

BOLT™

Harmonics Synthesizer



User Guide

www.nektartech.com



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Introduction

Thank you for purchasing the Nektar Bolt Harmonics Synthesizer!

BOLT is the first of its kind and employs a new form of synthesis based on a concept by Professor Dr. Udo Zoelzer of Helmut Schmidt University (HSU) in Hamburg, Germany – a scientist with decades of experience in digital signal processing. Originally, he came up with the MSO-technology (multi sine oscillator) to synthesize voices, but once we heard it, we just had to join in and help develop this into a full-blown synthesis engine.

The potential of this slightly different take on synthesis intrigued us: It is kind of additive synthesis ... and it isn't! What's more, unlike most known additive approaches it is extremely easy to use. Just by turning one knob, you can change the sound from subtle sines to overtone-rich waveforms. And a traditional filter section is not required either, it all happens directly in the oscillator. "Typical" filter-like sounds are created by modulating the Harmonics and Rolloff parameters. The resulting sounds are very organic and give BOLT its own sonic character. Apart from standard shapes such as sine, saw or square, this synthesis is also capable of generating pulse chains or even alternating shapes. And if you want to push the envelope further, engage cross modulation between oscillators which opens the door to FM-like sounds and all sorts of fun mayhem.

We have labelled this tone generation "Harmonics Synthesis" and set out to shape the technology into an instrument that won't require you to have a PhD in sound design. Although the concept is new, we would like to bring back the spirit of those "olden times", when synthesizers were about turning knobs and simply experimenting: On those instruments you might not even know what a particular knob does, but the results somehow almost always work. Many vintage mono-synths or the Roland Juno-60 are great examples for this interface philosophy (not claiming that Bolt sounds like a Juno by the way – this is not an emulation of anything!). Apart from those classics' obvious sonic qualities, their secret lies in the limited number of controls. Yes – you've read that right: Reducing complexity is a feature! Cramming tons of parameters for all kinds of eventualities into a piece of software is easy. Reducing them down to an essential set, less so.

Bolt sports a one window approach: What you see is what you get. No complex x/y-matrix tables staring at you, forcing you to assign parameters before anything meaningful can happen. Also, we avoided "novelty" parameter naming: If you've ever worked with traditional subtractive synthesis, you should feel right at home. So, without any further ado, give BOLT a spin: Select a preset and simply start "knobbing around". Control the parameters from your MIDI controller for the ultimate tactile feeling – and boldly go wherever you want to. BOLT was designed to feel like a musical instrument – and not like just another piece of technology. We hope, that we have succeeded – enjoy!

Specifications

- Harmonics Synthesizer with up to 16 voice polyphony
- 4 oscillators (2 main, 2 sub) + white noise generator per voice
- Unison Voice Double Mode with detune and stereo spread: Stack up to 4 instances
- Frequency Modulation (FM) of Oscillator 1 by dedicated sine oscillator
- X-Mod: cross-modulation of OSC1 from OSC2
- Overdrive stage for each oscillator
- ADSR envelope generator per oscillator
- 1 modulation envelope generator
- 3 LFOs with extended range up to 10 kHz, 13 waveforms and MIDI sync
- 4 modulation targets per modulation source (LFO 1-3, Mod EG)
- 4 FX processors: EQ, Chorus, Delay and Reverb
- Mono and Poly modes with adjustable glide
- Support for multiple sample rates
- Automatic 2-stage protection limiter

Minimum System Requirements

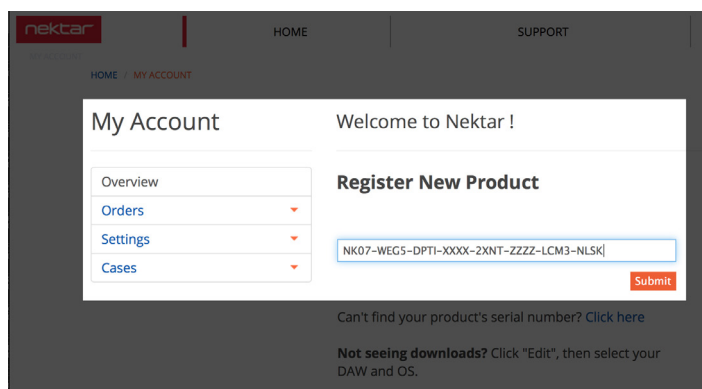
- Computer running Windows (64bit) version 7, 8, 10 or higher or a Mac with OS X 10.9 or higher.
- Any host DAW application with support for VST 2.4, VST 3 or AU Instrument Plug-Ins.

(All other requirements dependent on the DAW software / audio interface used, please consult the respective manuals for further details.)

Install Bolt

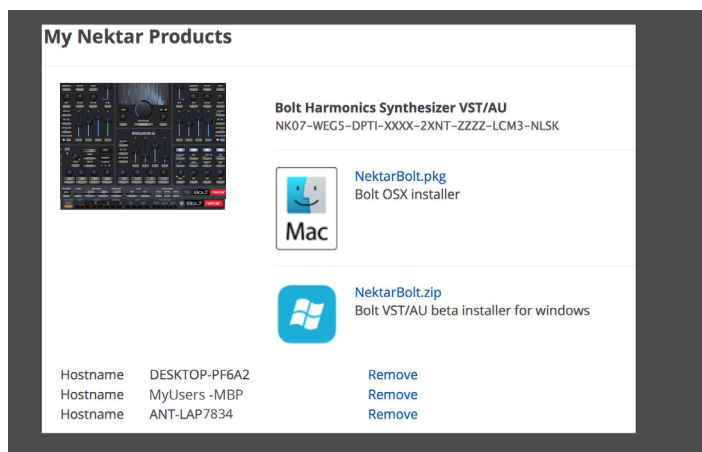
There are two ways to authorize Bolt: If you have an internet connection, you can do it online – if your computer is not connected to the internet, you will have to go via a different computer to the user account on the Nektar Website and we'll mail you the authorization key. You may install Bolt on up to three machines. So after the 3rd activation, you will need to deactivate a machine in your Nektar user account before you can authorize a new one. But let's get the software installed first. Here's how:

1. Register your Bolt serial number and download the latest version by logging into your Nektar Account at this link: www.nektartech.com
2. Type or paste the serial number you received when you purchased Bolt into the "Register New Product" field on your account's overview screen and click "Submit"



3. Now scroll further down to the "My Nektar Products" section on this page. With successful registration, the appropriate software packages are automatically made available to you. Select the required installer package by clicking on its title.

