

ORANGE VOCODER

THE REAL-TIME VOCODER PLUG-IN



RTAS
REAL-TIME AUDIO/SIGNAL

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PROSONIQ
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OrangeVocoder User's Manual
© 1998-2003 Prosoniq Products Software GmbH
Updated, Revised & Extended by Frederic Schelling, May 2003
<http://www.prosoniq.com>

info@prosoniq.com

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1 Introduction

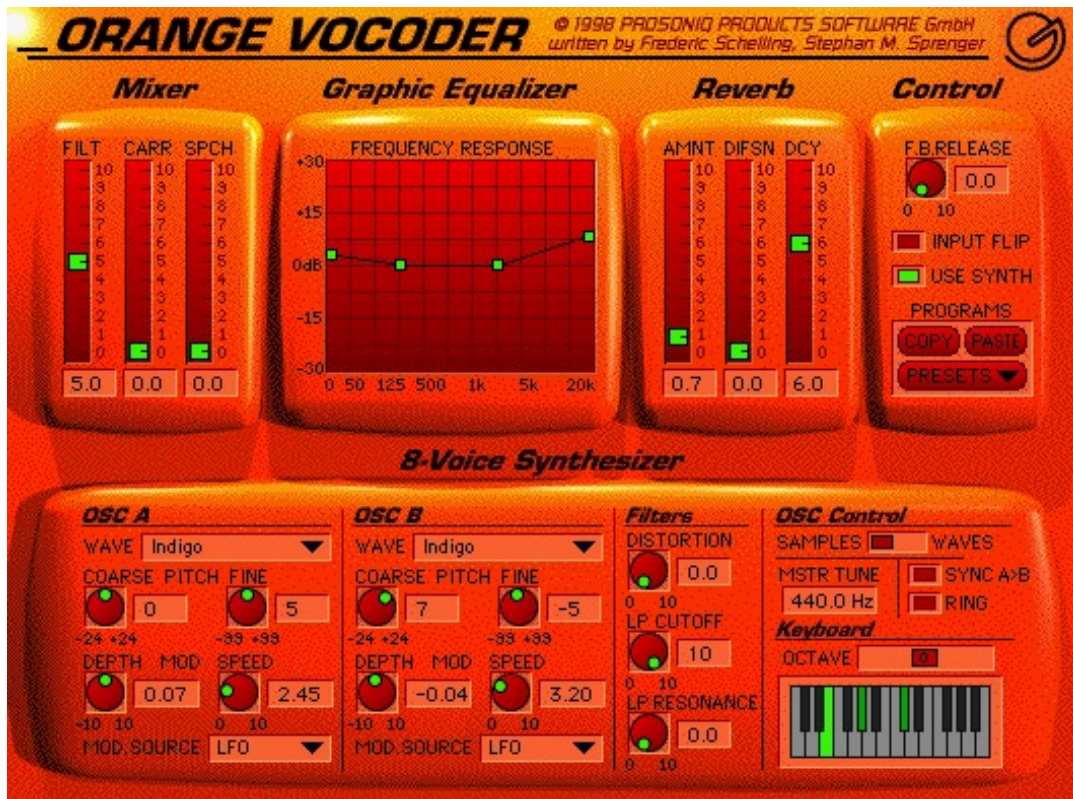
We would like to take the opportunity to thank you for choosing OrangeVocoder. This Prosoniq plugin for VST and RTAS compatible host applications such as Cubase, Logic or ProTools/LE provides you with a complete digital simulation of a 24-band high quality analog vocoder.

During a period of more than three years we have analyzed many different vocoder systems. The OrangeVocoder algorithm represents the results of our extensive research. On this basis we have created an authentic digital representation of an analog vocoder that includes all nonlinearities inherent in such a system. The OrangeVocoder's basic sound can be described as being warm and very powerful. It is a unique and usually quite expensive effect that helps to attract the listener's attention to your mix.

This manual refers to all of the following versions of OrangeVocoder:

- version 2.7 for VST MacOS
- version 2.0.1 for VST Windows
- version 2.0 for the DigiDesign RTAS platform.

The package you bought contains exactly one of these versions, depending on the platform your package is for.



The OrangeVocoder User Interface

The OrangeVocoder is a powerful all-in-one plugin. Here is a short overview of its major features:

- **Realtime** Vocoder for use as master, insert or bus/send effect. Any (live) input source, audio track or the built-in synthesizer can be used as carrier signal. Any (live) input source or audio track can be used as modulator signal.
- Integrated 16 oscillator / 8-voice **virtual analog synthesizer** with 2 oscillators per voice featuring 10 basic waveforms, and 7 sampled sounds, voice detune, pitch LFO, pitch modulation, 4-pole lowpass filter with cut-off and resonance, oscillator hard sync and ring modulator.
- Depending on the target platform of your package (**VST** or **RTAS**), OrangeVocoder is compatible with Steinberg Cubase (MacOS 9 & Windows) and Cubase SX (MacOS X & Windows), Emagic Logic version 5 (MacOS 9 & Windows), DigiDesign ProTools/ProToolsLE 5.x (MacOS 9 only) and ProTools/ProToolsLE 6.x (MacOS X only).
- The integrated synthesizer is controllable by an „integrated“ **keyboard** in the plugin's window or **over MIDI** (requires Cubase 4.x or newer, Logic 5, ProTools 5.3 or newer.) Use a prerecorded MIDI track to drive the built-in synthesizer or even your hardware MIDI+audio inputs for live vocoder performance!

