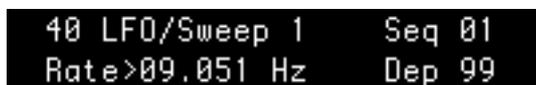


The LFO / Sweep Generator Menu

ZEIT supports eight sequences and each sequence has its own **Low Frequency Oscillator** (LFO) and **Sweep Generator**. These modules are called *modulators* or *modifiers* because they change or modify sequences in real time. In isolation, sequences can occasionally sound static, repetitive and lifeless and the modifiers can be used to inject melodic and dynamic variation into your patterns.

For more details on the Low Frequency Oscillators and Sweep Generators go to the *Tutorial* section, '*Using the Low Frequency Oscillators*'.

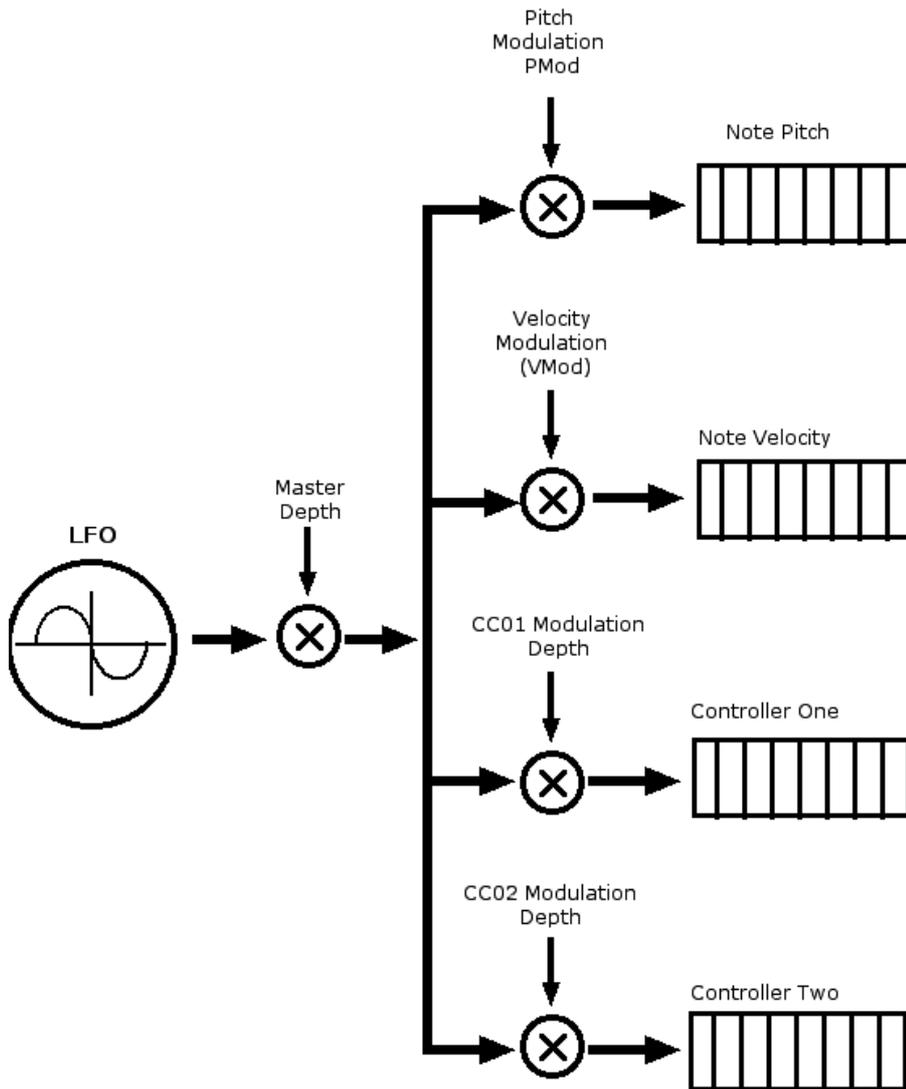
Page 1: Rate/Depth Page



```
40 LFO/Sweep 1   Seq 01
Rate>09.051 Hz   Dep 99
```