On this screen you can also check which computers are activated for Bolt, as pictured in the screenshot above. To deactivate, simply click "Remove". The maximum number of activations is three. How you activate the software, is described on the next page.



4. Run the Installer and follow the on-screen instructions. If applicable, select the plugin format (VST 2.4, VST 3 or AU) you want to install (default: all).

Activation

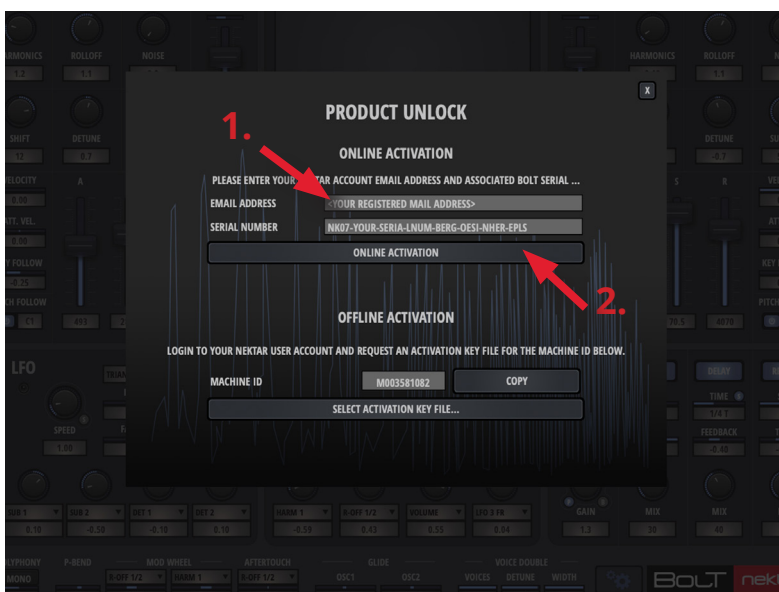
Online Activation

Bolt uses online activation. This means, that you need an active internet connection in order to authorize the plugin. This process is only required once, after successful activation, Bolt will not need a connection to run. Here's how you activate Bolt:

1. Open your DAW, load Bolt onto an instrument track and open the plugin window. How this is done, is described in your DAW's manual.
2. Open the Setup dialog by clicking on the sprocket wheel next to the Bolt logo:



2. Click on "Activate". This will open a new dialog. IMPORTANT: You need an active internet connection in order to activate the software.

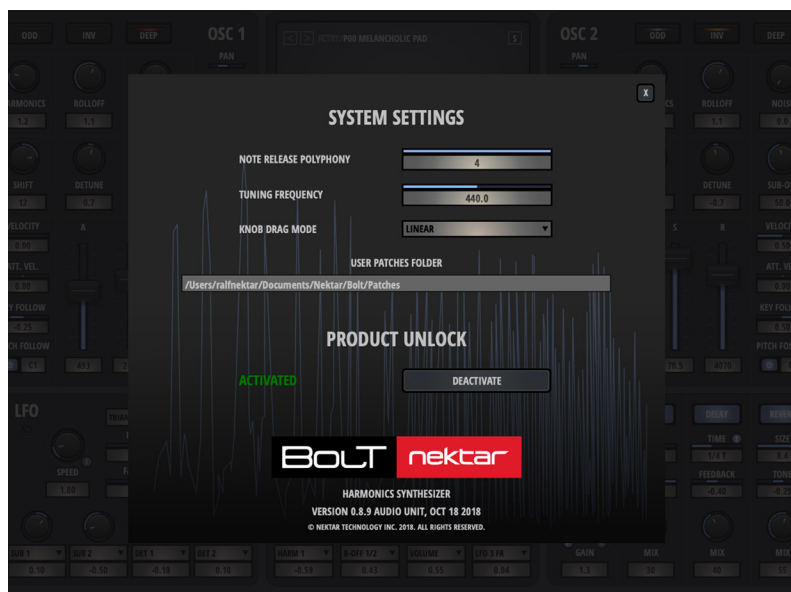


3. Now enter the registered e-mail address into the first and your serial number into the second field (1), then click on "Online Activation" (2) to authorize your product.

Please note, that you must register your serial number at nektartech.com before you can activate (see page 4).

Activation

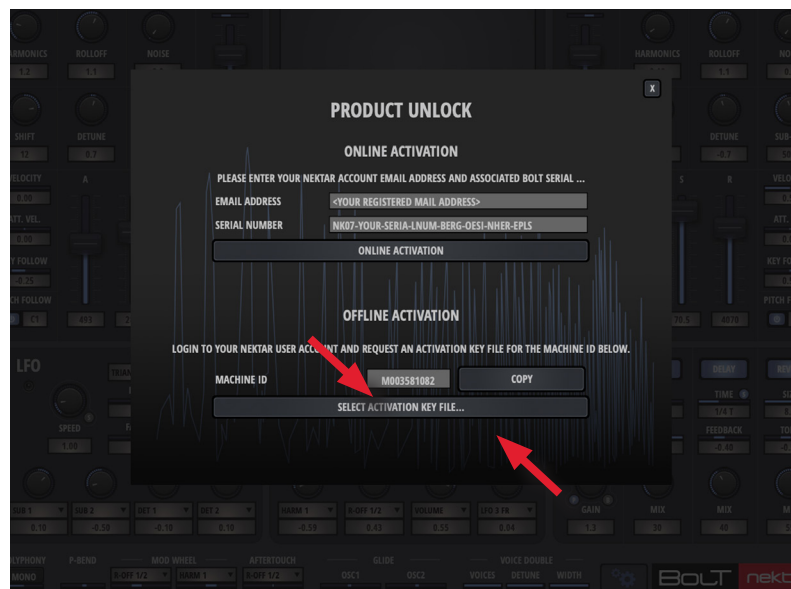
4. You are ready to use Bolt. The plugin is activated now - and the dialog should look just like the one below:



NUMBER OF ACTIVATIONS: Your Bolt license includes a maximum of 3 activations at the same time. Once you reach this limit, you will not be able to activate additional copies. In your Nektar user account, you will see a list of the activated computers (as shown on page 4). Deactivate a Bolt authorization by clicking on “Remove” in your user account. This will allow you to free it up and move it to another computer.

