PROGRAMMING PROCUSSION

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CREATING A CUSTOM KIT

Creating your own custom kit is easy. First, you select the key range for the zone. Then you may simply select the desired stack from the palette of pre-programmed factory stacks. Repeat the two steps until you have a large enough drum kit. You may assign up to 24 stacks to a kit and a zone may contain 1 or 2 stacks.

BUILDING A CUSTOM KIT ... STEP BY STEP

1) Select one of the "--default--" kits which are located at numbers 105-127.

2) Press the **Edit** button and go to the second screen, "STACK SELECT".

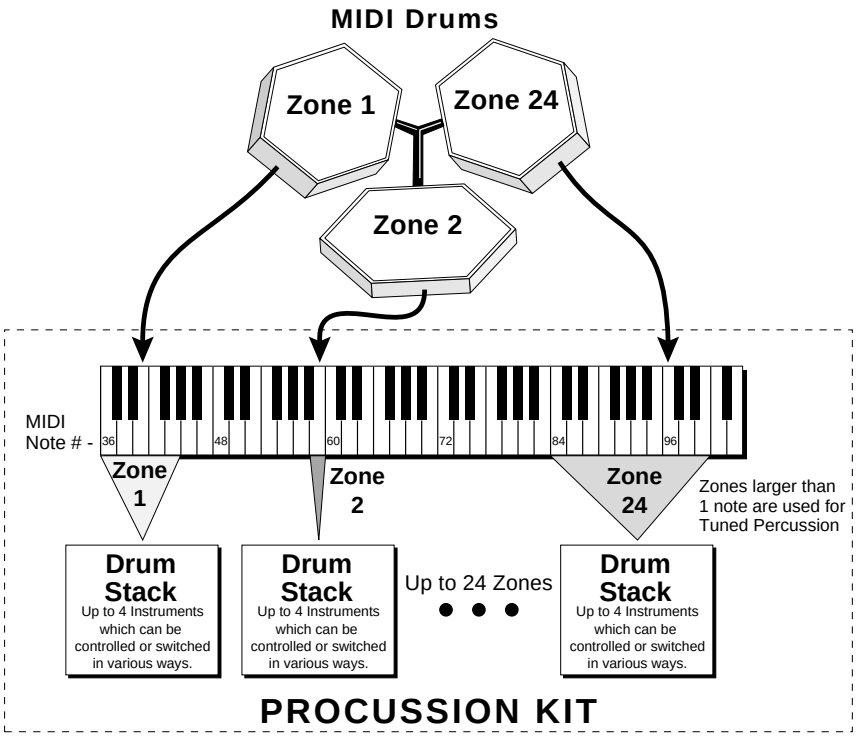
3) Play the **Pad** or **Key** to select the Zone.

4) Move the **Cursor** underneath the Stack number and use the **Data Knob** to change stacks until you find one you like.

5) Repeat steps 3 and 4 until your kit is complete. Then press **Enter**.

6) If you wish to rename your new kit, do so now using the "KIT NAME" function.

7) Rotate the **Data Knob** to the last screen, "SAVE KIT". Move the **Cursor** to the lower line and press **Enter**.



■ *If you are using the Procussion with a MIDI keyboard, set the Zone Map to "Kit" (Master Menu). If you are using MIDI drum pads or a drum machine you should use one of the User Zone Maps or a Zone Map which is preprogrammed for your controller.*

■ *The center of the zone is always the original pitch of the stack. The original pitch of most factory stacks is set at "C". If the zone is out of tune, use the Zone Tuning function to tune the stack to the correct pitch.*

PROGRAMMING PROCUSSION

EDITING KITS

The easiest way to make a kit is to edit an existing kit. This is also an excellent way of becoming familiar with Procussion. You can find a kit that is almost the way you want it and then slightly modify it to suit your taste. If you don't like what you hear, simply change the kit and Procussion reverts back to the original sound. Changes are not made permanent until you ***Save*** them using the "SAVE KIT" function, which is the last screen in the Edit menu. We'll start with a function that has an obvious effect on the sound; Stack Tuning. First, choose a kit that strikes your fancy and press the Edit button.

