



node

four-operator FM synthesis

USER MANUAL

Designed and developed by **Sinevibes** ©2020-2021

Node is a four-operator FM synthesis engine for KORG **prologue**, **minilogue xd** and **NTS-1**. It is based on a classic setup with four sine oscillators (operators), which are connected together via multiple different algorithms that let them apply frequency modulation onto one another. This plugin neatly packages a total of 24 such FM algorithms and allows to set operator frequency ratios within an extremely wide range, delivering nearly 90,000 possible combinations – and opening a whole universe of timbres, from timeless classic to edgy modern. **Node**'s engine runs 2x oversampled and employs a special filter to suppress unpleasant aliasing frequencies, enabling a much cleaner sound even in the higher octave range. **Node** also includes a very flexible built-in modulation generator that can be configured in a number of ways: exponential or linear envelopes, multi-waveform LFO, sample & hold, or random triangle. With this many features, **Node** is arguably the most user-configurable plugin available for KORG's platform – yet it's designed to be incredibly easy to use.

HIGHLIGHTS

- Genuine four-operator FM synthesis engine
- Internally runs at 96 kHz sample rate with an anti-aliasing filter, delivering superior audio quality even in the higher octave key range
- 24 total FM algorithms: 12 base configurations plus two variations each – with and without a self-modulating feedback loop
- Individual frequency ratio selection for operators 2, 3, and 4, plus variable operator detune
- Flexible modulation generator with 24 modes: exponential envelopes, linear envelopes, multi-waveform LFO (triangle, saw, square, pulse, trapezoid, peak), sample & hold, and random triangle
- Built-in lag filters for noise-free, ultra-smooth parameter adjustment and modulation

COMPATIBILITY

- KORG **prologue**
- KORG **minilogue xd**
- KORG **NTS-1**

PACKAGE CONTENTS

- **Node** plugin in **prologue**, **minilogue xd**, and **NTS-1** formats
- 60 example presets for **prologue** and **minilogue xd**, as well as for **NTS-1** (in the form of preset tables)
- User Manual PDF
- Preset Tables PDF
- Multi Engine Preset Converter utility



Before you install third-party plugins, please make sure that you have the latest **system update** installed on your KORG synthesizer, and that you also perform the **panel update** and **voice update** procedures if they are required. Older system versions can have major issues with newer plugins. You should keep the **Sound Librarian** application updated as well.

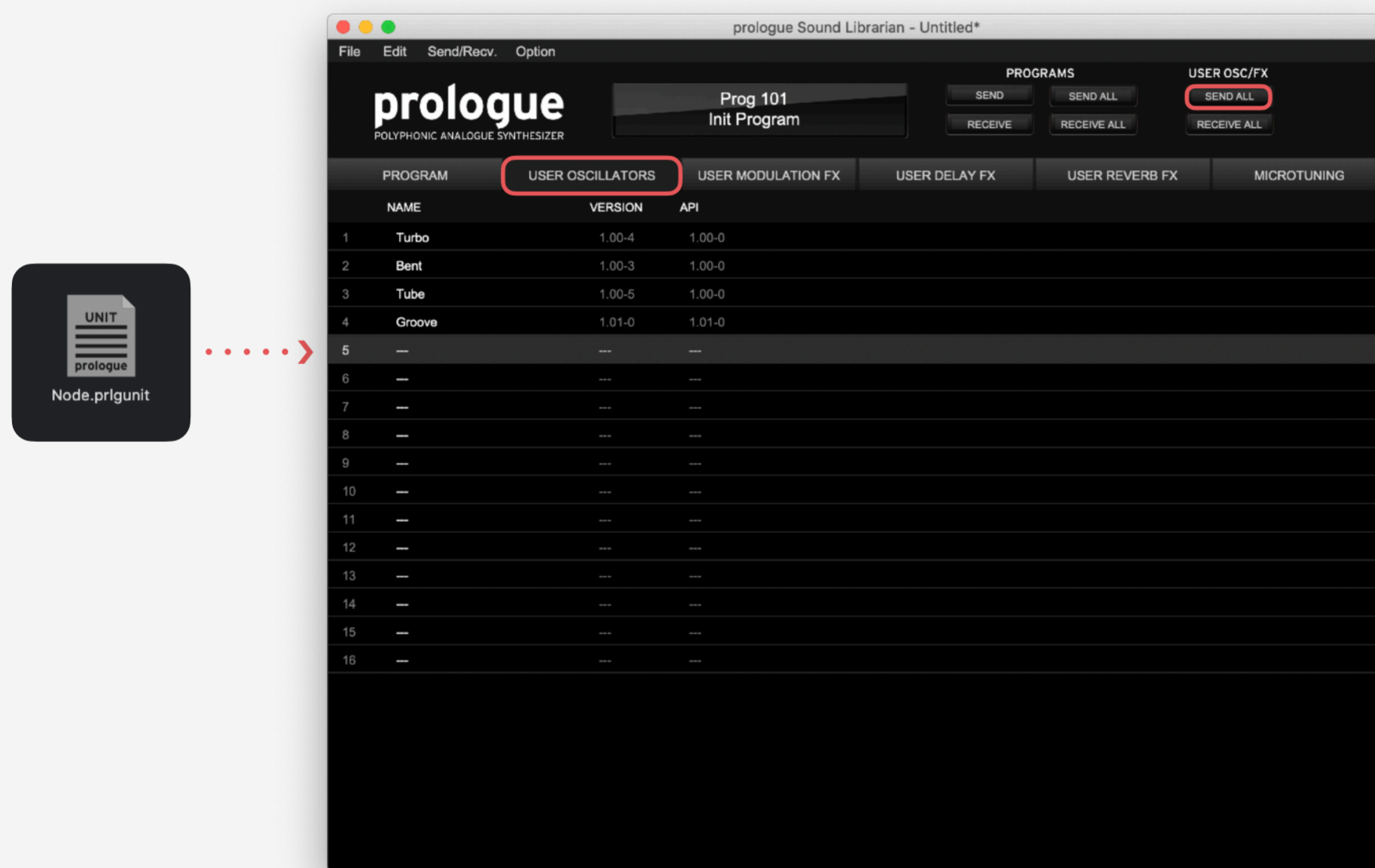
Follow the links below to check and download the latest software for your synthesizer:

