 41 | 10 | 5E | 12 | 01 | 0E | 04 | 7F | 6E | F7 |
| Channel 16 | F0 | 41 | 10 | 5E | 12 | 01 | 0F | 04 | 7F | 6D | F7 |

sequencing program you use. Learning about sys-ex is well worth the effort if you want to create new sounds or effects. [Ed. Note: Sys-ex commands are strings of numbers, usually written in hexadecimal format, that carry information specific to a certain model of MIDI device. In other words, that model exclusively will respond to the commands; all other MIDI devices ignore them. Sys-ex commands are typically entered by typing them into a sequencer's "event view" window; during playback, the sequencer will send them out over MIDI to control the device. See the Winter '95 M&C for more background.]

You may not be aware that the RAP-10 has eight different types of reverb. You can switch among them by adding a sys-ex command to your MIDI file. Table 1 shows a listing of sys-ex commands to change reverb types. Please note: Any time you change to a different reverb type, the reverb that you choose will be applied to every MIDI channel, including the drum tracks. Again, the amount and type of reverb to choose varies greatly depending on your personal taste and music style. Experiment with the different types to find the best one for each production.

1984 Revisited

One of the most popular synth tweaks, and by far my favorite, is filter cutoff. [Ed. Note: See "Synthesizer Programming Basics" (page 24) for more background on synthesizer filters.] When you sweep (vary) the filter cutoff in real time, it produces the wah-wah or "wow" effect used by many pop bands of the '70s and '80s. (This effect is very noticeable in the intro to "Tom Sawyer" by Rush and in the bass part on "Enjoy the Silence" by Depeche Mode.) Consequently, this simple tweak is particularly good for getting that vintage analog synth sound from your Sound Canvas. The good news: You can change filter cutoff levels for instrument sounds on your RAP-10. The bad news: Got a few minutes to spare? The RAP-10 requires that you send a sys-ex command for each MIDI channel you want to work with.

Table 2 shows a list of the sys-ex commands required to instruct

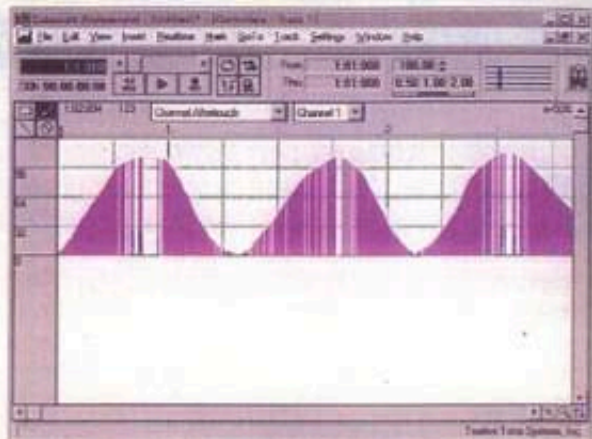


Fig. 4: Here we're again sweeping the RAP-10's filter, but in a smoother, less mechanical way than in Fig. 3. This effect might work well on a sustaining string sound.

each MIDI channel to respond to filter cutoff messages. The sys-ex command tells the RAP-10 that ensuing channel aftertouch messages on that MIDI channel will modify filter cutoff on the selected sound. (Aftertouch is a MIDI message produced by pressing down on a keyboard's key after it's reached the key bed. If your keyboard doesn't generate aftertouch, you may be able to assign a slider to transmit it, as can the Roland PC-180. Failing that, you may be able to draw aftertouch messages into your sequencer's graphic controller window.) On pages 16 and 17 of the owner's manual, there is a list of sounds that are not affected by changes in filter cutoff. The ones that don't work are denoted in the TVF column by the word "OFF".

Figure 3 shows aftertouch changes applied in sharp rises and drops to get a steady opening and closing of the filter tied to the rhythm

