

Chapter 19

Programming Examples

The other chapters in this manual have described the K2500's features in detail. This tutorial chapter will take you step-by-step through several programming operations.

Each of the following examples will begin from the same starting point: the default program with ID 199. This program is included specifically for the purpose of giving you a programming template. Most of its parameters have been set at values that don't affect the sound of the program.

You may want to adjust some of the parameters of Program 199, to create your own customized programming template. Even if you don't, it's a good idea to begin with Program 199 when you're building a new sound, so you'll know exactly what you have from the start.

Keep in mind that none of these examples provides you with a usable program. Instead, the examples are designed to give you tools and concepts which you can apply to your own sounds. Once you become familiar with the programming basics in this chapter, analyze a few of the factory presets by moving through the Program Editor, and observing how those presets were designed. This may help you learn more techniques for creating new sounds.

While in the Program Editor, there are several editing shortcuts you can use. To call up a control source, enter its number on the numeric keypad, or hold ENTER and strike a key on the keyboard (see Control Sources in chapter 6 of the *Reference Guide*). When a highlighted parameter has a Control Source as its value, press EDIT, and you will go directly to that Control Source page. You can also use the Previous Pg, Mark, and Jump buttons (see Chapter 5).

Example 1

Trumpet with Delayed Vibrato and Velocity-triggered Fall-offs

Vibrato is a regular oscillation in pitch that adds dimension to any sound. Brass players will often "fall-off" from a note, punching it then letting the pitch roll down smoothly or in small fast steps.

To create these effects, we'll use an LFO to control the pitch, (this is the typical way to create vibrato), and delay it with an ASR. This way you'll hear the vibrato only on notes that you hold for a second or so. The stab will be done with a second ASR controlling pitch and amplitude. The stab's ASR will be triggered by a velocity trigger (VTRIG), so only those notes you play at fortissimo will stab.

Start by selecting Program 199 and pressing EDIT. The ALG page will appear. The first task is to change the keymap. Press the KEYMAP soft button to select the KEYMAP page.

```

EditProg:KEYMAP                               <>Layer:1/1
KeyMap:17 Trumpet                               Stereo:Off
XPose :0ST                                     TimbreShift :0ST
KeyTrk:100ct/key                               AltSwitch   :OFF
VelTrk:0ct                                     PlaybackMode:Normal
<more  ALG  LAYER  KEYMAP  PITCH  more>
    
```

The KeyMap parameter is already selected, and as you can see, the Default program uses the Grand Piano Keymap. Use any data entry method to change the Keymap to Trumpet, which has ID 17. The KEYMAP page should look like the diagram above when you're done. Remember that you can play your MIDI controller's keyboard at any time while editing, so you can listen to each change as you make it.

Next set up the vibrato. Start by selecting the PITCH page (press the PITCH soft button). Use the cursor keys to move the cursor to the Src2 parameter. Use any data entry method to select LFO1 as its value by pressing 1, 1, 4, ENTER on the numeric keypad (or hold ENTER and strike B5 on the keyboard). This assigns LFO1 to control the pitch of the trumpet sample.

The next step is to set the depth of the vibrato. Select the MaxDpt parameter and assign a value of 10 cents (1, 0, ENTER). Since the default program is preset to have your controller's Mod Wheel control the depth of Src2, you can hear the vibrato by pushing the Mod Wheel fully up (LFO1 has non-zero default values in the default program, otherwise, you wouldn't hear the vibrato). If you're not sure you hear the vibrato, try setting the MaxDpt parameter to a larger value.

Next, select the DptCtl parameter and assign a value of ASR2 by pressing 1, 1, 1, then ENTER (or hold ENTER and strike G#5 on the keyboard). This will cause ASR2 to control the depth of the vibrato. At this point, the default values for ASR2 will cause the vibrato to fade in and out.

