Tutorial 3: Using the Controller Editors

In this tutorial, we'll show you how to get the best out of the two MIDI Continuous *Controllers*. We'll take you through setting up a series of controller values, setting the controller type and modulating the values using the LFOs.

This tutorial also follows on from the second tutorial and so we recommend that you work through *Tutorial 2* before attempting this exercise.

If you've never used MIDI Continuous Controllers then the best way to think of them is as a means of adding expression to your music, beyond simply playing the notes either louder or softer as you would with the note velocity controls.
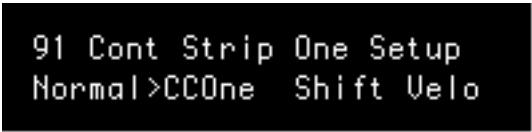
MIDI Continuous Controller messages have three components: a status byte that describes the MIDI Channel for this message, which is followed by the controller type and then the controller value itself.

There are two ways of inputting MIDI Continuous Controller information into *ZEIT*:

1)   The Continuous Controller knobs
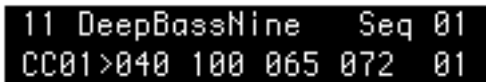2)   MIDI System Exclusive messages

In this tutorial, we'll cover just the first method.

Firstly, go to the *System* menu and scroll through the pages until you come to the *Controller One Setup* page. Change the setup so that *Controller Strip One* updates *CCOne* in *Normal* mode. Do the same with *Controller Strip Two* so that it updates *CCTwo* in *Normal* mode.

```
91 Cont Strip One Setup
Normal>CCOne  Shift Velo
```

Exit the *System* menu and try changing the knobs on the *Controller One* strip. *ZEIT* will recognise the change and drop you into the *Controller Editor*.

```
11 DeepBassNine   Seq 01
CC01>040 100 065 072  01
```

Before we can do anything useful with this *controller stream* we need to make sure that the data stream is *enabled - controller data streams* can be switched off to reduce congestion on the MIDI Out port.

Press the *Controller One* edit button to exit temporarily from this editor and then press this button a second time so that you're at the top level of the menu. (You'll find that this is a very handy shortcut for moving quickly between menus). Scroll through the pages until you come to the *Controller One Modulation* page.

```
11 CC01 Modulate  Seq 01
Dir>Pend Dep 099  Act On
```

Check that the third field, *Act,* is set to *on.*

Next, we'll set the *Controller Type*. There are 127 MIDI Continuous Controllers available within the MIDI standard, many of which are reserved for special purposes. Consult Appendix 2 at the end of this manual for a full list of the defined types. Although these definitions are *reserved*, you need to check with the manual that came with your instrument to find out how the manufacturer implemented the MIDI standard.

However, there are a number of *fixed* Continuous Controllers. One such *fixed controller* is *Controller 7* which, on the vast majority of MIDI systems, is used to update the master volume for a synthesiser patch. Another controller that is commonly used is *controller 74,* which can adjust the *Cut Off Frequency* of a synthesiser's filter*.*

Press the *Enter* button so that the cursor returns to the *Home* position and then scroll backwards until you come to the *Controller Type* page.

```
10 CC01 Setup     Seq 01
Type>07  Volume(C)
```

The default *Controller Type* for *Controller One* is *MIDI Volume (Coarse).* Press the *Enter* push button once and use the *Data Wheel* to scroll through the available controllers until you come to *Controller Type 74: Brightness*. *'Brightness'* is the term used in the MIDI Specification and this generally refers to the filter cut-off frequency. Now – and this is very important – to actually set the controller type, you must first press the *Select* push button. This isn't obvious and you need to remember it for future reference. Why is this implemented in such an unfriendly manner?

Suppose that *ZEIT* is playing a sequence as you're scrolling through the list of controller types. If the controller type changed every time you turned the *Data Wheel* then you could send a controller message that might suddenly update the portamento time, the pan position, volume level or the modulation amount for a synthesiser and that could potentially destroy a performance or recording session.

So, remember to press the *Select* push button when you want to set the *Controller Type*.

Now press *Play* and listen to the sounds made by your synthesiser. If everything is set up correctly and your synthesiser correctly responds to *controller 74 messages,* then you

should hear the overall brightness of the synthesiser's sound vary as the sequence plays. Try changing a couple of the controller knobs and see what happens. If this doesn't work then we recommend that you have a look at the synthesiser's MIDI implementation to see how the instrument has been configured.