CHANGING THE TUNING OF A ZONE

Changing the tuning of a zone is something you will often want to do. And it's so easy. Scroll through the Edit menu until you come to the screen:

```
TUNING        Z01
CRSE+00  FINE+00
```

Move the cursor under the Zone Number (using the cursor button) and play the keyboard key or drum pad containing the stack you want to tune. The proper zone will automatically be selected.

Next, move the cursor to the bottom line so that it is underneath the Coarse Tuning amount. As you play the stack, turn the data knob to change the tuning in semitone intervals. The Fine Tuning parameter changes the tuning in 1/64 of a semitone intervals.

By moving the cursor back under the Zone Number you could select the next zone to be tuned. Easy, isn't it? And, if you wanted to save the new tunings? Press the Enter button and continue.

SAVING YOUR WORK

Every time you have made a series of changes to a kit that you would hate to lose, you should SAVE your work using the "SAVE KIT" function which is the last screen in the Edit menu. Kits can be save to any of the User Kit locations 64-127. Kits 105-127 have been left empty to encourage you to modify and save your own custom kits.

PROGRAMMING PROCUSSION

TO SAVE A KIT

1) Turn the **Data Knob** clockwise until you get to the last screen, "SAVE KIT".

2) Move the **Cursor** to the lower line in the display.

3) Turn the **Data Knob** to select the Kit number where the new kit will be placed (64-127). ***Remember*** - Writing to a kit location erases whatever kit was already there.

4) When you have selected the new kit location, press **Enter**. The display will say, "SAVING KIT". The kit is now saved.

▼ ***Saving a Kit overwrites the previous Kit in that location!***

BUILDING YOUR OWN STACKS

Let's go a step further now and create a hot new sound completely from scratch. In order to get the most out of this section, you should have already read the Programming Basics section of this manual and have a basic understanding of the Procussion architecture.

Assign a Custom Stack

There are 8 Custom Stacks for each User Kit in Procussion.

1) Select one of the "--default--" kits which are located at numbers 105-127.

2) Press the **Edit** button and turn the **Data Knob** clockwise to the second screen, "STACK SELECT".

3) Move the **Cursor** to the lower line and select "Custom #1", then press **Enter**.

4) Turn the **Data Knob** clockwise to the next screen, "KEY RANGE". Choose zone 1 with cursor or data knob or by playing a key.

5) Move the **Cursor** to the lower line by pressing it twice. The display should look like this, with the cursor under the first key number:

```
KEY RANGE    Z01
036 -> 036
```

■ *When first learning your way around Procussion, keep your eye on the flashing cursor to make sure it is under the correct parameter.*

PROGRAMMING PROCUSSION

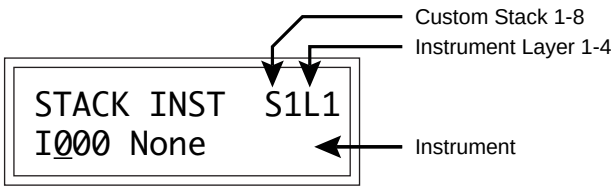
6) Play a note on your Keyboard or Drum Pad, and press the **Cursor**.

7) Play the note again and press **Enter** to assign the zone to a one-note range. (The one-note range is only for simplicity. You may of course, assign a wider range if desired.)

Select and Tune Instruments

8) Turn the **Data Knob** clockwise until you find the screen:

■ *The cursor can be moved to the function select position (top-left) by pressing Enter or by using the cursor control. Either method is fine.*

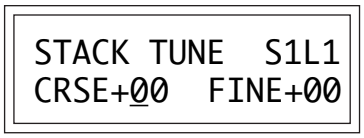


Set the Stack and Layer numbers to S1 L1 as shown above.