There are two more steps to programming the delayed vibrato: adjusting the rate of LFO1 and setting up ASR2 to control the vibrato's delay. First, highlight Src2 and press EDIT; this brings up the LFO page. The default value for LFO1's minimum rate (the MnRate parameter) is 2 seconds. Select this parameter with the cursor buttons, and set its value to .16 seconds (1, 6, ENTER). Select the MxRate parameter, and set its value to 4.40 Hz (4, 4, 0, ENTER). Select the RateCt parameter, and assign a value of ASR2 (1, 1, 1, ENTER). The vibrato will still fade in and out because of the default settings of ASR2.

The LFO page should now look like this:

```

EditProg:LFO                                   <>Layer:1/1
MnRate:MxRate:RateCt:Shape: Phase:
LFO1:  0.16H  4.40H  ASR2  Sine  0deg
LFO2:  2.00H  0.00H  OFF   Sine  0deg
<more  LFO  ASR  FUN  UTRIG  more>
    
```

Now select the ASR page to adjust the settings for ASR2. Since the cursor is highlighting ASR2 as the value for the RateCt parameter, you can select the ASR page by pressing EDIT.

To program a realistic delayed vibrato, you need to adjust the Mode, Delay, and Attack parameters. Select the Mode parameter and change its value to Hold (use the Alpha Wheel or

Plus/Minus buttons). This will prevent the vibrato from fading as it did. (This fading was caused by the ASR repeating, which was the default setting). Now select the Delay parameter and set its value to .4 seconds (4, 0, ENTER). Select the Attack parameter and change its value to .48 seconds (4, 8, ENTER). The vibrato should now begin to fade in gradually after a short delay, then remain constant at a rate of 4.40 cycles per second. The ASR page should look like the page below. We're finished with the delayed vibrato; next is the velocity stab.

```

EditProg:ASR <>Layer:1/1
ASR1: Trig:  Mode:  Delay:  Attack:  Releas:
      ON      Hold  1.00s  1.00s  1.00s
ASR2: ON      Hold  0.40s  0.48s  1.00s

<more LFO ASR FUN UTRIG more>

```

We want the stab to drop the trumpet's pitch *and* amplitude, but only when notes are played fortissimo or louder. This is done by using ASR1 as a control source on both the PITCH and AMP pages, then using a velocity trigger (VTRIG) to control ASR1.

First return to the PITCH page (if you're still on the ASR page, press the more> soft button three times, and the PITCH soft button will appear). Press PITCH, then select the Src1 parameter, and set its value to ASR1 (press 1, 1, 0, ENTER or hold ENTER and strike B5). Then select the Depth parameter, and set its value to -1200 cents (+/-, 1, 2, 0, 0, ENTER). ASR1 has non-zero default values in Program 199, so you'll hear the pitch drop an octave if you strike and hold a note. The PITCH page should look like this:

```

Edit Prog:PITCH >Layer:1/1
Coarse:0S1 Src1 :ASR1
Fine :0ct Depth :-1200ct
FineHz: 0.00Hz Src2 :LFO1
KeyTrk:0ct/key DptCtl:ASR2
VelTrk:0ct MinDpt:0ct
MaxDpt:-10ct
<more ALG LAYER KEYMAP PITCH more>

```

The next step is to adjust the characteristics of the stab by programming ASR1. Select the Src1 parameter again, and press EDIT to select the ASR page.

First, select the Trig parameter, and assign a value of VTRIG1 (press 1, 0, 6, ENTER or hold ENTER and strike E5). Select the Delay parameter and set its value to .34 seconds (3, 4, ENTER). Set the Attack parameter to a value of .78 seconds. The ASR page should now look like this:

```

EditProg:ASR <>Layer:1/1
ASR1: Trig:  Mode:  Delay:  Attack:  Releas:
      VTRIG1 Hold  0.34s  0.78s  1.00s
ASR2: ON      Hold  0.40s  0.48s  1.00s

<more ALG LAYER KEYMAP PITCH more>

```

Notice that the soft buttons are identical to those on the PITCH page; this is because you pressed EDIT to call up the ASR page, instead of using the more soft buttons.

To make the stab sound realistic, we'll drop the amplitude at the same rate as the pitch. To do this, select the F4 AMP page (press the more> soft button once, then press the F4 AMP soft button). Select the Adjust parameter, and assign a value of 8 dB. This will give the trumpet a bit more punch. Next, select the Src1 parameter, and set its value to ASR1. Then select the Depth parameter and set its value to -68 dB.