Just as with the *Note Editor* you can set up patterns of *active* and *skipped steps*.

```
13 CC01 Active    Seq 01
Step>On  Off On  On    01
```

Try pressing a couple of the *active step* push buttons and listen to their effect. When a step is *muted*, no MIDI Controller message is sent and so the *controller value* stays the same as it was in the previous step.

When a step is *skipped* then the sequencer ignores the step and the *controller value* stays the same. You can use this technique to greatly reduce the amount of data in the MIDI stream. It also makes it very easy to add some really exciting and interesting rhythmic variations to your sequences.
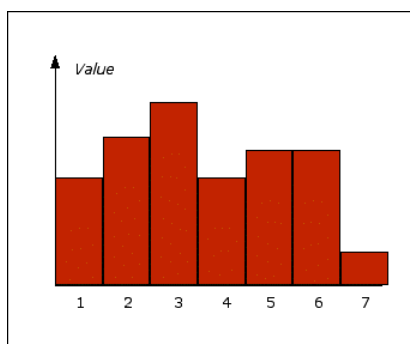
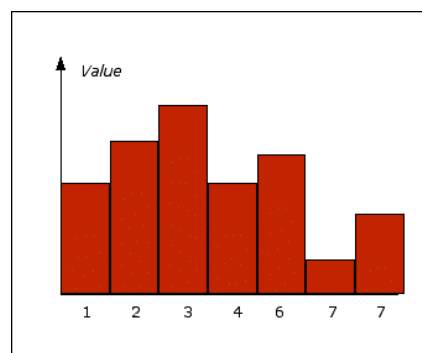Experimentation is the key to success here, as is a flexible and well-specified synthesiser.
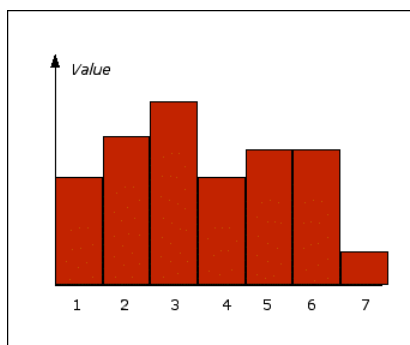
Before: All steps *Active*
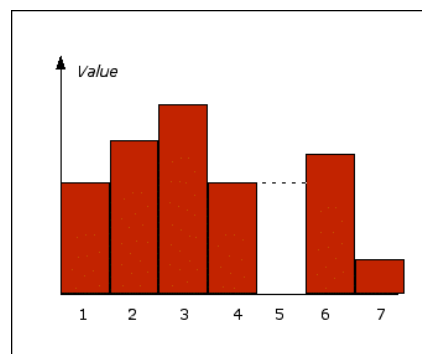
After: step 5 *muted*

Before: All steps *Normal*

After: Step 5 skipped

Controller Two is identical to *Controller One* in every respect. For the next step in the tutorial, repeat all of the above with *Controller Two* except, for this section, select another *MIDI Controller Type*. For really interesting results, try changing the type to *5,*
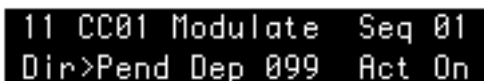
Portamento Time and then experiment with the results. You should find that you can create all manner of different playing techniques just by changing the *portamento time* in this way. Equally, you might like to try setting the *Controller Type* to number 1, *Modulation Wheel.* This will create some very intense, dramatic changes in most synthesisers.

In the next stage we're going to look at changing the *controller values* with the *LFO*. One of my favourite techniques is to use the MIDI Controllers in combination with the *LFO* and *Sweep Generators* to dynamically vary the waveform generated by an oscillator bank.

For this example, I'm going to talk about a little known synthesiser called the *Monowave.* The *Monowave* is a very simple, two oscillator monophonic synthesiser very similar in concept to the *PPG Wave Series* of synthesisers in that it has two digitally generated oscillators and a 4-pole, resonant, low-pass filter. The *Monowave's* MIDI specification says that you can use 4 *Continuous Controllers, Sliders 1 through 4,* to modify the wavenumber used by the oscillators. *Slider 1(16)* and *Slider 2(17)* can be used to set the wavenumber for oscillator 1 and *Slider 3(18)* and *Slider 4(19)* can be used to set the wavenumber for oscillator 2.