9) Move the **Cursor** to the lower line as shown above.

10) While playing the note that you assigned in step 7, turn the **Data Knob** until you find an instrument that you like. Press **Enter**.

11) Turn the **Data Knob** clockwise to the next screen:



12) Move the **Cursor** to the lower line underneath the Coarse Tuning value. Now turn the **Data Knob** to change the tuning. Notice how you can completely change the character of the sound by tuning it out of its normal range. Also notice the distortionless pitch shifting from Procussion that makes this possible. Tune this first layer to your liking, then press **Enter**.

13) Now go back to the "STACK INST" screen to select the instrument for layer 2.

14) Move the **Cursor** underneath the Instrument Layer parameter (see the diagram above) and use the **Data Knob** to select Layer 2.

15) Now move the **Cursor** back down to the bottom line and repeat steps 10 through 12. Try to find an instrument which complements the first one you selected. Remember that the tunings have a lot to do with how an instrument sounds. Play around awhile with the instruments and tunings until you have a composite sound that you like. If you want, you can even add a third or fourth layer to the brew. In any case, press **Enter** to select the next screen.

This might be a good time to introduce another cool feature, **"Audition Layer"**. This feature allows you to completely mute all layers but the one you are working on. It is often useful, when working on a complex sound, to be able to hear exactly what you are doing to a single layer.

16) Turn the **Data Knob** until you find the screen "AUDITION LAYER" and move the cursor down to the lower line. Use the **Data Knob** to select Layers 1, 2, 3, or 4. When you are finished, be sure to turn Audition Layer "Off" again and press **Enter**. Now, back to our programming.

Volume and Panning

17) Turn the **Data Knob** counter-clockwise until you find the screen:

```
STACK VOL   S1L1
100
```

Now we will adjust the relative volumes of the instruments. This can really "fine tune" the composite sound.

18) Go back and forth between the **Layer** and the **Volume** amount while playing the sound until you get the mix just right. Don't turn any of the levels up full or you won't be able to add accents later (the volume will already be "Maxed"). A maximum setting of around 100-110 will leave a little headroom.

19) Move the cursor back up to the top line by either pressing **Enter** or simply pressing the **Cursor** button until it is underneath "Stack Vol".

PROGRAMMING PROCUSSION

20) Turn the **Data Knob** to the next screen, "STACK PAN". Adjust the pan positions to hear how this separates the layers. Leave them set near center (0-2) and press **Enter**.

Delay, Sound Start and Reverse

21) Turn the **Data Knob** to the next screen, "DELAY/START". Play around with these two parameters and note the effects. Delay will be obvious. Sound Start removes samples from the start of the sound. A setting of 000 plays the sound from the beginning, higher values move the start point toward the end of the sound. These parameters may or may not appeal to your artistic sensibilities. In any case, now you know what they do. *Next…*

→ → → → → →

From here on out we'll dispense with the step-by-step explanations since you are probably becoming familiar with the way Procussion operates.

22) Let's move on to the next screen - **Reverse**. Reverse can be turned on or off for each layer. Try reversing each layer and note the effects. Reverse works especially well for special effects. *Next function …*

23) **Alternate Envelope.** This function allows you to change the default volume envelope for each instrument. The Alternate Envelope is a really powerful function for shaping the sound. Percussion sounds and waveforms can be shaped and blended over the course of the sound, creating new and dramatic textures.

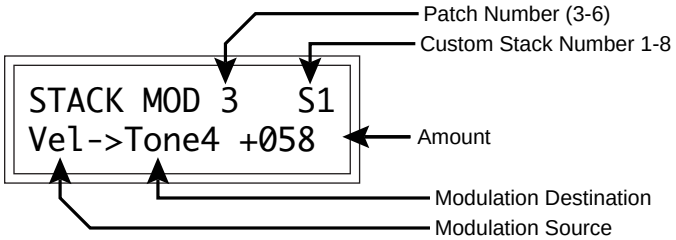
When first working with this function, keep track of which layer you are working on and where your cursor is located. It's easy to get confused and modify the wrong layer. You may want to make use of the Audition Layer function while experimenting with the Alternate Envelope, as it will allow you to hear each layer separately.