Here's an important point to remember: ASR1 is being used to control both the drop in pitch for the stab, and the drop in amplitude as well. All of the control sources can be similarly assigned for as many parameters as you like.

The final step in this example is to set the velocity threshold of the stab. Right now the stab is occurring on almost every note, but we want it to happen only when playing fortissimo or louder. To do this, press the more> soft button three times, then press the VTRIG soft button to select the VTRIG page. The VTrig1 Level parameter is already selected, so just turn the Alpha Wheel until the VTrig1 Level value is ff. Now you can play softly without triggering the stab.

That's it for Example 1. If you want to save your work, the easiest way is to press EXIT. The K2500 will ask you if you want to save. You should probably press the Rename soft button, give your program a new name, then save it with a new ID. See Chapter 5 if you need help with the Save dialog.

Example 2

Lowpass Filter, Envelopes

This example will show you how to assign a DSP function to an algorithm block (the 4-pole lowpass filter), and adjust its control parameters. You'll also set up an envelope to control the cutoff frequency of the filter.

Start with Program 199, press EDIT, and select the KEYMAP page (This is explained in a bit more detail in the previous example, if you haven't read it). Change the value to "6 Ensemble Strings." String sounds are especially responsive to lowpass filtering, because they have a great deal of activity in the higher frequencies. Lowpass filters, depending on their cutoff frequencies, attenuate high frequencies, so a bit of adjustment can alter a string sound considerably.

Next, press the ALG soft button to select the ALG page. The center DSP function block will already be selected. Set its value to "4POLE LOWPASS W/ SEP." Notice how the sound changes. Press the more> soft button, and the three soft buttons that select the control input pages for the lowpass filter will appear. Press the F1 FRQ soft button.

The Coarse Adjust parameter will already be selected. Try a few different values for this parameter, to get a feel for its effect on the sound. Then set it to a value of G#3 208 Hz. Use the cursor buttons to select the Src1 parameter, and set its value to MPress (3, 3, ENTER). Cursor down once to the Depth parameter, and set it to a moderate value, like 3800 cents. Now try playing and applying pressure to the keys. (Obviously, this will have no effect if your MIDI controller doesn't send mono pressure.)

Now we're going to use an envelope to control the sweep of the filter. The K2500 has one envelope dedicated to shaping the output of the sound; this is called AMPENV. However, two other envelopes (ENV 2 and ENV3) can be assigned to control other parameters. You can assign AMPENV as a Control Source, but using ENV2 and ENV3 lets you assign separate envelopes to do different things.

Cursor down to the Src2 parameter, and set its value to ENV2 (1, 2, 1, ENTER). Cursor down to the DptCtl parameter and set its value to ON. Cursor down to the MaxDpt parameter, and set

its value to 5800 cents. As soon as you set a depth, you'll hear the envelope sweep the cutoff frequency. We'll adjust it further in a minute. The F1 FRQ page should now look like this:

```

Edit Prog#1 FRQ(4P LOPASS) >Layer:1/1
Coarse:G#3 208Hz Src1 :MPress
Fine :0ct Depth :3800ct
Src2 :ENU2
KeyTrk:0ct/key DptCtl:ON
VelTrk:0ct MinDpt:0ct
Pad :0dB MaxDpt:5800ct
<more F1 FRQ F2 RES F3 SEP F4 AMP more>
    
```

Next, press the F2 RES soft button to select the page for adjusting the resonance of the lowpass filter. Select the Src1 parameter, and set its value to Data (6, ENTER). Select the Depth parameter and set its value to 30.0 dB. This means that the partials at the cutoff frequency will be boosted 30 dB. The F2 RES page should look like the following diagram.

