



Waves Submarine

Subharmonics Generator

User Guide



Introduction

Waves Submarine is a plugin that enables you to add clean, natural sub-bass content to a signal. It generates subs that are one octave and two octaves lower than the input signal. These generated sub signals can be controlled further before they are mixed with the original signal or sent straight to the LFE buss. You can create bone-rattling subs that highlight the low end of an instrument or use Submarine with a light touch to subtly enhance a sound.

Submarine is not an EQ; it doesn't increase the gain of existing frequencies. Instead, it exploits the power of an exclusive Waves processing tool, Organic ReSynthesis (ORS), to generate flawless subs. ORS breaks down an input signal to its core characteristics: carrier, pitch, formant, and envelope. Processing is built on these four characteristics, not on the input signal. This enables Submarine to generate minus-one-octave and minus-two-octave subs without compromising sound quality.

Standard FFT-based pitch or formant-tuning processors are often not as effective or natural sounding since they rely on formant shifting and resampling, which can result in artifacts.

Getting Started

Submarine is very easy to use and its interface is quite intuitive. You can likely run Submarine without reading about it. We nonetheless suggest that you look over the next few pages, just to make sure that you know what does what.

There's one thing that's really important: levels. Make sure that the input level leaves some room for processing. Plugin input level is controlled in the DAW. Adding sub frequencies will likely increase the overall signal level, so lower the output control as needed in order to return the signal to the DAW at an appropriate level.

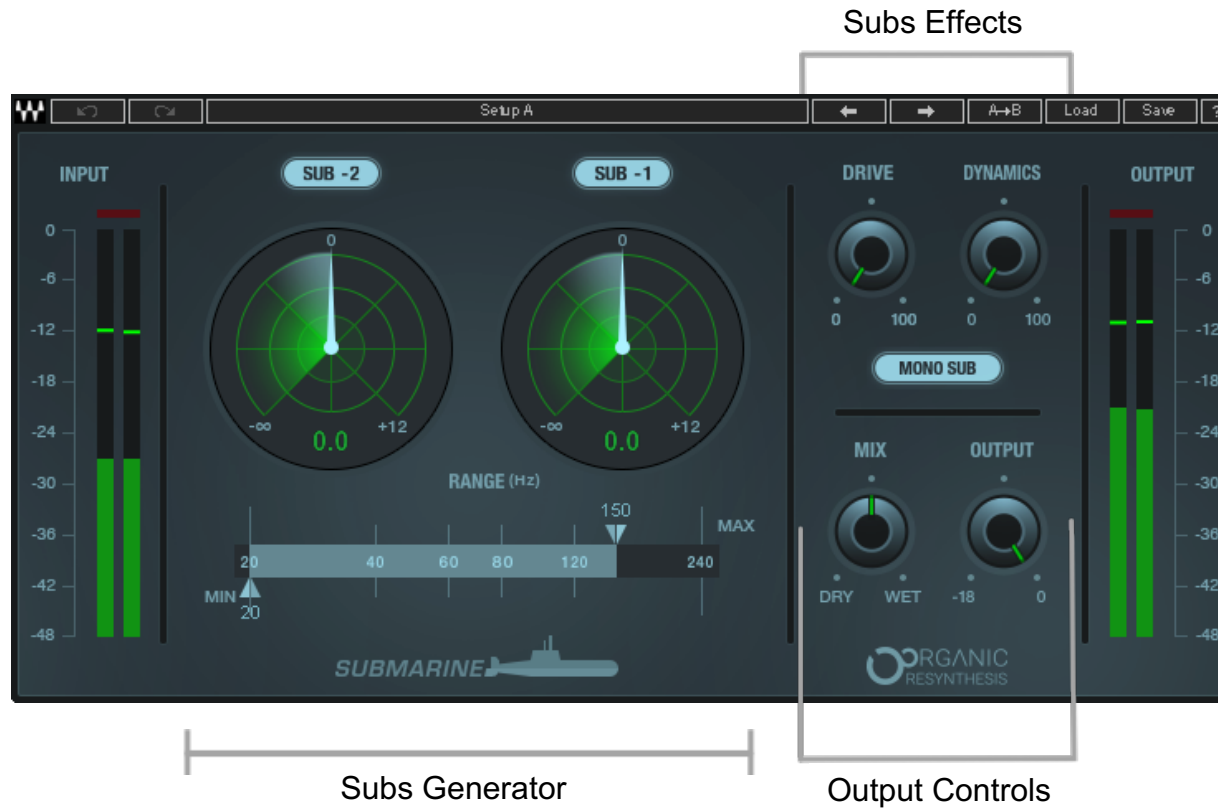
Components

There are two Submarine components: mono and stereo. Their interfaces are identical, aside from the number of channels.