Offline Activation

If you don't have an internet connection on your computer, please copy the Machine ID from the lower half of the activation dialog (1) and submit it to us with your serial number. We will then create a key-file for you, that you can use to activate Bolt.



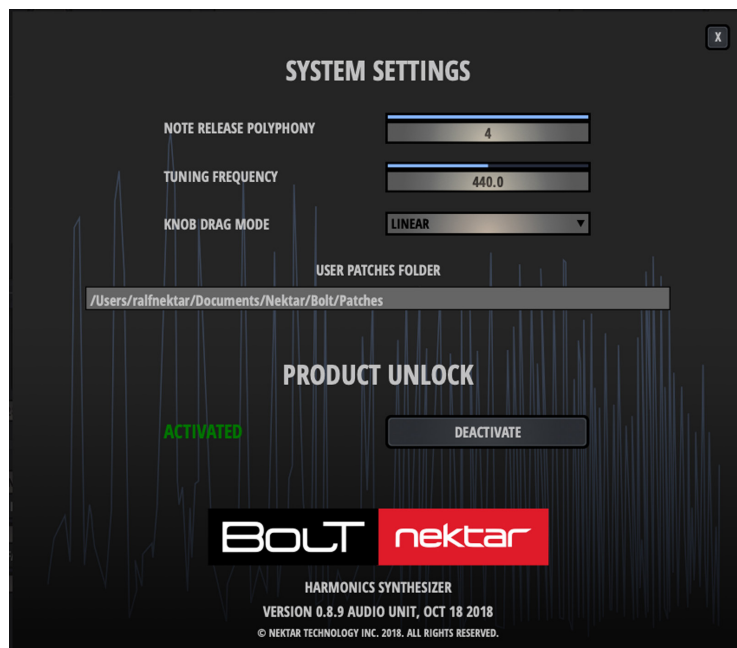
You will receive an e-mail with your activation key file. Simply load the file into Bolt by clicking on “Select Activation File...” (2). Once loaded, Bolt will be active. More detailed installation instructions will be in our e-mail.

Please allow 24 hours response time during normal business hours. We do recommend to use online authorization, as it will be much faster for you.

If you have questions regarding the installation or activation of your Nektar software, please look in the FAQ section on our website or contact our support team at: www.nektartech.com/support

System Settings Dialog

In Bolt's System Settings dialog, you will find a couple of options that globally affect all active instances of the plugin (how to open it is described on page 5). Apart from the activation, that we've explained on the previous pages, this is what you can edit:



Activation: Please see previous pages.

Note Release Polyphony: If you play the same note repeatedly on a sound with long release time, the release phases might stack and hog performance unnecessarily. By adjusting the Release Polyphony, you can adjust this overlap from 0 (note is cut off on next note repeat) to 4 (up to 4 identical notes can decay according to their set release phase while you play the next). Please note, that increasing the voice count increases the performance requirements. The default setting is 4.

Tuning Frequency: Bolt's tuning reference can be changed from 430 to 450 Hz. Factory default is 440 Hz.

Knob Drag Mode: Set the knob behaviour to Linear or Rotary. Rotary has the advantage, that the further you get away from the control while adjusting, the finer you can set the value. Linear is preferred by many, because you simply need an up-and-down movement to change a value. Factory default is Linear.

User Patches Folder: Choose your preferred user patches folder. This will make your patches available in Bolt's Patch Browser for easy selection. More details on page 16 "Loading and Saving Patches".

Once you have edited a parameter, the change is confirmed and active. In the case you are running several instances of Bolt in your project, reload your project for the changes to take effect in all instances.

CPU Performance Requirements and Audio Resolution

Several parameters will affect and increase Bolt's CPU requirements. In the following, we want to guide you through the most important ones, as there is hardly ever "enough CPU performance" available.

Polyphony: Default is 10, maximum is 16 voices. If you set polyphony to maximum and have 5 instances open, 10 additional voices are being processed. So this quickly adds up. You change polyphony in Bolt's General Parameter section described on page 15. Polyphony changes take effect immediately.

Voice Double: Also located in the General Parameters section, this feature provides unison and voice double effects. Mode 2 adds 2 instances for doubling, Mode 4 adds 4 instances: So in Mode 4 you are practically running 5 instances of Bolt! Setting changes take effect immediately.

Modulation: The more modulation is going on, the more performance is required. So a sound with MOD EG and 3 LFOs modulating Bolt's oscillators will require more CPU than a "simple" sound running only one LFO.

Sample Rate: Bolt supports multiple sample rates. So you can get even higher fidelity by running your DAWs audio at 96 kHz, which will also further reduce aliasing. Keep in mind, that this will increase the CPU-load at the same time. You change the sample rate in your DAW's setup or project preferences.

Getting Started: User Interface Controls

In this chapter we are taking you on a tour of Bolt's user interface and explain what each control does. This manual assumes that you are already familiar with synthesizer terminology. If not, there are many excellent books on the subject such as "Synthesizer Technique" by Bob Moog or "The Synthesizer" by Mark Vail, just to name a few.

General Operation

Coarse and fine parameter adjustments: Simply grab a fader or knob by clicking and dragging with the mouse for coarse adjustments. A second option for coarse adjustments is to hover over a knob or fader and scroll with the mouse wheel. For fine adjustments, hover over a value field and adjust the value by clicking and dragging or scrolling up and down with the mouse wheel. Please note, that you can change the knob behaviour from linear to rotary in the setup dialog (click on the sprocket wheel located next to the logo).

Direct parameter entry: If you prefer direct parameter entry, double-clicking on any of the value fields will allow you to do that.

Reset to Default value: Double-clicking on a fader, knob or label will invoke a default setting for that parameter. So if you've been too daring, or quickly want to reset parameters such as Shift, Harmonics, ADSR or level – it's just one double-click away!

Section Disable: Section headings double up as bypass buttons. If you want to quickly deactivate an LFO, Oscillator or Modulation EG, a click on their heading will get you there without having to alter any settings.

OSC Parameter Link and Copy: If you hold down shift and click on a parameter in one of the Oscillators (or shift-click and drag), the corresponding parameter in the other Oscillator will take over the setting and follow. You can also shift-click on a parameter heading to set the other Oscillator's corresponding parameter to the same setting. This makes it very easy to align settings across Oscillators.