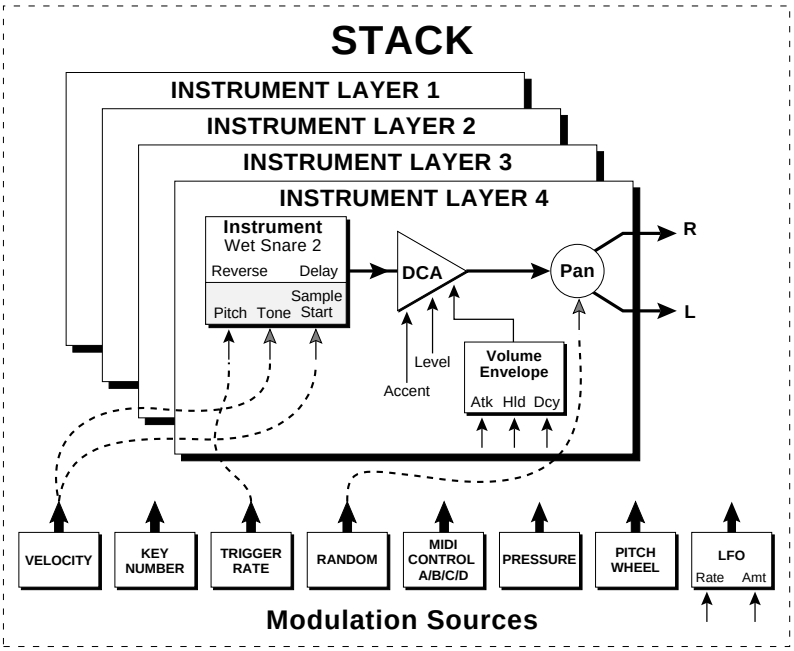
24) **Pitch Envelope.** The Pitch Envelope allows you to add a pitch sweep (up or down) to each layer of your stack. The decay time of the sweep and the amount are adjustable. Positive amounts sweep the pitch down and negative amounts sweep the pitch up. This is another powerful synthesis function which can completely change the character of a sound. The effect of this function can be subtle or very obvious. Try changing the initial tuning of the instrument as it relates to the Pitch Envelope.

25) **LFO.** The LFO (or Low Frequency Oscillator) allows you to cyclically sweep either the pitch or the volume of any layer. Note that there is

only one LFO for all four layers. There are four different LFO waveforms from which to choose from, as well as a rate (speed) and amount parameter. Modulating the pitch is an easy way to hear the effects of the different waveforms.

26) **Stack Modulation Routings 3-6.** We'll walk you through this one since it can be confusing. You can make four "patches" in this module (3, 4, 5, 6) to connect modulation sources to destinations.





Note how the screen parameters relate to the stack block diagram. Try making a few "patches" and note the effects. The flexible modulation routing scheme is probably the most powerful feature of Procussion because it allows you to produce subtle variations in the sound using performance parameters such as velocity, playing speed, etc. Remember that everything is "legal" when it comes to making music. Experiment!

PROGRAMMING PROCUSSION

27) **Using Trigger Tempo.** Trigger Tempo is a modulation source which increases from zero when your playing speed exceeds a preset tempo. First of all, go into the Master menu and turn to the Global Trigger Tempo screen. Set it to 150 beats-per-minute as shown below.

```
GLOBAL TR TEMPO
150 BPM
```

■ *Modulation destinations followed by a number (Pitch 1, Pitch 2, etc.) affect only one layer. Destinations without numbers affect* ***all*** *layers.*