Using Submarine

Using Submarine means controlling three things: sub generator, effects, and output.



To get started, insert Submarine on a DAW channel. Then follow these steps, in this order:

- 1 Define the Range of frequencies from which you want to generate subs.
 - Select Sub generator(s) and set levels.
- 2 Set Drive and Dynamics to color the sound of the subs and to help the subs “sit” in the mix.
- 3 Set Wet/Dry mix and Output level.



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Generate Subs



RANGE (WHAT FREQUENCIES DO YOU WANT TO USE TO MAKE THE SUBS?)

Range sets which frequencies of the input signal will be used by the generators to create subs. Use the **Max** grabber to locate the instrument's fundamental or the frequency that you want to focus. This is most easily done by setting the **Mix** knob to Wet. This way you hear only the generated subs. The **Min** grabber sets the lowest frequency of the original signal that's sent to the sub generators.

It's important to accurately define the Min and Max settings:

If **Max** is set too low, the fundamental will be outside the range and will not be used to generate subs. If Max is set too high, the range will include unwanted higher harmonic information, which can result in incoherent, less focused subs.

Lower **Min** settings send more low frequencies to the sub generators. Higher Min settings effectively limit the frequency of the generated sub. Raising this setting can also reduce the amount of sub-fundamental noise on the original signal before going to the generators.

SUB GENERATORS (CHOOSE ONE OR TWO OCTAVES OF SUBS AND THEN SET THE LEVEL FOR EACH)

There are two sub generators. They create harmonics that are one octave and two octaves below the part of the original signal that's within the frequency Range.

Sub -1 generates a signal that is one octave lower than the input signal within the detected range.

Sub -2 generates a signal that is two octaves lower than the input signal within the detected range.

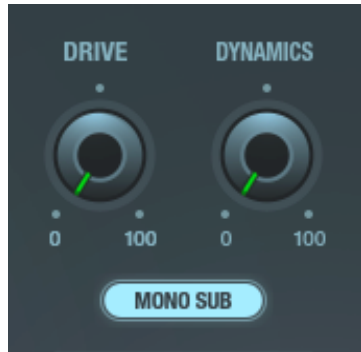
By default, both generators are on when you open Submarine. Drag up or down on the **Sub Gain** controls to change the level. Experiment with both generators together and get a good balance, then try each generator on its own. Use the switch above a generator to turn it off or on. Turn each generator on or off and listen to the difference.

Using two generators is not necessarily more effective than using only one.



2 Control the Generated Subs

DRIVE (GLUE THE SUBS INTO THE MIX)



Drive adds a small amount of harmonic distortion to the sub signal. These even harmonics help the generated subs stick to the original signal. Generally, the greater the drive, the more dynamic the subs sound. Start at the default setting of 0 (zero) and slowly increase the Drive until you hear the subs get warmer and more glued to the other mix elements. At very high settings you may hear the distortion itself. Normally, you will set the subs generators before adjusting the drive.

Drive affects only the generated sub signal.

DYNAMICS (CONTROL HOW TIGHT THE SUBS SOUND)

Use the Dynamics knob to adjust the compression of the generated subs. It can control how “short” or “thumpy+sustained” the subs feel. The Dynamics control affects only the generated subs, not the original signal.

Continuous control ranges from 0 (no compression) to 100 (maximum compression).

MONO SUB (MAKE A MONO SUB SIGNAL FOR MORE PUNCH)

This sums a stereo generated sub signal to mono (stereo component only). Using a mono sub helps to focus the sub energy in the mix. This generally produces a stronger sub sensation, since, in mono mode, all loudspeaker cones will move together on the subharmonics. Try both mono and stereo; it’s a creative choice as well as a technical one. Stereo/mono mode affects only the generated sub signal.



3 Control the Output

MIX (SET CONTENT OF THE PLUGIN OUTPUT)



Controls the output mix between the input signal (dry) and the generated subs signal (wet). When sending the generated subs directly to an LFE channel, set Mix to 100% wet. Similarly, when using Submarine as an aux send, set Mix to 100%.

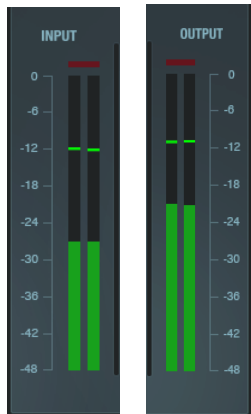
OUTPUT GAIN (SET A PROPER OUTPUT SIGNAL)

Allows you to lower the plugin output gain. Adding sub frequencies will likely add energy to the output signal; adjust the output gain to avoid clipping and return the signal to the DAW at an acceptable signal level.