- Software for KORG [prologue](#)
- Software for KORG [minilogue xd](#)
- Software for KORG [NTS-1](#)

INSTALLING NODE

3/11

1. Connect your synthesizer to your computer with a USB cable. Alternatively, connect them together via two MIDI cables and a USB-MIDI interface.
2. Launch the Sound Librarian application on your computer.
3. Switch to the USER OSCILLATORS tab.
4. Drag and drop the **Node** plugin file into any available oscillator slot.
5. Click the SEND ALL button in the USER OSC/FX toolbar section.

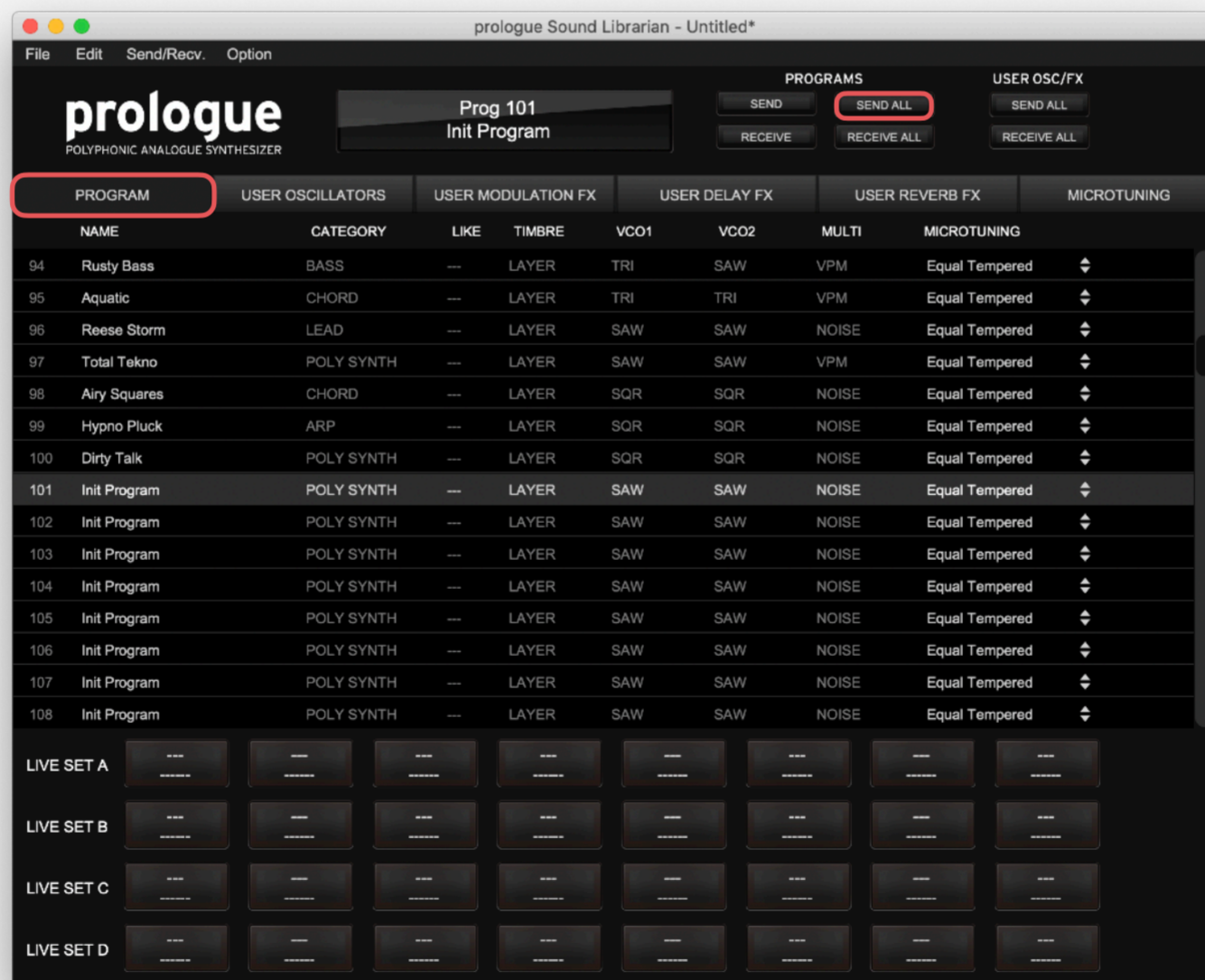


To get the latest version of **Node**, visit the **Sinevibes** website and request your downloads:
www.sinevibes.com/updates

INSTALLING PRESETS

4/11

1. Connect your synthesizer to your computer with a USB cable. Alternatively, connect them together via two MIDI cables and a USB-MIDI interface.
2. Launch the Sound Librarian application on your computer.
3. Stay in the default PROGRAMS tab.
4. In the **Node** package, open the Presets folder, and then open the folder corresponding to the slot number into which you installed the plugin.
5. In the Sound Librarian, click to highlight the target preset location, then drag and drop the desired preset file onto this location. Repeat this for all presets you'd like to install.
6. Click the SEND ALL button in the PROGRAMS toolbar section.



To use **Node** for creating your own sounds, you need to load the plugin into the MULTI ENGINE oscillator. It is best to start from an initialized preset to make sure that there are no pre-existing sound adjustments that could prevent the plugin from sounding correctly.

prologue

- Select an initialized patch.
- In the MIXER, set VCO1 level to zero and MULTI level to the maximum.
- Set the MULTI ENGINE oscillator type switch to USR.