Go back to the Edit menu, Stack Modulation screen and route Trigger Tempo to control the Pitch as shown below. Now start playing, slowly at first, then faster. Notice that the pitch stays constant until you play faster than 150 BPM, then it begins to increase. That's how it works!

```
MODULATION 3
Trig->Pitch +100
```

■ *By setting the Global Trigger Tempo to MIDI Clocks, the Trigger Tempo rate will follow along with a sequencer or drum machine.*

Further your experiments by using Trigger Tempo as a switch source to switch in different instrument layers depending on your playing speed. As an example, copy Stack 150, "Rapper Snare" to a User location (in a Default Kit). Set *Switch Mode* → *Threshold; Switch Source* → *Trigger Rate* and play. The Tempo controls which layers are heard.

28) **Routing the Pitch Wheel to Control … *Pitch*.** This is something that you might want to do either at the **Stack** level (to affect only one Stack) or at the **Kit** level (to affect all the Stacks in the Kit). For now let's control the pitch of the entire Kit. The Modulation 1 and 2 parameters affect the entire Kit. Simply set the Modulation 1 (or 2) screen as shown below and *voilà*, Pitch Wheel control. Incidentally, the setting of +114 will produce a pitch bend interval of a perfect fifth. See the Pitch Modulation Interval Charts (in the Reference Section) for more information.

▼ *Modulation Enable must be turned* ***On*** *for each Stack or the Pitch Wheel will not work!*

```
MODULATION 1
PWhl->Pitch +056
```

PROGRAMMING PROCUSSION

HI-HAT INVESTIGATION

The Hi-Hat is perhaps the most expressive part of a drum set. Procussion offers expressive Hi-Hat control; up to 4 different Hi-Hat samples can be switched-in depending on the position of a pedal or control wheel. Many of the factory kits already have a Hi-Hat programmed to respond to the Modulation Wheel of a MIDI keyboard. The Hi-Hat is assigned to MIDI key number 52 (Zone 9). Play key number 52 (E) while moving the Modulation Wheel. You will notice that the closed Hi-Hat sound triggers as the wheel nears maximum. If you are using a MIDI drum pad setup, you will need a continuous controller pedal which has its output translated into MIDI. The diagram on page 12 shows one such arrangement.

Copy Stack

In order to modify a factory stack, it must first be copied to a user location.
1. Start with a Default Kit (105-127) in the **Edit Menu**.
2. Press the Edit button and move to the second to last screen, **Copy Stack**.
3. Copy from: Factory Stacks. Select #243 Mod Hi-Hat 2 (for this example).
4. Copy to: Custom #1 (or any of the Custom Stacks).

Assign the Hi-Hat

1. Set **Stack Select**, Zone 9 to: ModHiHat 2
2. Set **Key Range**, Zone 9: 052 -> 052.
3. Play MIDI Key # 52. You should be hearing the Hi-Hat.

Examination of the Hi-Hat

1. Go to the **Stack Inst.** screen. Move the cursor to the Layer (L1) and turn the data knob. You will see that the ModHiHat 2 stack is made up of four instruments; L1-HihatB open, L2-HihatB 2/3, L3-HihatB 1/3, L4-HihatB shut. Press **Enter** to return to the screen identifier.
2. Turn to the **Switch Mode** screen. Notice that the switch mode is **Hi-Hat**.
3. Turn to the **Switch Source** screen. Notice that the switch source is **Control A**. Control A is normally a Modulation Wheel. Alternately, a control pedal can be used as shown in the drum kit diagram on page 12. (If you do not understand the concept of Control A, see pages 44 and 45.) There are other possible sources such as: Velocity, Trigger Rate, etc., but when in Hi-Hat mode, only controllers A-D will have any effect.
4. Turn to the next screen, **Switch Points**. Think of the Modulation Wheel or Pedal as going from 0-127. These are the points at which the different Hi-Hat Instruments will be switched in. Try changing the switch points and note the effects. The points should be in an ascending order for this function to work correctly. Now continue on your own. *Experiment!*