- Fully customizable **freeform EQ** with max. 12 nodes, ranging from 20 Hz to 20 kHz and resolving from -30 to +30 dB FS.
- **Input channel flip** lets you instantly exchange carrier and modulator signals without having to re-route tracks.
- Post- vocoder filter bank **reverb effect** with mix, decay and density
- 64-bit internal processing using RISC-assembly coding for lightning fast real-time performance.
- 32 ready-to-use **presets** for achieving an authentic vocoder sound in an instant.

We sincerely hope that you will enjoy using OrangeVocoder!

2 Getting started

Please fill out and send in the registration card that you have received with your software package. By doing so you are entitled to technical support and will be notified of updates and other news regarding OrangeVocoder.

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- Before proceeding, read the Software Licensing Contract included in this package and also available at the end of this manual. By opening the package, installing the software or sending back the registration card, you are declaring yourself to be in agreement with the conditions of the contract.
-

2.1 System requirements

In order to be able to use OrangeVocoder without limitations you need to observe the following requirements regarding your hardware and software setup.

Minimal hardware requirements:

- Mac: a PowerMacintosh or compatible system with 604 processor at 200 MHz, 8 MB of free RAM and MacOS version 7.5 or higher (256MB of 2nd level cache required). With this configuration, OrangeVocoder will need about 60% of CPU time with all notes of the internal synthesizer playing or 30% with an external carrier signal (internal synth switched off).
- PC: Pentium 266 MHz, 8 MB of free RAM, Windows 95/98/NT/2000/XP/ME

Recommended hardware setup:

- Mac: a PowerMacintosh or compatible system with 604 or G3 processor at 400 MHz, 128 MB of RAM and MacOS version 9 or higher.
- PC: Pentium 400MHz, 128MB RAM, Windows 2000 or XP

Software requirements (alternative):

- ProTools LE (minimum version 5.0 or later; for MIDI control version 5.3 or later) or another RTAS compatible host application, for use under MacOS 9.
- Cubase VST 4.x or higher (including Cubase SX). Cubase Version 5 is recommended for MacOS 9 and Windows users.
- Emagic Logic 4.x (for MIDI control, version 5.x is required) for use under MacOS 9 and Windows. Please note that as of Logic version 6, Emagic has dropped VST support and therefore OrangeVocoder cannot be used with Logic 6 under OS X (at the time of writing of this manual).
- Any other VST or RTAS compatible host software. Here, the availability of features like MIDI controllability or automation depends on the implemented type and version of the plugin interface. If in doubt, you should always use the most recent version of the respective host software.

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- Please note that, at the time of writing of this manual, Emagic Logic for OS X is not compatible with the VST platform. This means that you cannot use OrangeVocoder VST with Logic under OS X.
-

2.2 Installation

For detailed installation instructions please read the separate document „Installation Manual“ found on the CD or refer to the corresponding chapter in the printed manual, if one is contained in your software package.

3 Vocoder Basics

3.1 What is a vocoder?

The first vocoder was developed by H. Dudley in 1939 at the Bell Laboratories. It was intended as a means for analyzing and synthesizing speech and was used mainly as a device for encrypting messages for transmission during WW2. The word „Vocoder“ is derived from „voice“ and „en/decoder“ which was the main purpose of this device at that time. Since then, the vocoder has experienced many improvements and a drastic change in application. Today, almost all vocoders are used either for research into speech processing or for musical applications.

There are many different types of vocoders in use today for processing, analyzing and synthesizing speech, but the original „Channel Vocoder“ is the oldest vocoder ever made. Other important vocoder types are the Phase Vocoder developed in 1966 by Flanagan and Golden and the LPC Vocoder.

A channel vocoder typically consists of two filter banks, each of which is a series of band pass filters connected in parallel to the input. This means that each of these filters only lets a very narrow frequency range of the input signal pass through and cuts all other frequencies outside this band. When applied to music signals, one of these two filter banks is used to process what is called the „modulator“ (or „speech“) input, the other one is used to analyze the „carrier“ input. With this routing, the tonal character of the speech input is transferred on the carrier input, which produces all kinds of interesting sounds.

For example, this setup can be used to make a string arrangement „talk“, or a create synthetic speech or melodies.

In OrangeVocoder, an equivalent of 24 band pass filters is used that are about 16 poles steep (typical filter designs for synthesizer applications have about 2-

4 pole steepness) which corresponds to about 96 dB attenuation per octave. In analog filter designs (where filters used for vocoders typically have between 54 and 60 dB/Oct. steepness) as well as in their digital equivalents, very low tolerance components need to be used to make such steep filters have good sonic qualities. This is one of the main reasons for the huge differences in sound between vocoders of different manufacturers, and for the cost of an analog vocoder. Luckily, in the era of digital signal processing high quality audio processing only is a matter of processor speed and high quality algorithms.

The standard OrangeVocoder routing feeds the output of the built-in synthesizer to the carrier input of the vocoder, while the speech input typically comes from an audio track in your sequencer application. This is convenient, as it does not need any changes to the routing to immediately enjoy the vocoder effect on your audio tracks. If you disable the „use Synth“ feature in OrangeVocoder, any audio track can be used as carrier input, which you can use to make OrangeVocoder process melodic lines from other synths, or any audio material of your choosing.