This page sets the LFO Rate and Depth parameters. The **LFO Rate** field is a precision data field. To edit this field, press the *Enter* push button so that the cursor moves down to the first field. The first character will begin to flash, alternating between the current value and an asterisk (*) character. To increase the value, turn the Data Wheel clockwise. To decrease the value, turn the Data Wheel anticlockwise. You cannot increase the value of the whole field beyond its preset limits. In the case of the LFO Rate the maximum rate is currently 10 Hz and the minimum rate is 0.01 Hz. To advance to the next digit in the field, press the *Select* push button once. When you reach the final digit in the field, press *Select* to return to the first digit in the field or *Enter* to advance to the LFO Modulation Depth field.

The **LFO Modulation Depth** is the master depth control for the LFO (see figure below). When this value is at 0 then all other LFO modulation amounts are also at 0. Equally, when this field is at its maximum value of 99, then all other LFO derived modulation levels will be at their maximum amount. For example, suppose that the Pitch Modulation Depth is set to 60% and the Velocity Modulation Depth (VMOD) is set to 40%. If the Master LFO Level control is set to 50% then the maximum modulation applied to these two fields is 30% and 20% respectively. If the Master LFO Level is then set to 25% then the maximum LFO signal passed to these two fields will be 15% and 10%.



Page 2: Oscillator Waveshape and Synchronisation

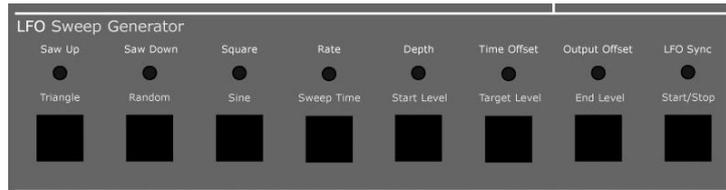
```
41 LFO/Sweep 2   Seq 03
Wave>SawUp      Sync Off
```

This page sets the **LFO Waveshape** and the state of the **Oscillator Synchronisation** flag. The LFO can have one of six possible waveshapes. The available waveshapes and their abbreviations are as follows:

Waveshape	Abbreviation
Rising Sawtooth	SawUp
Falling Sawtooth	SawDn
Square Wave	Squ
Triangle Wave	Tri
Random	Rand
Sine	Sine

2.26 THE MENUS IN DETAIL

The oscillator waveshape changes the effects of the LFO on the signal that is being modulated. For instance, the rising sawtooth can produce long, slowly changing sweeps. If you had a sequence of notes where the individual note velocities were all roughly the same, then setting the waveshape to a rising sawtooth would result in a sequence that grew progressively louder until the oscillator reached its maximum output level. The output signal from the oscillator would then drop to a minimum and the note velocities would return to their original values and the cycle would begin again.



The **Oscillator Synchronisation flag (Sync)** has two states, On and Off. When this is set to On the frequency of the LFO is locked to the tempo of the sequencer and the length (in steps) of the current sequence.

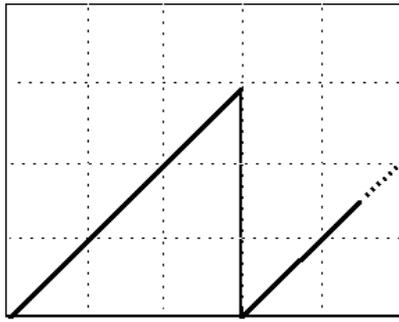
If the sequence is playing, press the *LFO Sync* push button so that oscillator synchronisation is enabled and the associated LED is switched on. Now, press the *Enter* push button once and then use the Data Wheel to return to the LFO Rate/Depth Page at the top of the menu. You should now see that the LFO Rate parameter has been reset to a new value.

Next, try changing the Start and End Steps for the Note Stream in the **Note Editor** and then return to the LFO Rate/Depth page. You should see that the Rate value has changed yet again. This is because the LFO Rate parameter is locked to both the tempo and the length of the Note Stream.