■ *You can create custom Hi-Hats by simply changing the instruments.*

■ *You can change the switch points to adjust the modulation wheel or pedal to your own specifictions.*

PROGRAMMING PROCUSSION

ON YOUR OWN

In the course of these exercises you have hopefully learned a little about programming a Procussion Stack. You can experiment as much as you want and when you come up with something good, save it to one of the empty kit locations. Feel free to try out all the other parameters that we did not cover such as the Footswitches and other Super-Switch modes. Simply trying out the various functions will remove a lot of the mystery associated with them. Procussion is an extremely powerful tool which will do a lot of things that no one has even thought of yet. Dig in and discover them yourself.

PROGRAMMING TIPS and IDEAS

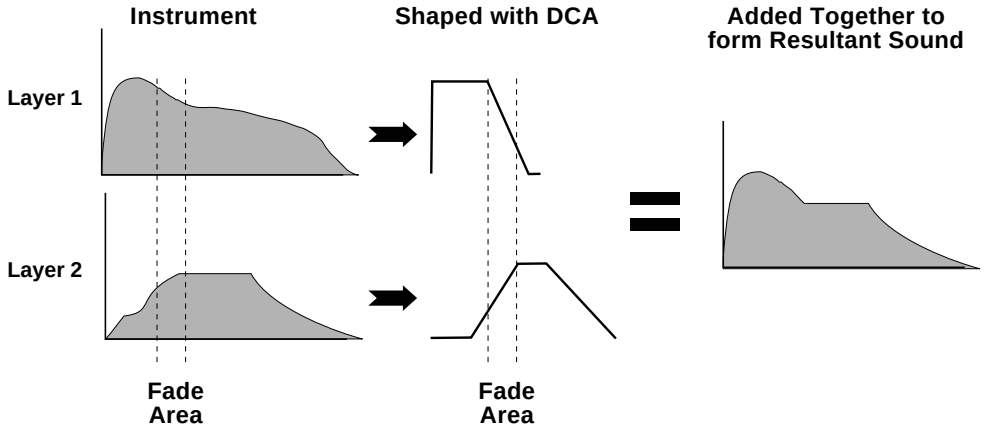
- Use the Stack Select screen in the Edit menu to monitor which stacks you are playing. This is also a quick way to temporarily disable MIDI program changes.
- Routing Velocity to Sound Start with a negative amount will remove the Attack portion of the drum when played softly, simulating the effect of an actual drum head.
- Remember that the center of the Zone is always the original pitch of the Stack (usually C), so you may have to retune the stack using the Zone Tune function when creating tuned instruments such as Marimbas.
- Key Number can be routed to control Pitch (+ or -) in order to change the normal equal tempered tuning relationship between notes.
- Remember that Sample Start, Tone, Attack and Pan Position are set at the beginning of the note. Continuous controllers used after the start of the note (such as pressure) will not have any effect.
- In order to modify a Factory Stack, it must first be copied to a Custom Stack location.
- Interesting factory ROM stacks may be analyzed by first copying them to RAM stack locations and then examining the various parameters.

PROGRAMMING PROCUSSION

PROCUSSION SYNTHESIS

Procussion Synthesis is a form of additive synthesis. Normal additive synthesis uses simple sine waves as the basis of its sound. In Procussion Synthesis, we start off with complete sampled sounds or complex waveforms and combine all or part of these together to form new sounds. The process is illustrated below.

PROCUSSION SYNTHESIS



In this example, portions of two sounds are dynamically crossfaded in order to produce a new sound containing elements of both.

The envelope generators controlling the DCAs (digitally controlled amplifiers) can be used to fade between up to four instruments during the course of a note. This powerful technique allows you to combine elements of different instruments together to form completely new sounds. New sounds that are totally natural, because they are based on natural sounds. Procussion also contains many digitally generated waveforms that may be combined with other digital waves or with the sampled instruments in order to change the character of the sound, perhaps to add a digital "edge" or add more bottom. In addition to the envelope generators, parameters such as Tone, Tuning, Delay, Sound Start, and Super-Switch allow you to further control the texture and blend of the four instruments.