If your MIDI controller has a data slider (or a control that can be programmed to send MIDI 06), the data slider (or programmable control) will now affect the resonance of the filter. Be aware though that the change in resonance is subtle; resonance affects some waveforms more noticeably than others.

```

Edit Prog#2 RES(4P LOPASS) >Layer:1/1
Adjust: 0.0dB Src1 :Data
Depth :30.0dB
Src2 :OFF
KeyTrk:0.00dB/key DptCtl:MWheel
VelTrk:0.00dB MinDpt:0.00dB
MaxDpt:0.00dB
<more F1 FRQ F2 RES F3 SEP F4 AMP more>
    
```

Next press either of the <more> soft buttons until you see the ENV2 soft button. Press it to select the ENV2 page. Here you'll program Envelope 2 to control the filter's cutoff frequency.

The Att1 time parameter will already be selected; set its value to 0.50 seconds. Press the right cursor button once to select the Att2 time parameter and set its value to 1.06 seconds. Cursor down once to select the Att2 level parameter and set its value to -1%. Cursor right once, then up once, selecting the Att3 time parameter. Set its value to 3.52 seconds. The ENV2 page should look like the diagram below. Play around with the sound a bit. Hold a few notes through the full length of ENV2; the sound will continue to change for several seconds. Work your controller's Mod Wheel and data slider through several different positions to get an idea of the range of variation you can add by using the two control sources in tandem.

```

Edit Prog#3 ENV2 [1/1] <>Layer:1/1
Att1:Att2:Att3:Dec1:Rel1:Rel2:Rel3:Loop:
0.50 1.06 3.52 0s 0s 0s 0s Off
100% -1% 100% 0% 0% 0% 0% Inf
    
```



```

<more AMPENV ENV2 ENV3 ENUCTL more>
    
```

Example 3

Sample and Hold; Using a FUN

This example will use one of the FUNs to create a sample and hold program. As usual, start with Program 199, and press EDIT. While you're on the ALG page, select a value of "PARAMETRIC EQ" for the center DSP function block. Then select the KEYMAP page, and select the keymap 152 Dull Sawtooth.

Now press the more> soft button, then the F1 FRQ soft button. This enables you to set the frequency for the parametric EQ, which will set the depth of the modulation for the sample and hold function. The Coarse parameter will already be selected; set its value to D#4 311 Hz. Cursor down to the KeyTrk parameter, and set its value to 100 cents per key. Cursor over to the Src1 parameter, and set its value to FUN1 (1, 1, 2, ENTER). Cursor down once to the Depth parameter, and set its value to a fairly large negative number, like -4000 cents.

Next, press the F3 AMP soft button, to set the amplitude for the Parametric EQ (make sure you don't select F4 FINAL AMP). Set the value of the Adjust parameter to about 17 dB.

Now press either <more> soft button until you see the LFO soft button. Press the LFO button to select the LFO page. We'll program LFO1 as a square wave, then use it as one of the FUN's inputs.

Select the MnRate parameter for LFO1 and set it to a value of 5.00 Hz. Select the MxRate parameter and set its value to 15.00 Hz. Select the RateCt parameter and set it to a value of Data. Select the Shape parameter and set its value to Square. That's it for the LFO page.

Next press the FUN soft button to select the FUN page. Select the Input A parameter for FUN1, and set its value to LFO1 (1, 1, 4, ENTER). Select the Input B parameter and set its value to RandV1 (1, 0, 8, ENTER). Finally, select the Function parameter, and set its value to "Sample B On A." Now when you play and hold a note, you'll hear the sample and hold effect. Use your MIDI controller's data slider (or a programmable control set to MIDI 06) to control the rate of the effect.

Here's what's happening. The square wave of the LFO cycles from +1 to -1. Every time this occurs, the random signal generator (RandV1) randomly picks a value which changes the frequency of the parametric EQ. There are lots of ways to set up sample and hold effects, but the FUN is the basic element. In this case, every time the value of the FUN's "A" input (LFO1) becomes greater than +.5, the value of the "B" input (RandV1) is sampled. That value becomes the FUN's output until the next time the value of the "A" input becomes greater than +.5 (see Chapter 16 for more). In this example, the FUN's output modulates the frequency of the EQ, and causes rapid changes in timbre.