4 The OrangeVocoder Window

4.1 Opening the OrangeVocoder Window

The OrangeVocoder plugin is typically used in such a way that it **replaces** the original (input) signal. For this reason, you normally should use OrangeVocoder in a **channel insert** effect slot in your audio/MIDI sequencer application. When using it in a send or bus effect slot, you should make sure that the send or bus mode is set to “pre-fader” and that the fader of the channel in question is turned all the way down to avoid hearing the original unprocessed signal.

To use OrangeVocoder, choose an audio channel with an audio recording or activate the live input of an audio channel. Now select “• Orange” (for VST hosts) or “Orange” (for RTAS hosts) from the track insert popup menu.

If are using **Emagic Logic 5** and you want to send MIDI data to OrangeVocoder’s built-in synthesiser, please observe the setup instructions in chapter 5.3.3.

4.2 OrangeVocoder Controls

OrangeVocoder provides several different types of controls. This section describes how to use them.

4.2.1 Faders

OrangeVocoder has a number of faders. There are several methods to set a value on any of these faders:

- You can drag the fader handle up or down with the mouse.

- You can click & drag in the value field of a fader: hold down the mouse button and then move the mouse up or down.
- You can click somewhere in the fader to make the handle jump there.
- (VST plugin only): You can position the mouse over the fader (so that the value field highlights) and use the arrow keys on the keyboard to change the value one step at a time (or hold down to change continuously).

-
- To reset a fader to its factory default setting, hold down the [Command] key on your computer keyboard and click on the fader.
-

4.2.2 Dials

The dials behave similar to the dials in other windows. To set a value, click on a dial, hold down the mouse button and move the mouse around in a circle. Making incremental (relative) changes is done the same way as with the faders: just click & drag in the value field.

-
- The larger the radius, the finer the resolution of the values.
-

-
- To reset a dial to its factory default setting, hold down the [Command] key on your computer keyboard and click on the fader.
-

4.2.3 Switches & Buttons

There are several types of switches in OrangeVocoder:

- on/off switches to activate or deactivate a function; e.g. the **SYNC A>B** switch in the Synthesizer.
- buttons that start an action; e.g. the **COPY** and **PASTE** buttons.
- selector switches that you can move to two or more available positions, for example, the **SAMPLES/WAVES** switch. By moving the handle of such a switch you activate one option and deactivate the other(s).

4.2.4 Graphic EQ Nodes

OrangeVocoder features a powerful graphic equalizer which you can adjust using „nodes“ that are inserted and removed.

- To create a node, just click in an empty spot (e.g. with no node in the vicinity) in the equalizer display, at the desired frequency and level.
- To move a node, click & drag it into the desired direction.
- To remove a node, click & drag it at least to the next adjacent node to the left or right.
- To change the level of a frequency band, move the corresponding node up or down.
- To change the center frequency of a frequency band, move the corresponding node to the left or right

- Actually, you cannot directly remove the node you are dragging, but only replace one or more of the other nodes by dragging the node over them (with exception of the leftmost and rightmost nodes, which cannot be removed.) You can drag a node beyond the horizontal limits set by its left and right neighbours; this will remove all the nodes which would become „superfluous“ with the new position of the dragged node. Keep in mind that „superfluous“ nodes are not removed until you release the mouse button. You can see this if you drag a node beyond other nodes (which makes those nodes disappear) and then - without releasing the mouse button - dragging the node back to its original position, which will make the previously „superfluous“ nodes reappear.

- To reset the EQ to a standard (flat) setting with 5 nodes, command-click somewhere inside the EQ area.

4.2.5 Popup Menus

There are four popup menus in the Synthesizer section of the OrangeVocoder window. You can use them e. g. to select a Modulation source for one of the oscillators.

4.2.6 The „Soft Keyboard“

In the lower right corner of the OrangeVocoder window you can find a „soft“ keyboard (in the sense that it is not a real hardware keyboard) with which you can set the notes (up to 8 simultaneously) which the built-in synthesizer will

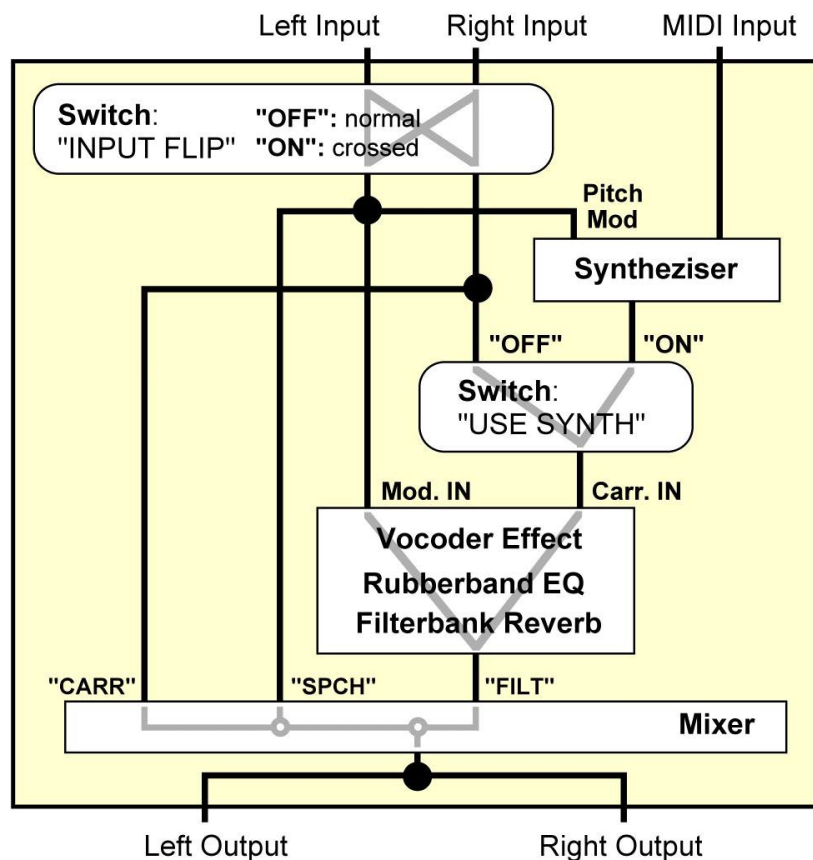
play (the **USE SYNTH** switch must be lit for this to work). A key on the keyboard can be activated and deactivated by one mouse click. The active key will be lit in green. The synthesizer will play the note corresponding to that key as long as the key is lit. Repeatedly clicking on different keys will activate those notes and permits you to play chords on the synthesizer (up to 8 notes simultaneously.)