- Use the TYPE dial to scroll through plugins until you select **Node**.

minilogue xd

- Select an initialized patch.
- In the MIXER, set VCO1 level to zero and MULTI level to the maximum.
- Set the MULTI ENGINE oscillator type switch to USR.
- Use the TYPE dial to scroll through plugins until you select **Node**.

NTS-1

- Turn the synthesizer off and on again to initialize the current patch.
- Press the OSC button.
- Use the TYPE dial to scroll through plugins until you select **Node**.

NOTE: due to the limited resources on the **NTS-1**'s single processor, and considerable resource requirements for **Node**, it can affect the total amount of effects you can run at the same time.

Like all multi-engine plugins, **Node** includes additional parameters that enable deep customization. Below are the instructions for accessing and editing them depending on the device model. For the detailed description of what each parameter does, please see the [PARAMETER GUIDE](#).

prologue

- Press the EDIT MODE button and select PROGRAM EDIT.
- Press the function key #7 repeatedly to switch between the additional plugin parameters.
- Use the PROGRAM/VALUE dial to adjust the currently selected parameter.

minilogue xd

- On the **minilogue xd** module, make sure that the KEYBOARD switch is off.
- Press the EDIT MODE button and select PROGRAM EDIT.
- Press the sequencer key #10 repeatedly to switch between the additional plugin parameters.
- Use the PROGRAM/VALUE dial to adjust the currently selected parameter.

NTS-1

- Press and hold the OSC button, then rotate the TYPE dial to enter the oscillator parameter edit mode.
- Use the TYPE dial to switch between the additional plugin parameters.
- Use the B knob to adjust the currently selected parameter.