Now we'll apply the FUN to control the pitch of the sound as well. Press either of the <more> soft buttons until the PITCH soft button is visible, and press it to select the PITCH page. Select the Src1 parameter and set its value to FUN1. Select the Depth parameter and set its value to about 400 cents. Now the sound's pitch will fluctuate in sync with the EQ effect.

Example 4

SHAPER and PANNER

Our next example incorporates two of the DSP functions, and will give you a general overview of using the algorithms to build sounds.

Starting with Program 199, press EDIT, and while you're on the ALG page, cursor up to the Algorithm parameter, and select Algorithm 13. Select values of NONE in the F1 and F2 blocks. The value of the F3 block is already set to PANNER, as shown below.



Next press the KEYMAP soft button to select the KEYMAP page, and select 163 Sine Wave as the keymap. Play a few notes to accustom your ear to the sound of the unshaped sine wave. Then return to the ALG page, and select SHAPER for the algorithm's F1 block. You'll notice a bit of an effect right away. The SHAPER DSP adds additional high frequency partials to the waveform in unpredictable ways, resulting in large changes in timbre. For more on the SHAPER, see Chapter 14.



Press the more> soft button, then press the F1 AMT soft button. This enables you to adjust the amount of shaping applied to the sine wave. Try different values for the Adjust parameter, then set it to its minimum—0.100x. Then cursor down to the VelTrk parameter, and set a value of 0.70. Listen for the variation in the effect as you play with different attack velocities.

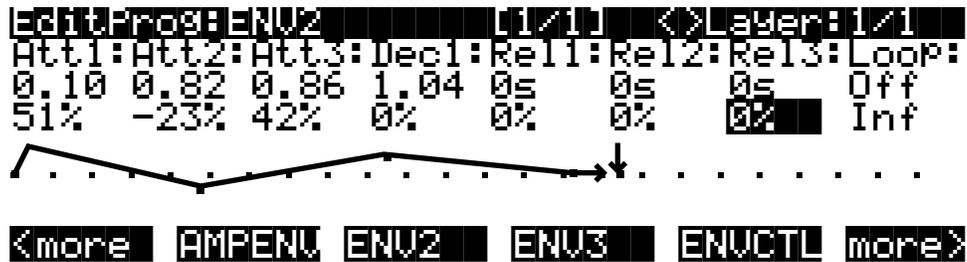
Now go back to the KEYMAP page, and select different keymaps so you can hear the SHAPER's effect on different sounds. When you're finished experimenting, set the Keymap parameter at 152 Dull Sawtooth.

Notice how notes on the high end tend to break up. If you return to the F1 AMT page you can reduce this distortion and/or *aliasing* with the KStart and KeyTrk parameters.

Select the KStart parameter and set a value of C 2 Unipolar. This limits the amount of shaping applied to notes above or below C 2, depending on the value of the KeyTrk parameter. Next set the value for the KeyTrk parameter to -0.018x / key. Since we're using a negative value, the amount of shaping will decrease with higher notes.

Next we'll program an envelope to change the SHAPER in realtime. While still on the F1 AMT page, select the Src2 parameter, and set it to a value of ENV2 (1, 2, 1, ENTER). Cursor down to the DptCtl parameter and set it to a value of AttVel (1, 0, 0, ENTER). Set the MinDpt parameter to 0.00x and the MaxDpt parameter to a value of 1.70 x. This will let you use attack velocity to control the amount of the envelope's effect on the SHAPER.

Next, use the <more> soft buttons to locate the ENV2 soft button, then press it to select the ENV2 page. Set up the parameters as shown in the diagram on the following page.



This can still be a little harsh on the high end when you play with high attack velocities. One way to smooth it out would be to go back to the ALG page, select a lowpass filter for the F2 block, and adjust its cutoff frequency to about F# 6. This is done by pressing EDIT when the F2 block is selected, then selecting the Adjust parameter and changing the value with any data entry method.



That’s it for the SHAPER example; we’ll continue with this program to describe the PANNER. You’ll notice that in Algorithm 13, PANNER is the only value available for the F3 block. The PANNER function takes a single signal from the sound engine, and splits it into two. These are referred to as the upper and lower wires. The upper and lower wires pass independently into the final Amp block, and from there to the audio outputs.