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As an example, let's combine two cymbals in order to create a new cymbal containing elements of both. Use one of the 8 Custom Stacks in a "Default Kit" for your experiments. Refer to the Edit menu parameters in the chart below and do not change any parameters but the ones specified.

The **Ride Bell** instrument is used for the "Attack" (or the sound you hear when the cymbal is first struck). We'll put this sound on layer 1. The **19" Pang** instrument is used for the "Decay" (or the sound you hear after the initial strike until the sound fades away). The Pang sound will be layer 2. The 19" Pang cymbal doesn't seem to quite fit with the Ride cymbal somehow, but by tuning it up an octave, it sounds fine. Next we'll adjust the Delay of the Pang so that it comes in after the Ride Bell sound. Moving the Sound Start parameter of the 19" Pang to 124 removes the attack portion of the cymbal since we only want to hear the Ride Bell at the start of the note. The Alternate Envelope generators are used to fade out the Ride Bell during the decay portion of the sound and also to shorten the 19" Pang's decay a little. Finally we adjust the volume of the Pang cymbal to match it up with the Ride Bell. That's it! You have just bought yourself a new cymbal!

Stack Name: Ride Pang	
Layer 1	**Layer 2**
Instrument: Ride Bell	Instrument: 19" Pang
Tuning: C:00 F:00	Tuning: C:12 F:00
Volume: 100	Volume: 074
Pan: +0	Pan: +0
Delay: 00	Delay: 03
Sound Start: 000	Sound Start: 124
On A H D 00 02 21	On A H D 00 23 36

The example above shows one way that you can transform the ROM instruments into completely new sounds. In this example we have only used two layers and no modulation parameters at all! Remember that you can have up to *eight* layers by assigning two zones to a key range.

Next, we'll cover another exciting new technique, *Spatial Convolution.*

SPATIAL CONVOLUTION

"It's technical…" Spatial Convolution is a technique of adding reverb ambience to the sound by combining a "convolved" reverb sound with a "dry" drum sound of the same type. Convolution involves combining two sounds so that only frequency components common to both sounds are accentuated while uncommon frequencies are discarded. In simple terms this produces a nearly ideal reverb "tail" that can be tuned and shaped like an ordinary sample. There are four Spatial Convolution "spaces" (instruments 132-135) in Procussion which were created using the Transform Multiplication function on our Emax II 16-bit sampler.

Enough tech talk. Let's get busy and add some space to the sound. As before, use one of the 8 Custom Stacks in a "Default Kit" for your experiments. Set up the Edit menu parameters as in the chart below and change only the parameters specified.

Stack Name: Ambient Snare			
Layer 1	**Layer 2**	**Layer 3**	**Layer 4**
Instrument: Dry Snare8b	Instrument: Dry Snare 7	Instrument: Snare Space	Instrument: Snare Space
Tuning: C:00 F:-55	Tuning: C:00 F:00	Tuning: C:00 F:+12	Tuning: C:-01 F:-26
Volume: 100	Volume: 095	Volume: 100	Volume: 100
Pan: +0	Pan: +0	Pan: +7	Pan: -7
Delay: 00	Delay: 00	Delay: 00	Delay: 01
Sound Start: 000	Sound Start: 000	Sound Start: 000	Sound Start: 085

Examine the first two layers. This is a straightforward combination of two snare sounds. Layer 1 has been slightly detuned in order to "fatten up" the sound a bit. In layers 3 and 4 things start to get interesting. Notice that we are using the same instrument (#134-Snare Space) on both layers, one panned hard right and the other hard left. In addition they are quite detuned from each other in order to give each one a separate identity. The Delay and Sound Start parameters are used on layer 4 to prevent flanging effects which occur when identical samples are mixed together. Use the Audition Layer function in order to hear what each layer contributes to the overall sound. You will be impressed!