User Interface Controls (cont.)

Oscillator

Each Oscillator includes its own ADSR-envelope and all parameters required to shape its sound, apart from modulation. So you are able to create a solid foundation for a sound using just one oscillator. If you engage FM, Oscillator 1 will be modulated from an independent sine oscillator for frequency modulation sounds. When you activate X-Mod, Oscillator 2 becomes the modulation source for the first oscillator's pitch, giving you access to more advanced frequency modulation options including shift, envelope, level and velocity.

OSCILLATOR DISABLE – By clicking on an oscillator label (like “OSC 1”), you can bypass it. The parameters will grey out to show their inactivity. This is helpful for fast A/B comparison of settings.

ODD – If you switch this on, the oscillator will generate odd harmonics only. If you additionally engage DEEP, the wave displayed in Bolt's oscilloscope display will look close to a square wave shape.



INV – Inverts the oscillator output. Allows for interesting phase cancellation effects when you set both oscillators to identical settings and then modulate the settings on one of them.

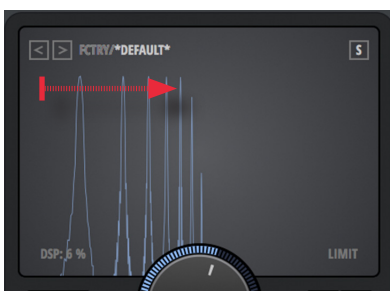
DEEP – This special filter boosts the low end, makes the wave sound “softer” and shapes it to be more like a traditional sawtooth (ODD off) or square (ODD on) waveform at higher HARMONICS amounts.

HARMONICS - Adjusts the oscillator's harmonic content in a range from 0 to 20. At 0, only the fundamental harmonic is audible, the further you turn this knob, the more harmonics are being added. It sounds very similar to the effect of a filter cutoff.

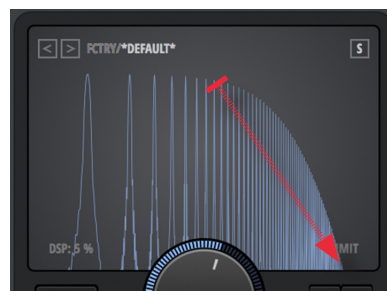
The ROLLOFF setting also has an effect on the harmonic content of your waveform.

ROLLOFF – Controls the slope of the HARMONICS from 0.01 to 4.0. This parameter adds additional harmonics above your set number of harmonics. Each added higher ROLLOFF harmonic is added at a lower volume than the previous one. The higher the ROLLOFF, the softer and broader the resulting slope and the more harmonics are

being added towards the top end of the frequency spectrum. If you switch the waveform display to spectrum view (click on the display to toggle), you will instantly see what's going on as you turn the HARMONICS and ROLLOFF knobs:



HARMONICS (0 - 20)



ROLLOFF (0.01 - 4.0)

User Interface Controls (cont.)

NOISE – Level Balance for the white noise generator: Turn it clockwise to add white noise to the oscillator or fully clockwise for noise only. HARMONICS and ROLLOFF change the noise sound similar to that of a filter cutoff and resonance. When the Oscillator's PITCH FOLLOW is on, the noise filter follows the keyboard pitch. The Noise level may be modulated as a modulation target from the LFO and Modulation EG.

SHIFT – Shifts the Oscillator Pitch by +/- 36 semitones. Double-click resets it to zero.

DETUNE – Allows for oscillator detune from up to +/- 50 cents. Double-click resets it to zero.

SUB – Adds a sub oscillator one octave below the main oscillator's pitch. The SUB's settings are identical to your main oscillator settings. However, you will notice a different behaviour when using DYNX: Without DYNX, the SUB will have less harmonics, if you activate DYNX, the Sub "opens up" and sounds brighter.

PAN – Panning balance for the oscillator: Double-click for center position, or click and drag left and right for desired position. You can also use the mouse wheel. The range goes from -1.0 (hard left) to 1.0 (hard right).

LEVEL – Adjusts the oscillator's output gain from -40 dB to +6 dB. If the signal passes the clipping threshold of 0dB (digital scale), the automatic protection Limiter will engage and show up red in Bolt's main display. At the bottom fader position, the oscillator output is muted and the parameter display reads "MUTE". Mute comes in handy when you use OSC 2 for XM modulation.

DRIVE – The little triangles left (respectively right) of an oscillator LEVEL fader add distortion to an oscillator's signal. The range goes from 0 (distortion off, clean) to 60 (maximum distortion). When drive is active, the little triangle shines red - when it is deactivated, it is grey. Drive emulates the behaviour of analogue harmonic distortion and saturation, resulting in a warmer, softer character. Hover over the triangle to see the currently set value. Double-click to reset to zero.

ADSR Envelope – Provides the traditional envelope parameters A (Attack, 1 msec – 5 sec), D (Decay, 1 msec – 10 sec), S (Sustain, Level 0-100%) and R (Release, 1 msec – 10 sec). Attack Time and Level can be modulated in the Oscillator's mod section. Key Follow can change the Decay time dependent on the pitch.

Oscillator Modulation – The oscillator mod section provides **Velocity** modulation (0-1) to make the oscillator level velocity sensitive, **Attack Velocity** modulation (+/- 1.00) for Attack time control using velocity and **Key Follow** for the envelope decay (+/- 1.00). Key Follow is centered around C4 (MIDI Note 48), so you will hear no effect on that key. The further you move away from C4, the more audible the alteration of the envelope's decay time becomes.



LFO – Low Frequency Oscillator

Bolt offers three identical LFO sections with 13 waveforms and 4 assignable modulation targets each. A drop-down list with up to 24 different targets provides a lot of routing flexibility. What's more, the LFOs have several operation modes including one shot, retrigger or MIDI-sync. So you have plenty of sound-shaping tools at hand. You can also use the LFOs as auxiliary envelopes, if you eg. use a Saw Wave with CYCLE set to off and modulate Pitch or Harmonics. You select an LFO by clicking on the numbered tabs to the left of the heading.