The parameters on the control input page for the PANNER let you distribute the signal between the upper and lower wires. You can send the signal all to the lower wire (an Adjust value of -100%), all to the upper wire (100%), or anywhere in between. This in itself won’t necessarily change the pan position of the current layer. It works in tandem with the Pan parameter on the layer’s OUTPUT page.

When a layer uses an algorithm that contains the PANNER function, you always have two wires going through the final Amp and to the audio outputs. Consequently, on the layer’s OUTPUT page, there are parameters to assign the output pair and pan position of each wire. When you have one wire panned hard left, and the other hard right, changing the parameters on the PANNER control input page will enable you to move the layer’s pan position in realtime. The closer a layer’s output is to the center of the stereo field, the less effective the PANNER function will be.

The first step in our PANNER example, therefore, will be to select the OUTPUT page. Select the Pan parameter for the upper wire, and set it all the way to the right. Select the Pan parameter for the lower wire and set it all the way to the left.

Now you can select the F3 POS page, and program it to move the sound around. First try changing the value of the Adjust parameter. You should hear the sound move to the left when the value is negative, and to the right when it’s positive. Set it back to 0%, then select the Src1 parameter. Select LFO1 as the value, then select the Depth parameter and set it to 100%.

Now select the Src1 parameter again, and press EDIT (or use the more soft button locate the LFO button, then press it). You will now see the LFO page. Set the MnRate parameter for LFO1 to a value of 0.1 Hz. Set the MxRate parameter to a value of 2.00 Hz, and the RateCt parameter to Data. Leave the Shape parameter set to Sine. You should hear the sound shift slowly from left to right as the LFO cycles. You can adjust the speed of the shift with your MIDI controller’s data slider (or a programmable control set to MIDI 06).

Example 5

Building a Drum Program; Using the Keymap Editor

With our next example, you'll learn how to build a drum program using the Program and Keymap Editors. To keep the example as brief as possible, we'll include only a few timbres and DSP examples. This won't make for a terribly realistic drum program, but it will give you the basic ideas you need to build your own. In this example, you'll create a four-layer program, with a different percussion timbre in each layer, each timbre having a different set of DSP functions applied.

Start with the default program 199. Press EDIT, then press the KEYMAP soft button. Select a value of 168 Silence. This gives you a keymap with a single key range from C 0 to G 10. Select the KeyTrk parameter, and change the value to 0. This will make the pitches of all the samples you assign the same on each key (you won't hear anything until you assign the samples). Next, press the <more soft button once, then press the DupLyr soft button. Layer 2 will be created. Repeat this twice, until you have four layers. If the K2500 tells you that you can't add any more layers, exit the Program Editor (don't bother to save at this point), check the current MIDI channel shown at the top right of the Program mode page, then go to Master mode and set the DrumChan parameter so that one of the eight available drum channels matches the current MIDI channel. Now you can start over, and the K2500 will allow you to add the fourth layer.

When you've created the four layers, you'll notice that the top line of the display tells you that you're looking at Layer 4 of a 4-layer program. Press the Up CHAN/BANK button to return to Layer 1. Press the LAYER soft button to select the LAYER page. Set the LoKey and HiKey parameters to C 4 and D 4 respectively. The easiest way to do this is to select the LoKey parameter, hold the ENTER button, and strike C 4 on your MIDI controller. Do the same for the HiKey parameter, striking D 4. Press the Up CHAN/BANK button to select Layer 2. Set its LoKey and HiKey to D# 4 and F 4, respectively. Repeat this for Layer 3, setting its LoKey and HiKey parameters to F# 4 and G# 4 respectively. Do the same for Layer 4, setting its LoKey and HiKey parameters to A 4 and B 4 respectively. This might be a good time to save what you've done so far.