Following is a list of useful keyboard shortcuts and tricks:

- Clicking on the soft keyboard with the command key held down instantly deactivates all keys
- Pressing the left and right arrow on the keyboard transposes the currently active keys one semitone in the corresponding direction (note that „moving“ the keys out of the visible keyboard range will turn them off.)
- To transpose the whole keyboard setting by full octaves, use the **OCTAVE** slider right above the soft keyboard.

5 Using OrangeVocoder

This chapter describes the functionality of the controls and how they affect the signal fed through OrangeVocoder. To begin, a signal flow diagram explains in detail how the input signals travel through the various stages of the plugin and how the various switches affect the signal flow inside the plugin. Consulting this diagram is helpful for understanding how the various parts and switches of the OrangeVocoder plugin act together and what this means for the routing “outside” of OrangeVocoder, i.e. how the routing of your sequencer software should be set up to achieve the desired effect.



Signal Flow within OrangeVocoder

-
- In the explanations throughout this chapter, names of controls, parameters or values that appear somewhere in the OrangeVocoder window are marked like **THIS**, to make it easier to quickly find references to those objects within the manual text.
-

5.1 Signal Routing with OrangeVocoder

In this section you will find information on how to integrate OrangeVocoder in your sequencer software and how to setup signal routing so that OrangeVocoder gets the required audio signals to be able to provide the desired effect.

Basically, OrangeVocoder can be used in two different ways:

- a) by using the integrated synthesizer as a carrier signal source
- b) by using an external signal as carrier (for example, a synth generating a string or pad sound)

When using OrangeVocoder like described under (a), setting it up is a very straightforward task: just insert it in a „channel effect insert“ of the channel you want to apply the effect to, for example a channel containing spoken or sung words. (If you don't know how to insert an effect into a channel please consult the user's manual of your sequencer software). The channel may be a mono or a stereo channel.

-
- Please note that when inserted in a stereo channel and the built-in synthesizer is switched on, OrangeVocoder only takes the signal from **one** of the two input channels as modulator signal source (that is, the left and right channel are **not** mixed together before entering the vocoder stage.) If the **INPUT FLIP** switch is off, the left channel is taken as modulator, if it is switched on, the right channel is taken as modulator signal for the vocoder effect.
-

When using OrangeVocoder like described under (b), a little more effort is necessary to set up the signal routing. In general, the correct setup here is achieved by using the concept of „Subgroup“ or „Bus“ in your sequencer software and will be explained in the following separate chapter. Before reading on, you should be familiar with how to set up and use subgroups (in Cubase) or buses

(in Logic and ProTools) and how to route tracks to subgroups or buses. This information can be found in the User's Manual of your sequencer software.

The procedure and general concept for subgroups and buses is basically all the same, therefore the following explanations use a general approach, to make them applicable for every type and brand of sequencer and audio software.

-
- A note for **ProTools/LE** users: you may have noticed that in the OrangeVocoder window there's a "Sidechain" popup menu available. Using the sidechain is an alternative method (exclusively available to ProTools users) to route the necessary two signals into the OrangeVocoder plugin. If the sidechain input is active, the signal of the channel OrangeVocoder is inserted in is fed into the **left input** (and in case of a stereo track left and right channels are mixed together before being fed into the left OrangeVocoder input) and the signal of the sidechain is fed into OrangeVocoder's **right input** (thus being taken as carrier signal.)
-

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- **Important note for ProTools users:** please observe that using the bus system as described in this chapter or the sidechain input to achieve the necessary routing is only possible in ProTools LE or - when using ProTools TDM - if the audio engine is switched to "LE on ProTools" mode. This is due to the fact that OrangeVocoder is not a TDM, but an **RTAS only** plugin and also due to the architecture of the ProTools software (which does not offer any signal return path from the TDM audio hardware back into the hosts native signal path.) This limitation cannot be circumvented. When using the built-in synthesiser though - which surely will fulfill almost all your needs for a flexible and well sounding source for carrier signals - there are absolutely no limitations as to the available setups and configurations OrangeVocoder can be used in.
-

5.2 Using OrangeVocoder with External Carrier Signals

If you want to use another synth (or sound source) than the built-in synthesizer, then click on the **USE SYNTH** switch to turn off the built-in synthesizer (the switch should be unlit.) In this mode of operation OrangeVocoder as before uses the signal present at its left input as modulator signal, but instead of using the signal of the built-in synthesizer as carrier, it takes the signal provided at its right input and feeds it into the Vocoder effect stage (see the diagram at the beginning of chapter 5.) This means that in this mode OrangeVocoder takes **two different signals** from its inputs and processes them to produce the vocoder effect. For this setup to work, OrangeVocoder needs to be inserted in a **stereo channel**, since in this way one signal can be provided on the left channel and the other signal on the right channel.