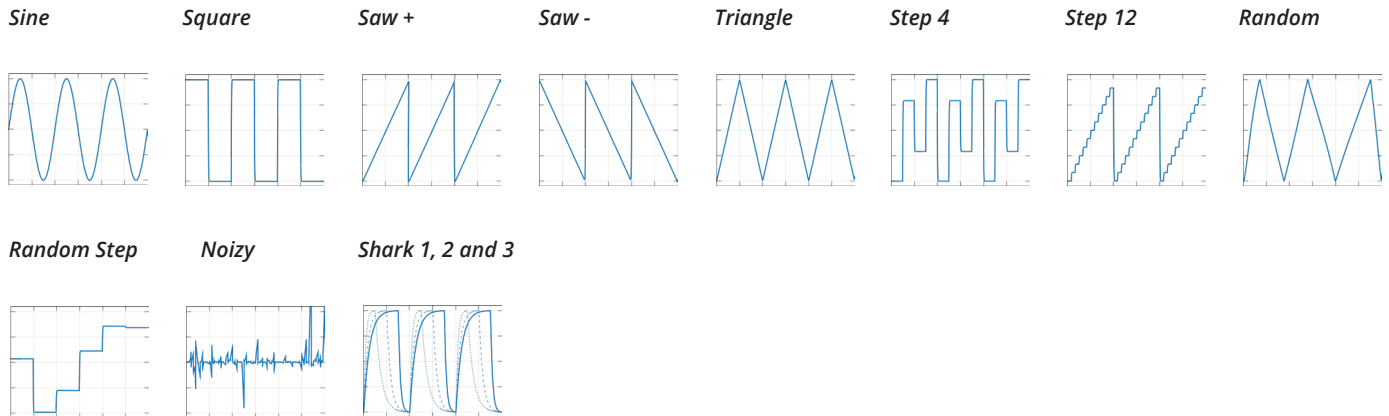
LFO BYPASS – Click on the active LFO's label ("LFO") to bypass it without having to change any parameters for quick A/B-ing.

SPEED – The LFO's speed range goes from 0.01 Hz to 10 kHz. When SYNC is active, the incoming MIDI clock is used as tempo basis and SPEED displays musical divisions from 16 bars per LFO cycle down to 1/128th note triplet instead. This makes it easy to create rhythmical modulation effects.

User Interface Controls (cont.)

SYNC – Switches the oscillator speed between MIDI and internal clock. With SYNC active, the SPEED display shows musical values instead of Hertz.

WAVE – This drop-down menu offers 13 LFO waveforms. Available are:



PHASE – Adjusts the offset of the LFO wave's start phase from 0 to +/- 180 degrees. So you can start a sine wave at +1 rather than 0 for instance, allowing you to start the modulation at the wave's maximum rather than the start.

FADE IN – Determines the offset time for the LFO to reach its maximum intensity. If set to 0, it starts immediately. If set to any other time, you will notice the LFO to blend its modulation depth in gradually. The delay time ranges from 0.1 msec to 10 sec. In sync, it follows musical values down to 64th note triplet or up to 4 bars.

CYCLE – Most LFOs simply keep on running, and always have their cycle set to on. Bolt's LFO allows you to switch it to one shot mode: With Cycle off, the LFO will stop after one cycle of the selected waveform. This opens up some interesting modulation possibilities: Use the LFO to modulate a parameter just once, rather than continuously – employ it as an auxiliary envelope (saw waves are great for that, the speed setting the envelope's shape – or use a square wave set at a very high speed (over 20 Hz) to inject a transient for percussive sounds). With the Noisy wave you can inject noise by modulating HARMONICS, PITCH or LEVEL with speeds above 100 Hz and up to 10 kHz.

SYMMETRY – Sets the symmetry of the LFO waveform. With Symmetry on, the LFO oscillates between -1 and 1, with Symmetry off, it oscillates between 0 and 1.

RETRIGGER – If EG RETRIG is switched on, the selected Oscillator EG (1,2) or Modulation EG (M) will be triggered each time the waveform cycles. This is great, when you use the LFO to create arpeggio-style effects (set LFO WAVE to "Square", activate CYCLE, RETRIGGER and SYNC, select ¼ note in SPEED and choose "Pitch" as Modulation target with an amount set to "1.0" for that classic octave arpeggio).

MOD AMOUNT – The Modulation Amount parameter is centered, so you can add positive or negative modulation. The range goes from -1.00 to +1.00. The parameters you modulate, are selected with the next parameter.

MOD DESTINATION – The LFO Mod destinations are selectable from a drop-down list. We have pre-selected some typical destinations for you – but there's more to discover! You have access to:

- Pitch 1, 2, 1 and 2
- Roll-Off 1, 2, 1 and 2
- Sub 1, 2 (Level)
- Drive 1, 2, 1 and 2
- Detune 1, Detune 2, Detune 1/2
- Noise 1, Noise 2 (Level modulation)
- Level 1, 2 (OSC Level modulation)
- LFO Frequency (1/2, 1/3, 2/3 - dep. on sel. LFO)
- Harmonics 1, 2 or 1 and 2
- Pan 1, 2, 1 and 2
- Volume (Main Volume)

Modulation Envelope Generator

Bolt is slightly different from conventional synthesizer concepts insofar, that you won't find the typical subtractive filter section with cutoff and resonance parameters. This is due to the Harmonics Synthesis concept: The sound is shaped directly in the oscillator simply by adjusting HARMONICS and ROLLOFF and with the MODULATION EG you can then modulate this shaping. Apart from a typical ADSR-Envelope, the MODULATION EG provides 4 selectable modulation targets and can be made responsive to Velocity, Attack Velocity and Key Follow. If you are aiming for filter-style effects, modulate the HARMONICS and ROLLOFF parameters. But of course you can also assign it to many other modulation targets.

MOD EG BYPASS – Click on the MODULATION EG label to deactivate the envelope for quick comparisons.



MOD AMOUNT – The Modulation Amount parameter is centered, so you can add positive or negative modulation. The range goes from -1.00 to +1.00. The parameters you modulate, are selected with the next parameter.