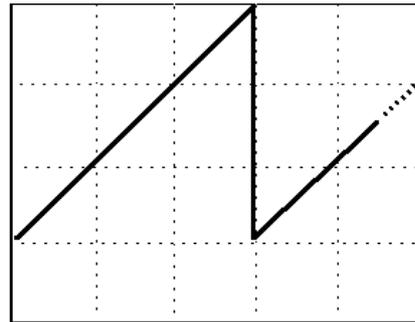
Page 3: Data Offsets

```
42 LFO/Sweep 3   Seq 03
Toff>50         Doff 30
```

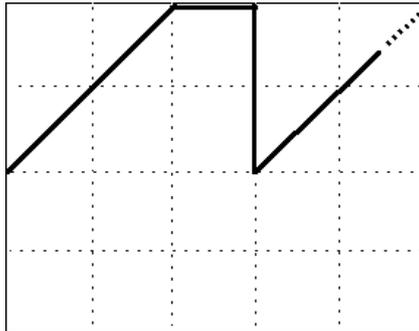
These two fields affect the output level of the LFO. The **Time Offset (TOFF)** field offsets the start of the oscillator cycle from 0 and is measured as a percentage of the Oscillator Wavelength. The **Depth Offset (DOFF)** field offsets the output level of the oscillator from the minimum possible value of 0.



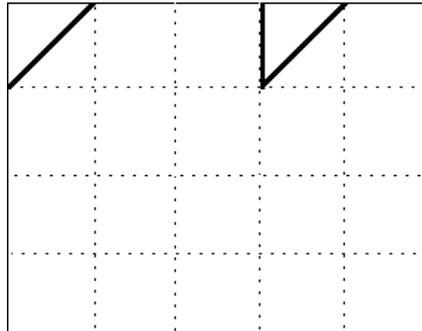
1. Depth Offset Value = 0
LFO Modulation Depth = 75%



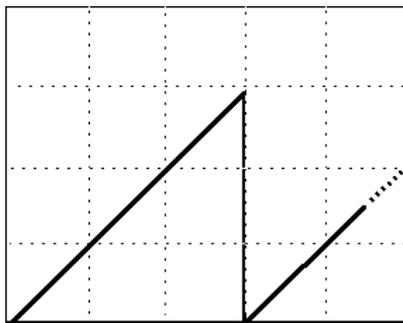
2. Depth Offset Value = 25%
LFO Modulation Depth = 75%



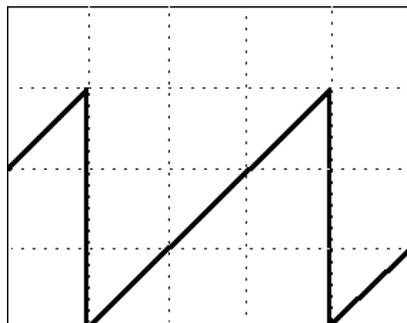
3. Depth Offset Value = 50%
LFO Modulation Depth = 75%



4. Depth Offset Value = 75%
LFO Modulation Depth = 75%



1. Depth Offset Value = 0,
LFO Modulation Depth = 75%

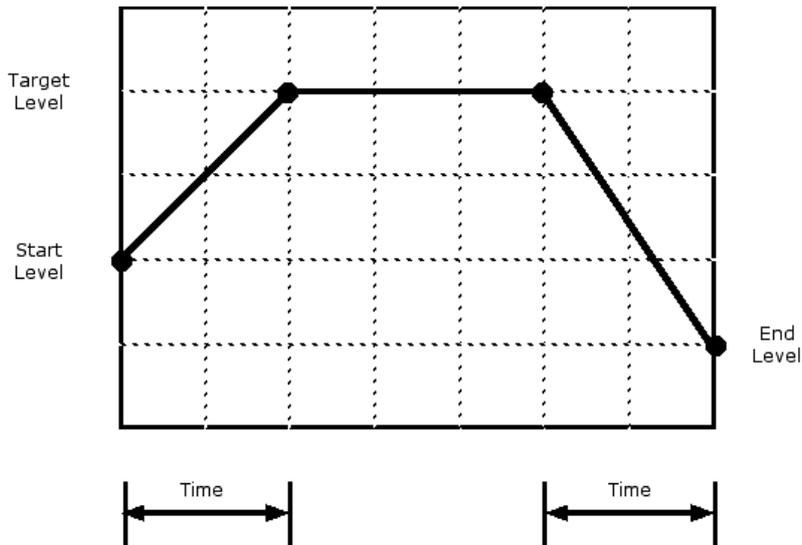


2. Time Offset Value = 33%
LFO Modulation Depth = 75%

Page 4: Sweep Generator Levels

```
43 LFO/Sweep 4   Seq 03
Start>30 Targ 99 End 30
```