What this obviously means is that you somehow have to combine two signals (which probably are already present on other - separate - channels in your sequencer application) into one single stereo channel. Whether these signals come from already recorded audio tracks or from the live inputs of your audio hardware does not matter.

For the sake of this example, let's define that the **modulator** signal (the speech signal, in general) is available on **channel 5** and the **carrier** signal (the synth pad sound) is playing on **channel 9**. The Vocoder is already active in an insert of a stereo subgroup or bus channel (consult your sequencer's user's manual as to how to set up this type of channels), say on subgroup/bus **channel 1**.

Now just follow these two steps:

- Change the routing of track 5 and 9 so that they use the subgroup/bus channel 1. If your sequencer software uses buses (such as ProTools/LE), then you also need to switch the bus send to "Pre-Fader" and turn the faders of channels 5 and 9 all the way down to avoid the original channel signal to be heard.
- Turn the panorama setting of channel 5 all the way to the left and that of channel 9 to the full right.

That's all there is to it. Now you should hear the speech signal from channel 5 vocoding the carrier signal from channel 9.

Remember that you can always check very easily if you are getting the correct signals into the OrangeVocoder plugin: just use the **CARR** and **SPCH** faders in OrangeVocoder's **MIXER** section to monitor the inputs. There must be signals playing simultaneously on both inputs for the vocoder effect to work. If there

is no signal playing on one or the other of the two inputs, then no vocoder effect will be heard. If you realize that the speech signal is coming in on the right channel (the one monitored by the **CARR** fader) and the synth pad sound is coming in on the left channel (the **SPCH** fader) don't worry: before re-doing everything, just use the **INPUT FLIP** switch in the control section of OrangeVocoder to set things right.

-
- You can always play around with the **INPUT FLIP** switch, even if the modulator and carrier signals come in “correctly” on their designated inputs; this often produces very interesting and cool effects. Imagine how it would sound if it is not the voice modulating the pad, but instead the pad modulating the voice...!
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- Please remember that you cannot use the **INPUT FLIP** switch to use the built-in synthesizer as modulator instead of as carrier (review the signal flow diagram for understanding why this is so.) If you want to use speech as carrier and a synth as modulator you have to switch off the built-in synthesizer and use an external synth as described.
-

An alternative, though not very flexible way of use is given if you have a **pre-recorded stereo file** already containing the speech signal on one channel and the synth pad on the other channel. In this case you can just insert OrangeVocoder on the stereo track playing that stereo file (remember to switch off the built-in synth) or into a master effect slot and you're done. Of course in this case you cannot quickly modify the carrier sound to adapt it to the rest of the arrangement since it's already recorded, but nevertheless this method may be a last resort for cases in which the sequencer software does not provide any subgroups or buses or any other type of dedicated signal routing other than effect sends.

5.3 Using OrangeVocoder with MIDI

The built-in synthesizer of OrangeVocoder can be controlled via a recorded MIDI track in your sequencer or even through the live MIDI input of your sequencer software. Together with the live audio inputs you can easily perform a live vocoder session, playing the carrier signal on your master keyboard and talking or singing into your microphone for realtime and live vocoder sounds.

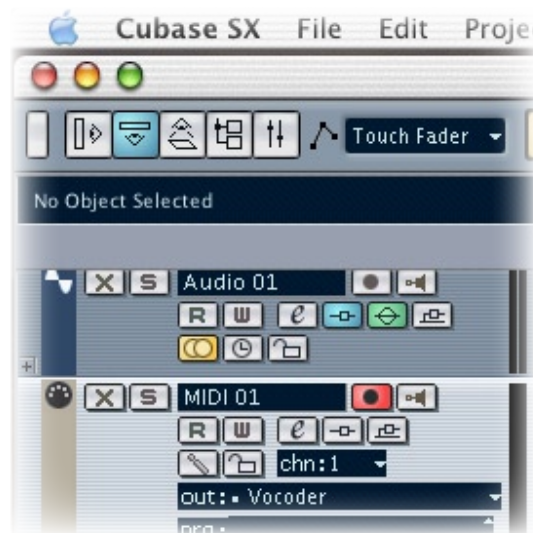
Following is a description on how to set up your sequencer so that MIDI data is correctly routed into the OrangeVocoder plugin. Before reading on, you should make sure that you are familiar with your sequencer's capabilities regarding the use of software synthesizers and virtual instruments, and with where to find and how to use the various controls, knobs, switches and popup menus necessary to set up this type of plugins. Consult the "software instruments" section of the user's manual of your sequencer software to get more information on this topic.

For your convenience, the following explanations cover the specific setup details of three of the most widely used sequencer applications.

5.3.1 Using MIDI with Steinberg Cubase

In Cubase (VST and SX), the setup is very straightforward:

- Insert OrangeVocoder on the audio track you wish to apply the effect to
- Create a new MIDI track and set the track output to "• Vocoder"



Example setup in Cubase SX

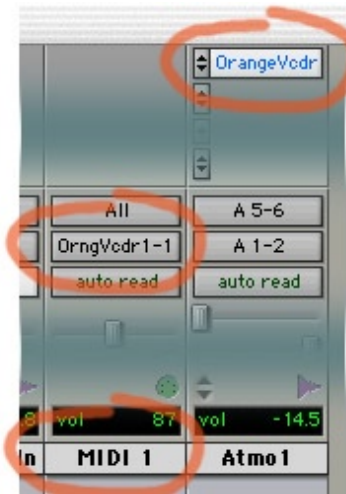
There is no substantial difference between the setup procedure in Cubase VST (for MacOS 9) and Cubase SX. Just refer to the section regarding MIDI track parameters in the Cubase User's Manual.