MOD DESTINATION – The Mod destinations are selectable from a drop-down list. We have preselected some destinations for you – but there's more to discover! You have access to:

- Pitch 1, 2 or 1 and 2
- Detune 1, 2 or 1 and 2
- Harmonics 1, 2 or 1 and 2 (default target 1 and 2)
- RollOff 1, 2 or 1 and 2 (default target 3 and 4)
- Noise 1, Noise 2 (Level modulation)
- Pan 1, 2, 1 and 2
- Sub 1, 2 (Level)
- Level 1, 2 (OSC Level modulation)
- Volume (Main Volume)
- Drive 1, 2, 1 and 2
- LFO Frequency 1, 2, 3 / • LFO Intensity 1, 2, 3

MOD EG MODULATION – The oscillator mod section provides the following parameter:

- **VELOCITY:** Velocity modulation (0 - 1.00). The higher the value, the more the modulation intensity will be controlled by Velocity. Great for creating more dynamic sounds.

- **ATT. VEL.:** Attack Velocity modulation (+/- 1.00). The higher the value, the more the Attack time can be increased (+) or decreased (-), when you hit the keyboard harder. Also excellent for creating more lively sounds.

- **KEY FOLLOW:** Positive or negative Key Follow for the envelope decay (+/- 1.00). Key Follow is centered around C4 (MIDI Note 48), so you will hear no effect on that key. The further you move away from C4 the more audible the alteration of the envelope's decay time becomes.

User interface controls (cont.)

Master Section

In this section you set Bolt's Output Level, DYNX, FM and X-MOD settings. What's more, the waveform display shows the synthesizer's generated overtone structure in realtime.

DISPLAY – Shows the shape and overtone structure of Bolt's waveforms. Toggle between Oscilloscope and Spectrum views by clicking on the display. Spectrum view visualizes a frequency range from 50 Hz to 16 kHz.

DSP – Shows the estimated amount of DSP resources used by the plugin instance. If the load goes beyond 60 - 70%, you might experience frame drops resulting in audible crackle. In this case, reduce polyphony or increase your audio system buffer size.

DYNX – Switch DYNX on, turn the knob and experience a brighter, louder sound. The effect becomes more pronounced once HARMONICS is set to a value greater than 3 and if HARMONICS and ROLLOFF are being modulated. When DYNX is disabled, the perceived overall loudness remains the same, independent of your HARMONICS and ROLLOFF settings.

MAIN VOLUME – Sets the Main Volume from -40 dB to +20 dB. If the output signal exceeds a level of -1 dB, the automatic protection limiter will be activated and the display's LIMIT indicator lights up red.



LIMIT – Bolt's automatic protection limiter is on by default. Click on its indicator to open a drop-down settings menu:

- **Standard** – Fast Protection Limiter (thresh. -1 dB)
- **Slow** – Protection Limiter plus slow Limiter (thresh. -6 dB), helps to avoid limiting artefacts with sustaining sounds such as pads.
- **Off** – All limiting bypassed

LEVEL METER – The level meter below the LIMIT indicator displays the peak level after Main Volume. The range is from -20 dB to 0 dB digital scale, where the meter will light up red to indicate clipping.

FM – This button activates a sine oscillator that's hardwired to modulate the pitch of OSC 1. Set the modulation amount from 0 to 5 with the knob right underneath. Once you move beyond 1, the effect sounds increasingly extreme and metallic. For ease of use, the FM oscillator's pitch is fixed at a shift val-

ue of -12, which produces musical results. If you change OSC 1's SHIFT parameter however, you can also try out metallic mayhem. Please note, that modulation and carrier pitch will be identical if you shift OSC 1 by -12, so the FM-effect will be minimal and only audible at high amount settings. For even more frequency modulation power, switch to XM. FM and XM may only be used alternatively.

XM – This switch activates cross modulation from the 2nd Oscillator. For first experiments load the Default Patch, engage X-MOD with a value of 1.00, turn the 2nd Oscillator's LEVEL down to "MUTE", set its SHIFT to -12 and DECAY and SUSTAIN to maximum levels. Now play with the HARMONICS and ROLLOFF parameters: The less harmonics OSC 2 has, and the greater the negative pitch distance to OSC 1, the more extreme the modulation. Shifting OSC 2 below OSC 1 produces more extreme results than shifting it higher. The Oscillator Mode settings ODD, INV and DEEP also have an effect on the modulation's sound.

Now play with the 2nd Oscillator's ADSR-Envelope: Start by increasing the XM amount to 3 and bring down SUSTAIN and then DECAY. Yeah, things can get wild here as you are modulating the frequency – especially, when you now also add the SUB-OSC. DYNX influences the frequency properties as well. Not wild enough? Add VOICE DOUBLE with a DETUNE of more than 4 cents and a high PAN SPREAD. And add GLIDE for the second oscillator. Enjoy!

User Interface Controls (cont.)

Effects Section

Four processors allow you to add some icing to your sonic cake. The idea is to provide you with fast and easy performance effects, so we have limited the control to two parameters each plus gain or mix ratio. The effects are routed in series and are in the order you see in the user interface.



Effects activation – Effects are switched on and off by clicking on the effect label.

EQ – One **peak** or **bandpass** EQ-band. The **peak** EQ band has a Q of 0.05 – 10, a frequency range from 20 Hz to 16 kHz and +/- 24dB Gain. When you switch to **bandpass** EQ, the Q sets the band's width and the frequency represents the band's center frequency.

CHORUS – Rich classic chorus effect with a rate from 0.05 – 3 Hz, a modulation depth setting from 0.1 to 1 and dry/wet MIX parameter. It will give you rich pads instantly. Immediately apparent when you use the default setting (double click the parameter labels to reset them).

DELAY – Delay with a range from 1 msec – 3 sec, click on the "S" button for tempo sync (switching the display to show musical values ranging from 2 bars – 1/128th triplet). The Feedback control is centered, if you move the feedback to the left you will get stereo feedback – if you move it to the right, the delay delivers mono feedback up to oscillation at very high values. We have modelled the behaviour of analog delays: so each repeat will increasingly sound duller. The dry/wet mix ratio is set by the MIX knob.

REVERB – Setting a reverb effect with only 2 parameters limits your choices of course: So we came up with meta parameters. SIZE controls stereo width, initial reflections and room size at the same time. From settings 0.00 – 1.00 you will notice a tighter, more "mono" ambience, once you move beyond 1.00 the stereo field expands to full width. TONE alters the reverb tail's sound and EQ: Move it to the left for dark and dull reverbs – to the right for bright reverb tails.

User Interface Controls (cont.)