As before, we change the *Controller Type* for *Controller One* so that it updates *Slider 1* and *Controller Two* so that it updates *Slider 2.* If we now press *Play,* we should be able to hear the waveshape changing dynamically.

To use the *LFO*, press the *Controller One* menu button twice so that you're at the top level of the menu and then scroll down until you reach the *Controller Modulation* page.

```
11 CC01 Modulate  Seq 01
Dir>Pend Dep 099  Act On
```

Increase the *Modulation Depth* parameter so that it's around 99% and then on the *LFO* strip select the *Random* waveform. This will create very dramatic variations in the waveform number.

As we said above, you should be able to apply this technique to any *MIDI Controller Type* to create sequences that, though rhythmically related, never repeat.

In the final part of this tutorial, we're going to talk about using the *Sweep Generator* in conjunction with the *Controllers*.

The *Sweep Generator* controls are available in *Shift* mode on the *LFO Strip* and, in this example, we're going to create a slowly rising volume envelope. As in the previous examples, return to the *Controller Type* menu and choose *Continuous Controller Type 7,*

which is the controller for MIDI Volume. Don't forget to press the *Select* push button to confirm the change.

Enter *Shift* mode by pressing the *Shift* key on the front panel and then press the *Start Level* push button. Set the *Start Level* to *0.* Press the *Target Level* push button and set it to 99% then press the *End Level* push button and set that to *0* as well.
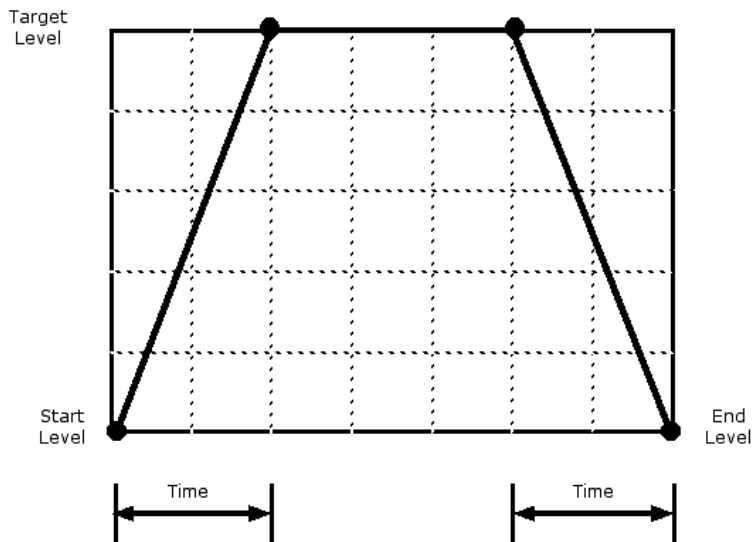
Stay within the *LFO/Sweep Generator Menu* and move the cursor to the home position. Scroll through the menu pages until you come to the second Sweep Generator Modulation Routing page, as shown below. Make sure that the *Sweep Generator* modulation is switched *On* for both *CC01* and *CC02*.

```
57 LFO/Sweep 8     Seq 01
Mod.CC01>Off   CC02 Off
```

Now go to the *Controller One* strip and turn all of the knobs to their minimum setting. Press *Play* and you should hear nothing. This is because the *Sweep Generator* is at its starting value, which we set to *0*.

Move the cursor to the *Home* position and scroll back up the menu pages until you come to the *Sweep Generator Enable/Disable* page.

```
55 LFO/Sweep 6     Seq 01
State>Stopped
```

The *State* parameter will show that the *Sweep Generator* is currently stopped. Press the *Enter* push button once and then use the *Data Wheel* to change the *State* to *Running*. The *Sweep Generator* will then begin running through the *Start Phase:*

```
55 LFO/Sweep 6     Seq 01
State>Running  Level 050
```

The *Level* field will show the current value of the *Sweep Generator's Output*. When it reaches its maximum level, the *Sweep Generator* will stop and remain at the *Target Level*.

To begin the *Release* phase of the *Sweep Generator* press the *Select* button. The *Level* field will show a slowly decreasing value and will stop when the *Sweep Generator's* output reaches the *End Level.* At the same time, you should hear the volume of your MIDI sequence gradually reducing.

These features are complex and experimentation is the best way to work out how the sequencer works.