This page is used to set the controlling levels for the **Sweep Generator**. Each value is represented as a percentage of the full scale value with 0 the minimum level and 99 the maximum possible level. To set the **Start Level** press the *Enter* push button once and turn the Data Wheel clockwise to increase the value and anticlockwise to decrease the value. Press the *Enter* push button to advance to the Target level. Press again to advance to the End Level.



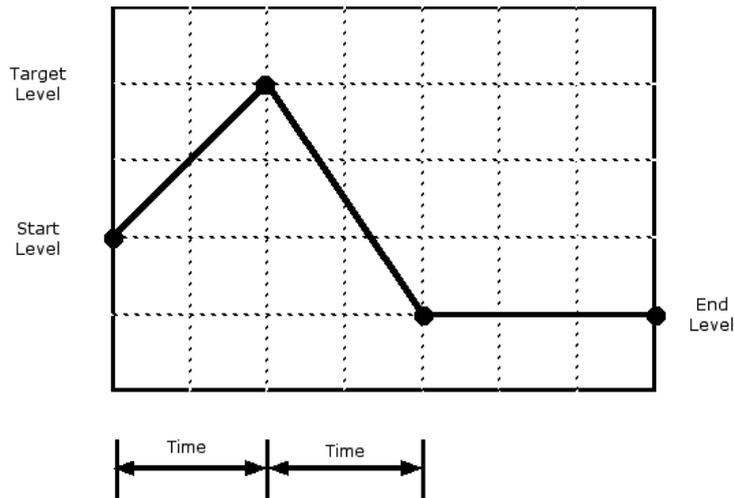
Page 5: Sweep Generator Time

```
44 LFO/Sweep 5   Seq 03
Time>20 secs    Mode ASR
```

The **Sweep Generator Time** is the time in seconds between the start of the Sweep Generator and the point where it reaches the Target Level. The same value is also used when the Sweep Generator leaves the Target Level and reaches the End Level. The maximum value for the Sweep Generator Time is 32 seconds and the minimum time is 1 second.

The **Sweep Generator Mode** parameter has two values, AR and ASR. In ASR mode, the Sweep Generator begins the Attack Phase and changes its output until it reaches the Target Level. It remains at the Target level until you press the *Sync/Sweep* push button. The Sweep Generator then advances to the Release Phase and the output changes until it reaches the End Level.

In AR mode, the Sweep Generator begins the Attack Phase and changes the output level until it matches the Target Level. Once it reaches the Target Level it then moves directly to the Release Phase and the output level is changed until the Sweep Generator reaches the End Level.



Page 6: Sweep Generator Enable/Disable

```
45 LFO/Sweep 6   Seq 02
State>Running  Level 050
```

This page sets the status of the Sweep Generator. The Sweep Generator has two possible states, Stopped and Running. To start the Sweep Generator press the *Enter* push button once so that it points to the **State** field. Now turn the Data Wheel clockwise one click. The **State** field will now display "Running" and the **Level** field will display the Output Level of the Sweep Generator.

To stop the Sweep Generator at any time, turn the Data Wheel anticlockwise one click. The **Level** field will hold at the current value.

Page 7: Sweep Generator Modulation Routing One

```
46 LFO/Sweep 7   Seq 01
Note>On  Velo Off
```

This page sets the **Sweep Generator Modulation Routing** for the Note Pitch and Note Velocity. These are both Boolean fields and the values are either On or Off. When switched to On, the output of the Sweep Generator is routed to the relevant data field.

Page 8: Sweep Generator Modulation Routing Two

```
47 LFO/Sweep 8   Seq 01
CCOne>On  CCTwo On
```

This page sets the Sweep Generator Modulation Routing for the **Controller One** and **Controller Two** data streams. These are both Boolean fields and the values are either On or Off. When switched to On, the output of the Sweep Generator is routed to the relevant data field.