Next, return to Layer 1 (CHAN/BANK button), press the KEYMAP soft button, select the Keymap parameter, and press EDIT to enter the Keymap Editor. Select the Sample parameter, and select a value of 20 14in Dry Tom-C 4. Press the Save soft button, and the K2500 will prompt you to save the keymap. Rename it as Tom, and save it. Press EXIT to return to the Program Editor, and select Layer 2 with the CHAN/BANK buttons. Press EDIT to return to the Keymap Editor, select the Sample parameter, and assign a value of 20 22in Dry Kick C 4. Save the keymap, renaming it Kick. Press EXIT to return to the Program Editor, and select Layer 3. Return to the Keymap Editor, select the Sample parameter, assign a value of 20 8in Dry Snare C 4, save the keymap—renaming it Snare. Return to the Program Editor, select Layer 4, select the Keymap parameter, and assign a value of 20 Vol Ft Cl Hat C 4. Save the Keymap, renaming it HiHat. You now have a 4-layer program, each layer having its own keymap with a different sample assigned to each one.

This is the basic process for creating any keymap and incorporating it into a program. In this case, we don't want the layers to overlap, and we want each layer to use a distinct keymap with its own sample assignment. In other programs, you might want to create a keymap with different timbres in a single layer, and you might want the layers to overlap.

As an example of how to quickly set up a multi-sample keymap, we'll change the sample assignment in Layer 1. Return to the Program Editor, and select Layer 1. Return to the Keymap Editor (by pressing EDIT while the Keymap parameter is highlighted on the EditProg*KEYMAP page), then press the NewRng soft button. The K2500 will prompt you to strike a low and high key on your MIDI controller. Strike C 4 and D 4. Notice that the value of the Key Range parameter changes to reflect the new range assignment. Now select the sample

parameter, and turn the Alpha Wheel one click to the right, to select the sample 20 12in Dry Tom C 4. Save the keymap, replacing the earlier version. You can repeat this process to create as many new key ranges as you like (in this example, doing so would have no effect, since we've limited each layer to a narrow 3-key span).

If you wanted the layers to overlap, you would simply set each layer's LoKey and HiKey parameters (on the LAYER page in the Program Editor) to the same respective values. For example, you might set each LoKey parameter to C 2, and each HiKey parameter to C 7, causing all layers to play across five octaves.

Now we'll add some processing to some of the layers in our drum program example. The fact that each sound is on a different layer enables us to use a different algorithm for each layer, giving us enormous control over each sound.

Return to the Program Editor and select Layer 1. Press the PITCH soft button, and select the Coarse transpose parameter. Set its value to -3 ST. Select the KeyTrk parameter, and set its value to 400 cents per key. This will give you a different pitch on each key.

Next, select the PITCH page and select the Src2 parameter. Set its value to ENV2 (1, 2, 1, ENTER). Select the MaxDpt parameter and set its value to 300 cents. Select the DptCtl parameter, and set its value to VTRIG1 (1, 0, 6, ENTER). Press EDIT to select the VTRIG page, and set the VTrig1 Level parameter to a value of fff. Return to the PITCH page, select the Src2 parameter, and press EDIT to select the ENV2 page. Set it up as shown in the page below.

```

EditProg: ENV2 [1/1] <> Layer: 1/1
Att1:Att2:Att3:Dec1:Rel1:Rel2:Rel3:Loop:
0.02 0.16 0s 0.38 0s 0s 0s Off
28% -100 0% -76% 0% 0% 0% Inf
.....
<more> AMPENV ENV2 ENV3 ENVCTL more>

```

Next, select Layer 2 and select the F4 AMP page. Set the Adjust parameter to 8 dB to give the kick a little more presence. Select the Src1 parameter and set it to a value of AttVel (1, 0, 0, ENTER). Select the Depth parameter and set a value of 10 dB. The kick will get considerably louder as you strike the keys harder.

Select Layer 3, and press the ALG soft button. Select the center, 3-stage DSP function block and assign a value of HIFREQ STIMULATOR. Press the more> soft button once, then press the F1 FRQ soft button. Select the Coarse Adjust parameter, and assign a value of G 10 25088 Hz. Select the Src1 parameter and assign a value of MWheel. Select the Depth parameter and set it to a value of -10800 cents. Move your MIDI controller's Mod Wheel to bring out the snare's high end.