5.3.2 Using MIDI with DigiDesign ProTools/LE

Routing MIDI to OrangeVocoder under ProTools is very simple:

- Insert OrangeVocoder in an insert of the audio track containing the speech (modulator) signal

- Create a new MIDI track and select OrangeVocoder in the MIDI output popup menu of that channel. OrangeVocoder receives MIDI data in OMNI mode, that is, on every MIDI data channel (1-16), so it does not matter which MIDI data channel you select in the popup menu.



Sending MIDI data to OrangeVocoder in ProTools/LE

5.3.3 Using MIDI with Emagic Logic

To send MIDI data to OrangeVocoder using Logic 5 (for MacOS 9), please follow these instructions:

- Activate the OrangeVocoder in the **I/O slot** of one of the **audio instrument** tracks. Usually they are labeled with something like „AudioInst 1“ or similar.
- Using the side chain popup menu in the bottom right area of the plugin's window, select the track that carries the modulator (speech). In the example screenshot this is track 3.
- In the track window, locate the track of the audio instrument channel of the OrangeVocoder (track 9 in the example screenshot). On this track you can now play, record or edit MIDI data to drive the built-in synthesizer.



Sending MIDI data to OrangeVocoder in Logic 5

5.3.4 MIDI data processed by OrangeVocoder

OrangeVocoder basically processes only NoteOn/NoteOff MIDI events. In a future version, also other MIDI controllers like PitchBend, Sustain may be processed.

5.4 The **MIXER** Section

The OrangeVocoder mixer can be found in the top left area of the OrangeVocoder window. It is used to set the amounts of the processed signal (the vocoder effect itself), the raw carrier and the modulator (speech) signals in the output of the OrangeVocoder plugin. The Mixer consists of three faders named **FILT** for Filter, **CARR** for Carrier and **SPCH** for Speech.



The Mixer section

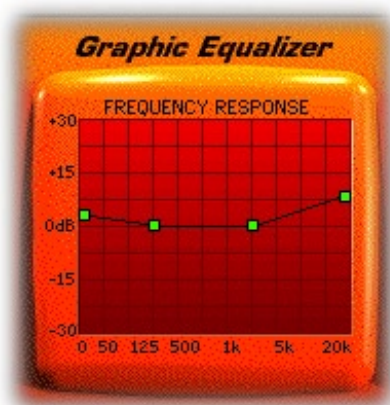
- With the **FILTER** fader you set the volume of the actual effect signal, the

vocoder effect. In the typical case you will only use this fader and let the others set at a level of zero. Nonetheless, there are cases in which you may want to add one or both of the original input signals to the effect signal at a (usually) lower level. The **CARR** and **SPCH** faders let you do exactly this. They let you pass through the unprocessed carrier and modulator signals at the specified levels. The vocoder effect itself is not affected in any way by the settings of the carrier and modulator fader.

- Using the carrier fader you can add a certain amount of the carrier signal to the output. The carrier signal is just fed through unprocessed at the level you set with the Carrier fader. If the integrated synthesizer is active and generating sound, then you can monitor it using this fader; if it is switched off, then you can listen to the right channel input.
- Using the speech fader you can add a certain amount of the speech signal to the output. The speech signal is just fed through unprocessed at the level you set with the Speech fader. It is actually the signal present at the left input of the OrangeVocoder plugin.

5.5 The **GRAPHIC EQUALIZER**

The Graphic Equalizer can be found to the right of the Mixer. It is applied on the resulting output signal of the vocoder effect (the signal set with the “Filter” fader). You can use it to adjust the overall sound or tweak the vocoder output to meet any desired frequency response. For example, to simulate old analog vocoders, you would typically cut out the high frequencies completely, while in many cases you’ll want a clean and brilliant sound, which would be achieved by boosting the high frequencies instead. Also, the best setting here heavily depends on the frequency distribution (the sound) of the carrier and modulator signals. If, for example, the carrier signal is very dull, but you still want a certain degree of “crispyness” in the vocoder effect, then you should turn the high frequencies all the way up and cut out the midrange. Experimenting is the key to a satisfying result here.



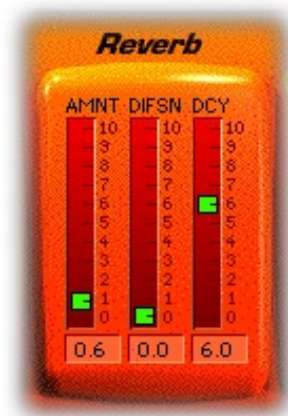
The Graphic Equalizer

At the left edge there is a dB scale with a range from +30 to -30 dB. At the bottom edge there is a (logarithmic) frequency scale with a range from 20 Hz to 20 kHz. These two scales help you define the frequency response curve.

-
- Keep in mind that the graphic equalizer affects only the vocoder effect signal. The carrier and modulator signals - which you can feed through to a certain amount set with the corresponding faders - are not fed through the equalizer. This of course also includes the raw output of the built-in synthesizer, which you can listen to by turning up the **CARR** fader (**USE SYNTH** must be switched on and some notes must be playing.)
-

5.6 The Filterbank **REVERB**

The Orange Vocoder has a built-in Filterbank Reverb effect, located to the right of the Graphic Equalizer. It is used to add a reverb-like effect to the vocoded signal at no extra CPU load.