General Parameters

In the section at the bottom of Bolt's UI you set general parameters such as the Voice Mode, realtime modulators, Glide per oscillator and the Voice Double mode. A click on the sprocket wheel will open the system settings and authorization dialog (details on how to activate Bolt on page 4 "Installation").



VOICE MODE – Poly or Mono mode. The maximum polyphony of Bolt is 12 voices, the default setting is 10. This may be changed in the SETUP dialog, rule of thumb: less voices, less CPU performance required. Note: This setting affects all loaded instances of Bolt. So if you are running out of performance, decreasing the voice count will free up resources across all loaded instances in a project upon next reload.

PITCH-BEND – Sets how Bolt reacts to MIDI-Pitch Bend. The maximum range is +/-12 semitones.

MOD-WHEEL – Allows you to assign the Modulation Wheel to various parameters from the drop-down menu. The Mod-Wheel can modulate two targets simultaneously. The value field below is centered with a range from -127 to +127.

AFTERTOUCH – Allows you to assign your keyboard's aftertouch to various parameters from the drop-down menu. The value field below is centered with a range from -127 to +127.

GLIDE OSC 1/2 – Dedicated Glide parameters per oscillator. Sets the time it takes to glide from one played pitch to the next (mono mode) or how long it takes to glide to the played note from the octave below or above (poly mode) in msec.

VOICE DOUBLE – Want your patches to sound fat? Then move this fader up – you can take this up to 4 additional instances of Bolt running at the same time with your sound. In combination with DETUNE and WIDTH you'll arrive at super-fat sounds in no time, just like on an old analog synth. Keep in mind, that this also makes Bolt more performance hungry – so keep an eye on your CPU.

Note: With low detune settings below 0.50 you might experience shifts in the stereo image due to phase cancellation as we don't reset the oscillators' phase for a more vivid sound. In this case decrease WIDTH or increase DETUNE.

DETUNE – Adds detune to your Voice Double instances. Range from 0 to 8 cents. For nice flanging effects set Voice Double to 4 with detune between 1 and 2 cents, and notice how it then it moves into rich detuning once you increase this parameter further.

WIDTH – This parameter only has an effect, when Voice Double is active: The more you double, the more the spread will become obvious. As the name implies, PAN SPREAD is spreading the doubled instances across the stereo panorama. Make sure Chorus is set to off, then set Osc 1 Panning to -0.3, Osc 2 Panning to +0.3, Voice Double to 2 or higher, add a Detune of 4 and then start playing with PAN SPREAD: Who needs Chorus, right? Well, now add Chorus. Of course, the stereo depth will become a bit blurry – but could it be any lushier?

Loading and Saving Patches

Factory Patches and Patch Selection

Bolt comes with over 500 Factory patches to get you started. After installation, you will find a list of the patches by clicking on the patch name next to the two triangles in Bolt's display. This will open up a list you can browse through in categories:



At the top of the list we have placed a bunch of sounds to showcase Bolt's versatility, further down you will find folders with categories such as Bass, Brass, Pads and so on, each containing patches from that category.

Direct Selection: Select a patch from the list by pointing with the mouse and click to confirm.

Patch Up/Down: You can step up and down through patches using the "<" and ">" arrows left of the patch name.

Factory Patches are "read-only": When you edit a sound and click on [S] to save, it will automatically be saved as a user sound. User patches are described in the next section.

User Patches and Patch Saving

User Patches will extend your patch list automatically at the top, and move the Factory Patches further down in the list. So your own sounds will always come out on top.

Saving Patches: Click on [S] in the display (1.). This will open up your computer's file selection dialog. Then, pick the location you want to save your patch to. If you'd like your User Patches to show up in Bolt's file dialog automatically (2.), you have to save them to the default location as described on the next page.



Loading Patches: Click on the active patch name in the display, this will open up the Patch Browser. Now pick a sound from the list and click the name to confirm.

Patch Up/Down: Use the "<" and ">" arrows left of the patch name in the Display.

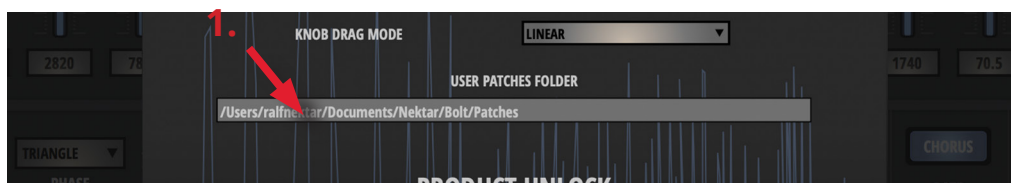
Loading and Saving Patches (cont.)

Setting the User Patches Folder

Any Patch that is saved into the selected User Patches Folder will automatically be displayed in Bolt's patch dialog for instant selection. You can change this folder during runtime and the patch list will reflect the change right away.

The factory default path after installation is `<user>/Documents/Nektar/Bolt/Patches`. This folder is used to display user patches in Bolt's file browser. This is how you set the User Patches Folder:

- Click on the Sprocket Wheel at the bottom of Bolt's UI. This opens the Settings dialog.
- Click on the currently selected path, displayed right at the center of the dialog above "Product Unlock"(1).



Now use your operating system's file browser to choose a new location. As stated above, the change is activated immediately in this instance of the plugin. If you have multiple instances of Bolt in your session, the other instances are still pointing to the User Patch Folder that was active at the time of their loading. If you want all instances to point to the same folder, save and reload your session. After reload, all instances of Bolt will point to the new location.

Default Patch

We have created a patch with some generic settings to get you started: There is a read-only version as part of your factory patches. But you can also create your own!

Everyone has their own preferences, when it comes to their favourite settings. So if you'd like to adapt the Default Patch to your own needs, you can! Simply load the Default, make any changes you want and save your version into the top level of your User Patches (default path: `<user>/Documents/Nektar/Bolt/Patches`). The next time you load the Default from Bolt's Patch menu, it will automatically be your version.

If you'd like to reset the Default to factory settings, simply delete your version of the patch. The next time you load Default, it will be the factory version again.

Simple Saw Bass with one Oscillator

In order to help you familiarize yourself with Bolt's UI, we we'll guide you through the creation of a simple saw bass sound, starting from scratch with the Default Patch.