SHAPE / A	SHIFT+SHAPE / B	Algorithm	Ratio 2:1
Simultaneously adjust the amount of modulation depth for all operators as well as the relative amount of operator feedback (if it's enabled in the currently selected algorithm): 0 .. 100%	Adjust the amount of frequency detune of operators 2, 3, 4 in relation to operator 1: 0 .. 100% (mapped to +/- 20%)	Select the operator configuration algorithm. Even algorithm numbers include a 30% feedback loop on operator 4, providing an additional self-modulation effect. For details, please see the <a>ALGORITHM CHART	Select the frequency ratio of FM operator 2 in relation to operator 1, within a total of 36 possible values: 1, 1/32, 1/16, 1/8, 1/4, 1/2, 2, 3, 4, 5, 6, 7, 8 ... 32
Ratio 3/4:1	MG Type	MG Speed	MG Depth
Select the frequency ratios of FM operators 3 and 4 in relation to operator 1, within a total of 100 value combinations. Each parameter value is split into two numbers: the tens set the operator 3 ratio, and the ones set the operator 4 ratio. E.g. within the range of 1..10, ratio 3 is set to 1 , while ratio 4 goes between 1..10 ; within the range of 11..20, ratio 3 is set to 2 , while ratio 4 goes between 1..10 – and so on.	Select the modulation generator type and shape – for details, see the <a>MODULATOR MODES	Adjust the modulation generator time or frequency depending on the currently selected modulator type: 5 ms .. 10 s (EG), 0.05 .. 10 Hz (LFO), 0 .. 10 Hz (sample & hold, random triangle)	Adjust the amount of modulation generator output sent into the SHAPE parameter

1



In the most basic form, FM synthesis starts from its main building block: a sine wave oscillator, called an **operator**. The sine wave is the most basic oscillator shape, its spectrum contains just a single frequency partial. In **Node**, operator 1 always runs at the base frequency of the key you play.

2



The frequencies of operators 2, 3, and 4 are all set as a relative **ratio** to the operator 1 frequency. Here, operator 2 is running at a two times higher frequency than operator 1 – which means the operator 2:1 ratio is 2.0.

3



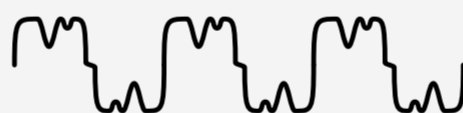
Adding yet another operator to this example, with operator 3:1 ratio set to 3.0 - meaning that this operator runs at three times the frequency of operator 1. **Node** allows these to be set from 0.5 to 20 for operator ratio 2:1, and from 1 to 10 for operator ratios 3:1 and 4:1.

2
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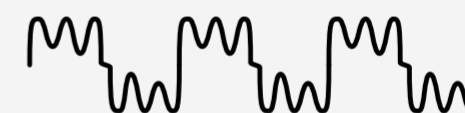
When operator 2 modulates the frequency of operator 1, the waveform produced by the latter changes dramatically, and so does its spectrum – which is now full of new frequency partials. The intensity of this effect grows as the modulation **depth** value is increased.

3
2
1



As a third operator is added to the FM **algorithm**, the waveform and the output spectrum change even more. Here, operator 3 is modulating operator 2, and operator 2 is modulating operator 1.

2
3
1



With the exact same operator settings, changing the FM algorithm will dramatically alter the resulting waveform. In this one, operator 2 and operator 3 are summed and then used to modulate operator 1.