Table 3 — Sys-Ex Commands for LFO Rate

| | BEGIN SYS-EX | ROLAND ID | DEVICE ID | MODEL NUMBER | COM- MAND ID | MSB | CHANNEL | LSB | VALUE | CHECK- SUM | END SYS-EX |
|------------|-----------------|--------------|--------------|-----------------|-----------------|-----|---------|-----|-------|---------------|---------------|
| Channel 1 | F0 | 41 | 10 | 56 | 12 | 01 | 01 | 06 | 7F | 79 | F7 |
| Channel 2 | F0 | 41 | 10 | 56 | 12 | 01 | 02 | 06 | 7F | 79 | F7 |
| Channel 3 | F0 | 41 | 10 | 56 | 12 | 01 | 03 | 06 | 7F | 77 | F7 |
| Channel 4 | F0 | 41 | 10 | 56 | 12 | 01 | 04 | 06 | 7F | 76 | F7 |
| Channel 5 | F0 | 41 | 10 | 56 | 12 | 01 | 05 | 06 | 7F | 75 | F7 |
| Channel 6 | F0 | 41 | 10 | 56 | 12 | 01 | 06 | 06 | 7F | 74 | F7 |
| Channel 7 | F0 | 41 | 10 | 56 | 12 | 01 | 07 | 06 | 7F | 73 | F7 |
| Channel 8 | F0 | 41 | 10 | 56 | 12 | 01 | 08 | 06 | 7F | 72 | F7 |
| Channel 9 | F0 | 41 | 10 | 56 | 12 | 01 | 09 | 06 | 7F | 71 | F7 |
| Channel 10 | — | — | — | — | — | — | 00 | — | — | — | — |
| Channel 11 | F0 | 41 | 10 | 56 | 12 | 01 | 0A | 06 | 7F | 70 | F7 |
| Channel 12 | F0 | 41 | 10 | 56 | 12 | 01 | 0B | 06 | 7F | 6F | F7 |
| Channel 13 | F0 | 41 | 10 | 56 | 12 | 01 | 0C | 06 | 7F | 6E | F7 |
| Channel 14 | F0 | 41 | 10 | 56 | 12 | 01 | 0D | 06 | 7F | 6D | F7 |
| Channel 15 | F0 | 41 | 10 | 56 | 12 | 01 | 0E | 06 | 7F | 6C | F7 |
| Channel 16 | F0 | 41 | 10 | 56 | 12 | 01 | 0F | 06 | 7F | 6B | F7 |

Table 4 — Sys-Ex Commands for LFO Depth

| | BEGIN SYS-EX | ROLAND ID | DEVICE ID | MODEL NUMBER | COM- MAND ID | MSB | CHANNEL | LSB | VALUE | CHECK- SUM | END SYS-EX |
|------------|-----------------|--------------|--------------|-----------------|-----------------|-----|---------|-----|-------|---------------|---------------|
| Channel 1 | FD | 41 | 10 | 56 | 12 | 01 | 01 | 02 | 7F | 70 | F7 |
| Channel 2 | FD | 41 | 10 | 56 | 12 | 01 | 02 | 03 | 7F | 76 | F7 |
| Channel 3 | FD | 41 | 10 | 56 | 12 | 01 | 03 | 03 | 7F | 7A | F7 |
| Channel 4 | FD | 41 | 10 | 56 | 12 | 01 | 04 | 03 | 7F | 72 | F7 |
| Channel 5 | FD | 41 | 10 | 56 | 12 | 01 | 05 | 03 | 7F | 78 | F7 |
| Channel 6 | FD | 41 | 10 | 56 | 12 | 01 | 06 | 03 | 7F | 77 | F7 |
| Channel 7 | FD | 41 | 10 | 56 | 12 | 01 | 07 | 03 | 7F | 76 | F7 |
| Channel 8 | FD | 41 | 10 | 56 | 12 | 01 | 08 | 03 | 7F | 75 | F7 |
| Channel 9 | FD | 41 | 10 | 56 | 12 | 01 | 09 | 03 | 7F | 74 | F7 |
| Channel 10 | — | — | — | — | — | — | 00 | — | — | — | — |
| Channel 11 | FD | 41 | 10 | 56 | 12 | 01 | 0A | 03 | 7F | 73 | F7 |
| Channel 12 | FD | 41 | 10 | 56 | 12 | 01 | 0B | 03 | 7F | 72 | F7 |
| Channel 13 | FD | 41 | 10 | 56 | 12 | 01 | 0C | 03 | 7F | 71 | F7 |
| Channel 14 | FD | 41 | 10 | 56 | 12 | 01 | 0D | 03 | 7F | 70 | F7 |
| Channel 15 | FD | 41 | 10 | 56 | 12 | 01 | 0E | 03 | 7F | 6F | F7 |
| Channel 16 | FD | 41 | 10 | 56 | 12 | 01 | 0F | 03 | 7F | 6E | F7 |

Table 5 — Enable NRPN on Drum Sounds

| | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|----|
| FD | 41 | 10 | 56 | 12 | 01 | 00 | 01 | 01 | 70 | F7 |
|----|----|----|----|----|----|----|----|----|----|----|

of the piece, peaking at the second and fourth beat of every measure. This technique is good for creating the robotic filter changes that are often heard in techno music. Figure 4 shows a more gradual, flowing filter sweep. This is very effective when used on synthetic sounds like patch 91, Polysynth, producing a "flowing" effect that many new age artists enjoy.