The Reverb Section

-
- The “reverb” is created by letting the synthesis filterbands decay smoothly. It is not a reverb in the conventional sense. It requires that a continuous carrier signal is present at the input of the vocoder stage. If the carrier signal stops, the reverb will stop immediately. Also, when the carrier signal changes during a reverb decay phase, the reverb sound will of course follow the changing carrier signal.
-

The Reverb section of the OrangeVocoder contains three faders called **AMNT** for Amount, **DIFSN** for Diffusion and **DCY** for Decay.

- Use the **AMNT** fader to control the amount of reverb that is added to the processed signal.
- Use the **DIFSN** fader to set the amount of early reflections in the reverberated signal.
- Use the **DCY** fader to define the length of the reverb effect.

5.7 The **CONTROL** section

The Control section contains a few general controls. It is located on the right side of the OrangeVocoder window.



The Control Section

5.7.1 **F.B.RELEASE** - Filter Bank Release Dial

This dial is located in the upper part of the Control section. It can be used to shorten or lengthen the release time of the Vocoder effect. Higher values will make the output sound more smooth but will also smear the attack transients of the signal.

5.7.2 **INPUT FLIP** switch

Using this switch makes sense when using OrangeVocoder in an insert of a stereo channel (or the master insert), and the built-in synthesizer is switched off. In this case, usually the left channel of the stereo channel should provide the modulator signal while the right channel should provide the carrier signal to the OrangeVocoder. Either you have a stereo audio file already containing those two signals correctly distributed on the stereo channels in this manner, or – this is the more common approach – you use the routing capabilities of your sequencer software to route the signals of two separate channels together into one stereo channel (see section 5.2.)

By clicking on **INPUT FLIP** you can exchange the input signals fed to the OrangeVocoder plugin, without having to re-route the tracks' signal paths: the signal that was previously used as the modulator will now be fed into the carrier input, and vice versa. This is useful if you have inadvertently routed the carrier to the left channel and the modulator to the right. Here just using the **INPUT FLIP** switch is much more convenient than changing the routing of the carrier and modulator channels – well, usually, all you would have to do is swapping the panorama positions of the respective channels – but of course you can also use **INPUT FLIP** as a creative tool which can produce interesting and unusual results (imagine modulating a voice with a string sound rather than modulating the string with the voice, which would be the “usual” case.)

5.7.3 **COPY/PASTE** and **PRESET**

These controls can be used to copy a complete OrangeVocoder setting from one VST programm or RTAS effect setting to another, and for loading any of the built-in factory presets.

The **PRESET** popup menu contains 32 presets which are not changeable. Whenever you select one of these presets, the current settings of all the controls and dials are overwritten with the settings of the selected preset. For VST host applications, this means that the current “Program” is overwritten with the settings of the selected preset.

In VST hosts, when activating the OrangeVocoder in your arrangement or song for the first time, the first 32 of the 64 available program slots are filled with 32 presets. These are the same presets as those selectable from the **PRESET** popup menu, therefore, you can safely modify these programs without losing the presets, since the presets are always available by using the **PRESET** popup menu.

-
- When using the paste button or the preset popup menu, please be aware of the fact that there is no “undo” function to revert the current program to the previous setting, so be sure that you don’t need the current setting any more or that you have saved it somewhere else (probably using the “Save/Load Effect/Bank” function of the host software) before.
-

The **COPY** and **PASTE** buttons have their usual and expected functionality, that is, they **COPY** the current setting into an internal clipboard or **PASTE** the contents of the internal clipboard back into the currently selected program or setting.

The OrangeVocoder’s internal clipboard is internal to the plugin. This has the following implications:

- OrangeVocoder’s internal clipboard does not affect, use or overwrite the “normal” clipboard available from the “Edit” menu in the menu bar. This also means that its contents cannot be “exported” into some other application.
- Since the clipboard is internal to the plugin, it is not possible to exchange a setting between multiple OrangeVocoder plugins in your song/session. To achieve this, use the “Program Save/Load” (VST hosts) or the “Settings” popup menu (ProTools) to save the current program/setting of one

plugin to a file on your hard disk and then load that setting back in in the other OrangeVocoder plugin.

- The contents of OrangeVocoder's internal clipboard are lost when closing the song or the sequencer application.

Some useful examples for the **COPY** & **PASTE** buttons are:

- Generating many settings (and storing them in adjacent programs) which differ only in a few values (for example, with different chords set on the "soft keyboard"), to be able to switch easily between a certain number of similar settings. If your host application does not offer parameter automation but if it can record plugin "program changes", this is a viable alternative for realizing dynamic changes in the vocoder effect sound.
- Using multiple programs for a pseudo-undo feature with multiple "edit buffers". When you have a setting that you like, copy it, switch to another program (VST) and paste the copied setting, where you can further edit it without losing the previous setting.

5.7.4 **USE SYNTH** switch

In most cases you will probably want to use the synthesizer which is built-in into OrangeVocoder. To do this, set the switch **USE SYNTH** to on, so that it is highlighted. Keys which are "active" on the soft keyboard will start to be played back and the synthesizer will start processing any MIDI note on/off events.

5.7.5 A note on CPU load

Using the built-in synthesizer consumes a certain amount of processing power in addition to the vocoder effect itself. Completely switching off the synth reduces the CPU time needed by OrangeVocoder itself to approx. 40% compared to the load with the synth playing all of the 8 voices simultaneously (taking this as 100%.)