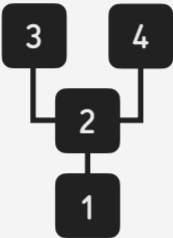
ALGORITHM CHART



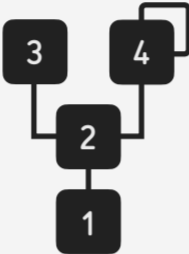
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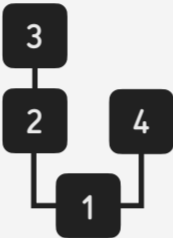
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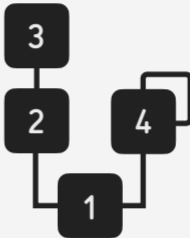
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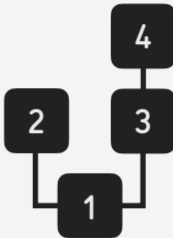
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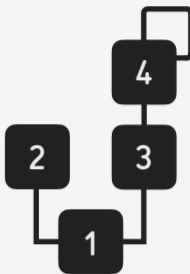
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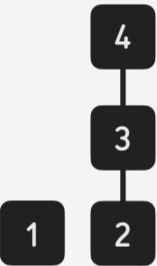
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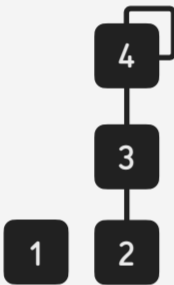
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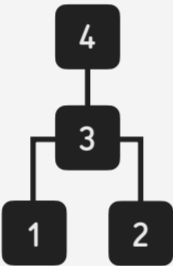
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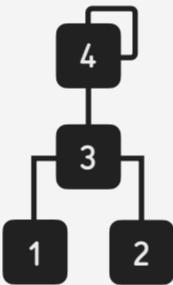
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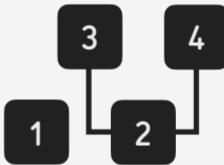
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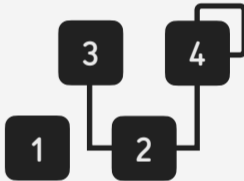
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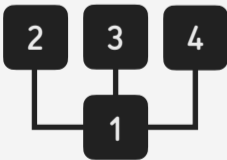
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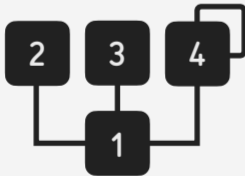
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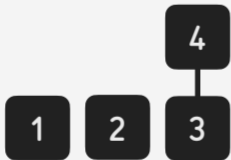
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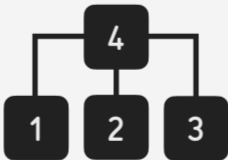
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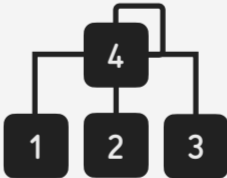
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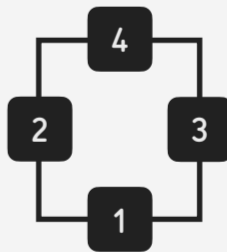
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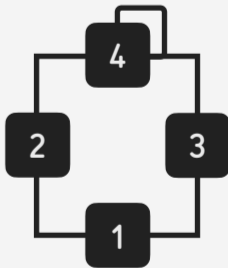
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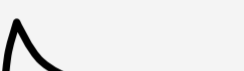

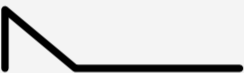





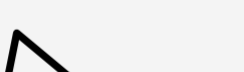









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24

MODULATOR MODES

10/11

1		Exponential decay-sustain EG	13		Square LFO
2		Exponential attack-sustain EG	14		Square LFO, inverted
3		Exponential attack-decay-sustain EG	15		80% pulse LFO
4		Exponential attack-decay-sustain EG, attack time 10x shorter than decay time	16		80% pulse LFO, inverted
5		Linear decay-sustain EG	17		20% pulse LFO
6		Linear attack-sustain EG	18		20% pulse LFO, inverted
7		Linear attack-decay-sustain EG	19		Trapezoid LFO
8		Linear attack-decay-sustain EG, attack time 10x shorter than decay time	20		Trapezoid LFO, inverted
9		Triangle LFO	21		Peak LFO
10		Triangle LFO, inverted	22		Peak LFO, inverted
11		Saw LFO	23		Sample & hold
12		Saw LFO, inverted	24		Random triangle

- You can use the filter on your synthesizer to further sculpt the **Node**'s sound. This works especially well if **Node** is producing a harmonically rich waveform (with high FM modulation depth value). To create sounds with complicated motion, try adding both shape modulation via **Node**'s built-in modulation generator plus filter modulation from your synthesizer's own EG or the LFO.
- On **prologue** and **minilogue xd**, you can use the VOICE MODE DEPTH control to double the amount of polyphony voices used per each key, and slightly detune these voices. This creates a nice unison/chorus effect that preserves the natural attack of the sound – which is especially useful on percussive bass, piano and bell patches.
- On **prologue** and **minilogue xd**, when using **Node** as the one and only sound source, it is sometimes useful to adjust the global output level of your current preset to balance it against your other presets. To do that, press EDIT MODE and make sure PROGRAM EDIT is selected, then switch to the Program Level parameter (function key #6 on **prologue**, sequencer key #9 on **minilogue xd**) and adjust the value.
- On **prologue**, you can run two instances of **Node** at the same time, each with its own parameter settings, using this model's timbre splitting and layering functionality. You can also combine an all-digital patch made with **Node** and a patch made with just the analog components of **prologue**, to have an interesting interplay of two distinct "worlds" of synthesis.



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