Meters (Input and Output)

Separate full-scale meters for input and output. There are two scales on each meter:

- A Full-Scale peak meter (green bar) indicates the maximum peak level of the plugin.
- A Digital VU meter (solid green) with a relatively slow attack averages out many of the short peaks, resulting in a more real-world expression of dynamics and volume.



Use each meter type to understand Submarine output.

- The full-scale meters report short peaks and are especially important in avoiding clipping.
- VU meters reveal more information about the total energy of a signal.

On the left you see the signal before and after subs generating. Note that the peak levels for input and output are essentially the same. But when using the digital VU meters to compare in and out signals, their total energy is markedly different—output energy is much greater than the input energy. This can help you create subs that do not overwhelm the playback system.

An infinite-hold clip indicator is above each meter. Click on the indicator to clear.



Tips for Better Subs

LIMIT THE NUMBER OF INSTRUMENTS

We recommend that you use Submarine on only one or two tracks in a mix. Submarine is effective in generating subs from naturally low-frequency instruments or sounds. These subs create very low frequencies and help to focus an instrument within the mix. But if Submarine is used on several instruments, the bottom end of the mix can become crowded or inarticulate.

IN GENERAL, WORK ON TRACKS, NOT ON THE MASTER BUSS

In general, we recommend against using Submarine on the master buss. There may be times when this creates just the effect that you're seeking, but consider this the exception rather than the rule.

USE AN ANALYZER

Your monitor system may not be able to reproduce the very low-frequency subs that Submarine generates. This can result in a mix that contains far more sub energy than you're aware of. What sounds good in the mix room can have too much low-frequency when played on systems that can reliably reproduce such sounds.

To better understand how generated subs are affecting your overall mix, we suggest you use a frequency analyzer.

ADJUSTING BOTH GENERATORS AT THE SAME TIME

Use the mouse to draw a rectangle that includes both generator controls. The controls are now linked: move one generator gain control and the other will move correspondingly.

PARALLEL PROCESSING SUBS

You may want to process the generated subs and the original signal separately. Send the signal to Submarine on an aux, then adjust Range and Subs. Minimize Drive and Dynamics and set the mix to 100% Wet. Return the Subs signal on a channel, process it as you see fit, and mix with the original signal.

DO IT AGAIN

Once you are happy with your setup, do it again. You always learn something the second time around. Save your first settings as a preset, if you like. If you created your subs without the rest of the mix, now's the time to see how everything plays together.



Control Values

Subs Generator Section

RANGE

Sets the input frequency range within which the sub-frequency generators will create subs. Use the triangular markers to define the Minimum and Maximum Range values.

Min: 20 Hz to 120 Hz; 48 dB/octave

Max: 40 Hz to 240 Hz; 24 dB/octave

Defaults: Min: 20 Hz; Max: 150 Hz

SUB GENERATORS

There are two Sub generators. Each one generates a sub signal based on the frequency range of the input signal, as defined by the Range setting.

Each generator has an on/off switch and a level control.

Ranges:

Sub Generator -1 generates a sub that is one octave below the Range-defined frequencies of the input signal.

Range: -inf to +12 dB

Default: 0 dB

Switch: On or Off, default: On

Sub Generator -2 generates a sub that is two octaves below the Range-defined frequencies of the input signal.

Range: -inf to +12 dB

Default: 0 dB

Switch: On or Off, default: On



Subs Effects Section

DRIVE

Adds a small amount of harmonic distortion to the sub signal.

Range: 0 to 100

Default: 0

Dynamics

Controls the compression of the generated subs.

Range: 0 (no compression) to 100 (maximum compression), continuous control

Default: 0

MONO SUB

Converts the generated sub to a mono signal (stereo component only).

Range: Mono or Stereo

Default: Mono



Output Section

MIX

Controls the output mix between the input signal (Dry) and the generated subs signal (Wet).

Range: Dry (0) to Wet (100)

Default: 50% (even mix between Dry and Wet)

OUTPUT GAIN

Allows you to lower the plugin output gain.

Range: -18 dB to 0 dB

Default: 0 dB

Meters (Input and Output)

Full-scale mono or stereo meters

Display range: -48 dBFS to 0 dBFS; clip lights trigger at 0 dBFS

Click on input or output clip light to clear both meters.

Digital VU meter

Display range: -48 dBFS to 0 dBFS;

A clip indicator is above each meter.