You'll notice that the sys-ex commands for each channel are identical except for the Channel and Checksum columns. Remember — these numbers are in hexadecimal format. The channel 10 checksum does not fall in sequence, but it works.

Once you have sent the sys-ex command for the channel you want to modify, you need to start changing the channel aftertouch controller. Each time you modify the aftertouch value, you'll hear the filter open or close. Check page 18 of the owner's manual for a listing of drum sounds that can be affected by filter sweeps. Changes to the filter cutoff on drum sounds are done to every drum sound marked with a dot next to it on page 18. This can provide some pretty funky drum tracks if used creatively.

In addition to TVF modifications, you can change the LFO (Low Frequency Oscillator) rate and depth through sys-ex messages (channel 10 is not modified by these changes). This is good for creating anything from a quivering vibrato (using small amounts of rate and depth) to an alien spacecraft (large amounts of rate and depth). Tables 3 and 4 show the sys-ex messages to change these parameters. If you do not increase the LFO depth first, changes to the rate may be hardly noticeable, so keep this in mind when you are modifying sounds.

As with the filter cutoff, you adjust the LFO rate by sending the appropriate sys-ex message followed by aftertouch messages. For the LFO depth, though, follow the sys-ex message with a modulation message (MIDI continuous controller #1, usually sent by the

modulation wheel on a MIDI keyboard). This way, you can control both rate and depth independently.

Boomy Bass

Another fun way to maximize your soundcard investment is to lower or raise the pitch of the drums on each of the drum kits. This is really good for getting a deep, boomy kick drum from the Roland TR-808 drum kit. Start by sending the sys-ex message in table 5 on channel 10. After that, you'll need to send standard MIDI controller messages to tell the RAP-10 what you intend to modify, and by how much.

Table 6 — NRPNs for Drum Control

| Controller Number | Value | Remarks |
|-------------------|-------|--|
| 99 | 24 | Tells the RAP-10 that pitch is to be changed. |
| 98 | xx | Tells the RAP-10 that note xx (Kick Drum 1 is #36, for example) is the drum sound to change. |
| 6 | yy | Specifies the relative pitch of the drum sound. |

Table 7 — General MIDI System ON

| | | | | | |
|----|----|----|----|----|----|
| FD | 7E | 7F | 00 | 01 | F7 |
|----|----|----|----|----|----|

The sys-ex data in table 5 tells the RAP-10 that you're ready to send NRPN (MIDI Non-Registered Parameter Number) messages to change the pitch of the drums. To send NRPN messages, send the controller messages in table 6. (Type them into the event view window of your sequencer, one clock tick apart.) The first two controller messages set the parameter, the third sets the value. Here the values are displayed in decimal format, not hex.

You can find the note numbers for each drum sound on page 18 of the owner's manual. For controller 6, you need to enter a value between 0 and 127. Values above 64 will raise the pitch, values below will lower it.

If you change the value of controller 99 to 26 instead of 24 in the table 6 sequence, then controller 6 will adjust panning for the drum sound you select. Panning allows you make a sound come from the left speaker, right speaker, or anywhere in between. Panning changes can also be recorded into your final mix using Roland Audio Tools' WaMi Mixer by adjusting the knobs marked PAN.

If you try any of these modifications and later want to get back to where you started, issue the sys-ex message in table 7 to reset the RAP-10. To ensure accurate General MIDI playback, it's a good idea to place this message at the beginning of every MIDI file you create.

RAP It Up

With the RAP-10 and Roland Audio Tools software you can make some professional-sounding songs by combining .WAV vocals with MIDI instruments, then applying DSP and mixer automation to your recorded tracks. Using the sys-ex messages I've covered here, you can get even more mileage from the RAP-10 by creating all-new sounds from the ones that are already there. In addition, the multiple reverb types allow you more flexibility in effects processing than you may have imagined. With these tips, and some creativity, you should be well on your way to your own Roland audio productions.

Kurt Heiden is a Roland product specialist. He creates interactive demonstrations, promotes the use of MIDI for developers, and conducts training on Roland products throughout the U.S. He has composed music for computer games from Interplay Productions and Go-Go Interactive.

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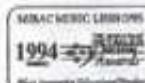
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David M. Rubin, The Desktop Musician,
Osburn McGraw-Hill, Berkeley CA 1995



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