The reverb tail can be further shaped using the Alternate Envelope, Reverse, the Pitch Envelope or any of the other modulation parameters.

PROGRAMMING PROCUSSION

USING PROCUSSION WITH A SEQUENCER

We thought you'd never ask. Procussion was designed from its conception with multi-timbral sequencing in mind. Just take a look at the main screen.

```
C01 Vol127 Pan=K
000 Ampitheatre
```

The kit for each MIDI channel is selected from the main screen. Press the cursor button to move the cursor up so that it is underneath the channel number.

```
C01 Vol127 Pan=K
000 Ampitheatre
```

Turn the data entry control and you will see that every MIDI channel has a kit assigned to it. Just select a kit for each of the MIDI channels. It's simple! In order to respond to multiple MIDI channels, Procussion must be in Multi-Mode. Multi-Mode is selected in the Master menu. Press the Master menu button and use the data entry control to scroll through the screens until you find MIDI MODE.

```
MIDI MODE    ID
Multi        00
```

Move the cursor down to the second line and change the mode to Multi as shown. Procussion will now respond to multiple MIDI channels.

MORE ADVANCED SEQUENCING

PRE-SEQUENCE SETUP

Suppose that you want to have your sequencer set up everything for you before the start of the song. Good idea. This will make the Procussion setup procedure automatic and prevent the wrong kits from playing.

PROGRAMMING PROCUSSION

The basic idea of a pre-sequence setup is to send out MIDI information just before the start of the song. This MIDI information will select all the proper kits, adjust the mix, and pan positions of each kit.

Note: Procussion setup information should be transmitted from the sequencer *before* the song actually starts, perhaps during a lead-in measure or countdown. DO NOT send setup information just before the first beat of the song or MIDI timing errors could result.

INITIAL SETUP

1) Set PAN in the main screen to any setting other than Kit. This allows Procussion to receive pan data over MIDI.

In the Master menu:

2) Turn ON Multi-Mode

3) Turn ON Kit Change enable for each channel.

4) Turn OFF MIDI Enable on MIDI channels that are to be used for other instruments.

KIT, VOLUME and PAN SETUP

Program your MIDI sequencer to transmit the following information before the song starts.

1) Select the proper kits for each MIDI channel used on Procussion (program change command).

2) Send MIDI volume information (controller #7) for each MIDI channel used on Procussion.

3) Send MIDI pan information (controller #10) for each MIDI channel used on Procussion.

■ *Transmitting the Master Settings will set up the Kit, Volume and Pan information for all 16 MIDI channels.*

Now your song will play perfectly every time using the proper kits, volumes and pan positions. In addition, kits, volumes and pan positions (or anything else for that matter) can be adjusted in realtime during the song. Note: If the wrong kits are being selected, check the MIDI Program -> Kit map.

To carry the pre-sequence setup even further, you can even include kit data for each kit used in the sequence. See page 30 for details.

PROGRAMMING PROCUSSION

CHANNEL RIPOFF

In very rare instances you may encounter what is commonly known as "channel ripoff". When Procussion uses up all its 32 channels and needs more, it steals a channel from the key that has been held the longest. Because percussion sounds are generally so short and because 32 instruments are almost never played all at once, the "ripoff" effect would probably only occur when using Procussion in multi-timbral mode. Since Procussion dynamically allocates channels as needed, to eliminate ripoff you must either, play fewer notes, or use simpler stacks (ones without all four layers used).

USING EXTERNAL PROCESSING

Don't be afraid to use external processing on specific sounds if you feel the urge. The submix sends and returns on Procussion are there for a reason. In many instances a bit of reverb or EQ will be just the thing a drum stack needs to give it a distinct identity. By dedicating a multi-effects box to a submix out/in, you can open up a whole new world of possibilities by effecting only those drums you have routed through the submix.