1. Open Bolt and load the "Default" patch from the patch menu.
2. Click on the "OSC 2" heading to deactivate the second oscillator. We'll only need one oscillator for this sound!
Click on the display once to switch it to the spectrogram mode. Now you see the harmonics structure, rather than a waveform.
3. Activate "DEEP" to engage the special filter that allows Bolt to generate the more traditionally shaped waveforms.
4. By default, HARMONICS is set to 2.0 - move that up and down to get a feel for the sound. We will set it to the tone we want at the "end" of the saw bass sound, so quite dull and low: set HARMONICS to 3.0. Don't worry about the dullness... we'll get to that in a second.
5. Of course, we want it to sound a bit more "squeaky". So bring ROLLOFF down to its minimum of 0.01 from the default setting of 0.90. You will instantly note how the sound becomes more nasal and almost organ-like.
6. OSC1, ADSR-Envelope: We'll leave this envelope untouched, using its default settings (5.0, 200, 50.0, 50.0).
7. MODULATION EG: As we've mentioned elsewhere in this manual, Bolt doesn't have a traditional filter section. But that doesn't mean, you can't create such sounds! We'll use the MODULATION EG for that by routing it to modulate HARMONICS and ROLLOFF. In the Default Patch, Target 1 and Target 3 are already assigned to HARM 1 and R-OFF 1 (if for whatever reason you are seeing something different, click on the little triangles to the right of the target parameters and pick the correct parameters from the drop-down menu). Now move HARM 1 to a value of approx. 0.65. You should now be hearing something resembling filter modulation, in sound similar to a steep 12 dB filter.
8. ADSR-Envelope in the MODULATION EG: The default curve already works quite well for this sound: but we'd like the "filter" to close more. So bring the Sustain parameter "S" down to 8.3. Adjust the Decay parameter "D" to 432. We'll leave the 2 other parameters at their default settings (A - 5.0, R - 50.0).
9. Depending on your preference, you can add ROLLOFF to make the sound more wiry and less nasal. Set R-OFF 1 to a value of 0.20. If you want velocity to have more effect on the filtering, move VELOCITY up to 1.0. Make higher notes become "duller" faster by adjusting KEY FOLLOW to -0.15.
10. OK - now we have a bare-bones saw-y bass sound. Too soft we hear you say? not enough bass? OK:
Bring OSC 1's SUB-OSC parameter up to 50.0 to add a sub-octave and engage DYNX in Bolt's Master Section. Set DYNX to 0.43. DYNX allows you to reduce the normalization we introduce to make up for the level increase when harmonics are added. By bringing the value up, you are reducing this effect, making Bolt sound brighter and more punchy. Better? Now boost the Main Volume to 10.0. Done!



Tutorial Saw Bass Patch

This is what your patch should look like, once you've finished setting it up (includes the optional settings on the next page).

OSC 2 and the Effects section are bypassed, The LFOs are all deactivated.

(You will find this patch in the "Tutorial" folder of our Factory Patches.)

11. Optional finishing touches: Of course, this sound is barley scratching the surface of Bolt's possibilities. But let's show you, how you can take this sound further with just a few more tweaks:

- Set POLYPHONY in the General Parameters bar to mono by clicking on the MONO button.

- Set P-BEND to 2, assign MOD WHL to HARM 1 with a value of 20.0 and the second modulator to R-OFF 1 with a value of -127.

(Oh. That **pitch modulation** is irritating you as well? That's because LFO 3 is pre-assigned to the Mod Wheel by default and set to create vibrato. Let's get rid of that by clicking on the "3" in the LFO-section to bring LFO 3 to the front. Deactivate it by clicking the "LFO" heading. If you now move the mod wheel up, Bolt's HARMONICS open up, the ROLLOFF comes down, creating a sound like a filter opening up.

- Glide: Add a bit of pitch glide by setting OSC1 in the GLIDE section of the General Parameters to -14.0

- Distortion: The little triangle to the left of the OSC 1 LEVEL control will add saturation when you move it up. Set it to a value around 6 - 7 for a touch of grit (Tip: if you have a wheel mouse, hover over the control and move the wheel. Easier that way!)

- Unison Voice Double: Set VOICES to 2 and DETUNE to 1.2, leave WIDTH at 0 for a bit of unison feel. If you engage voice double, Bolt adds additional instances with the same settings – and DETUNE will offset their pitches slightly against each other. This makes it really easy to create rich and fat sounds.

First XM-Experiments: Bolt's FM Arsenal

XM allows the second Oscillator to modulate OSC1, with all of OSC2's parameters having an influence on the modulation: Harmonics, Pitch, Detune and ADSR Envelope all affect the sound. Let's extend our simple Tutorial Bass with a touch of FM-magic:

1. Activate OSC2 by clicking on its heading. Move the volume down to "Mute", we only want to use it as a modulator. For more low end, you can add the volume back in later.

2. Activate XM in the Master Section and set it to 1.0.

3. Set SHIFT to -12. For XM to deliver the expected results, it should be an octave lower than OSC1. Experiment with other values: odd intervals (-11, -27, etc.) create all kinds of mayhem. Now add the SUB-OSC with a value of 30.0 to make it sound "rougher".

4. Set HARMONICS to 0.50 and ROLLOFF to 0.90 (the lower the harmonics settings, the more extreme the modulation).

5. Set the ADSR-Envelope as follows: A - 10.5, D - 1740, S - 47.5 and R - 340. Double-Click numerical fields to enter the values directly. Set VELOCITY, ATT. VEL and KEY FOLLOW to zero (0.00). As the Envelope now affects the pitch of OSC1, velocity is not always desirable. Done! (Experiment by switching PITCH FOLLOW off and moving the pitch to, say, C#4 (click & drag with the mouse): This creates atonal, metal-bowel-like sounds.)

Tutorial FM Bass Patch

There you have it: A typical FM-style Bass created with just a couple more tweaks. For more low-end, simply switch OSC 2 DEEP on and move its LEVEL up. If you want more of "that" FM-touch, move XM up to 2.0 or beyond. To tame it a little, move OSC 1 HARMONICS down to 1.0. And finally, if you switch the OSC 1 and OSC 2 ODD Buttons on, only odd harmonics are generated and you can give the patch a more "square-like touch."

(You will find this patch in the "Tutorial" folder of our Factory Patches.)