As can be derived from the hardware system requirements, OrangeVocoder's impact on system performance is still quite low even with all the built-in synth's voices playing when used on a fairly recent Macintosh model (G4 with 500MHz and up). This very efficient use of processing power comes mainly from the fact that at the time of its first release in 1998, OrangeVocoder was designed to run fairly smooth on computers which had approximately one tenth of the power of computers available today.

Nonetheless this fact should be kept in mind when running OrangeVocoder on older computers. When running out of CPU power, consider switching off the

built-in synth and use an external synth as carrier source or – this is probably the most practical approach – bounce the solo'ed OrangeVocoder track to disk and import it back to an audio track, permitting you to switch off the plugin completely as soon as you have found a suitable setting.

6 The Synthesizer

The OrangeVocoder Synthesizer is a full-featured 8-voice synthesizer unit. The following list demonstrates that it is not just meant as a shabby give-away that doesn't get past the first few tests, but that it really is a full-featured synthesizer that will surely fulfill all your expectations regarding a warm, "fat", brilliant and powerful synth sound for your vocoder effects, so that in the vast majority of cases you won't need to setup an external synth for generating the carrier signal at all.

The OrangeVocoder synthesizer has

- sixteen oscillators, two per voice (resulting in a polyphony of 8 voices)
- ten basic waveforms like sawthooth, square, etc.
- seven integrated sampled sounds (string, vox, airy, etc.)
- voice detune
- LFO pitch modulation with a separate LFO per oscillator
- unique pitch and envelope follower modulating the oscillator pitch (track the pitch or the envelope of the modulator audio signal to control synth pitch)
- a 4-pole Low Pass filter with Cutoff and Resonance
- oscillator hard sync switch for classic lead-type synth sounds
- a ring modulator
- distortion stage for extra fat sound



The OrangeVocoder Synthesizer Section

6.1 The oscillators

The two identical oscillator sections **OSC A** and **OSC B** are located on the left side of the synthesizer section. Here's a description of the available controls in each oscillator:

6.1.1 **WAVE** popup menu

You can choose the oscillator's basic waveform or sampled-sound type in this popup menu.



The Wave Popup Menu

Whether you can choose between periodic waveforms or sampled sounds depends on the setting of the **SAMPLES/WAVES** switch in the **OSC CONTROL** section (see below).

- If the switch is set to **WAVES**, ten basic oscillator waveforms are available in the popup:

PULSE	SAWTOOTH	DAMPED PULSE	DAMPED TRIANGLE	SQUARE
DAMPED SQUARE	CIRCULAR	CURVATION	DISTORTED SAW	HARSH

In each oscillator you can select one of those waveforms as the oscillator's basic sound.

- If the switch is set to **SAMPLES**, instead of the waveforms one of the following seven sampled and looped sounds can be selected:

INDIGO	VOX	STRINGS	AIRY
VOXPAD	UNISONO	NOISE	

The last entry in the popup menu is the **OFF** setting. With this option you can switch off the respective oscillator completely. This can be of use if you want to avoid beats in the sound coming from the two oscillators interfering with each other because of differences in phase.

6.1.2 **COARSE PITCH** dial

This dial controls the pitch of the oscillator waveform/sample. You can use it to tune the oscillator signal up to 24 semitones (two octaves) upward or downward.



The Coarse Pitch Dial

6.1.3 **FINE PITCH** dial

The Fine Pitch dial lets you fine tune the pitch of the oscillator waveform/sample by a semitone upwards or downwards each. One semitone is subdivided into 100 steps (0–99), giving you a total adjustment range of –99 to +99.



The Fine Pitch Dial

6.1.4 **MOD. SOURCE** – Modulation Source popup menu

The oscillator's pitch can be modulated by various sources, from which you can select by using the "MOD. SOURCE" popup menu.



The Modulation Source Popup Menu

- “LFO”: the oscillator’s pitch is modulated by an LFO (Low Frequency Oscillator) with a sinusoidal waveform in the frequency set by the “SPEED” dial (see below).
- “ENV”: in this mode, the level of the modulator signal directly influences the pitch of the oscillator, in the amount and direction set by the “DEPTH” dial (see below).
- “PITCH”: in this mode, the pitch of the modulator signal directly influences the pitch of the oscillator, in the amount and direction set by the “DEPTH” dial (see below).
- “OFF”: this setting is useful if you want to switch off the modulation completely, but for some reason you do not want to change the setting of the “DEPTH” dial to zero (which would have the same effect), probably because you want to reactivate the modulation at a later time with the previously set depth.

6.1.5 **MOD. DEPTH** – Modulation Depth dial

The Modulation depth dial controls the modulation depth of the modulation source selected in the **MOD. SOURCE** popup menu. It has a resolution of 1000 steps upward or downward. The effect on the oscillator’s pitch depends on the modulation source that is selected in the **MOD. SOURCE** popup menu:



The Modulation Depth Dial

Modulation Source	Modulation Depth	Modulation Effect
LFO	> 0	The LFO waveform starts upwards
LFO	< 0	The LFO waveform starts downwards
ENV	> 0	The louder the signal, the higher the pitch
ENV	< 0	The louder the signal, the lower the pitch
PITCH	> 0	The higher the pitch of the signal, the higher the oscillator's pitch
PITCH	< 0	The higher the pitch of the signal, the lower the oscillator's pitch

6.1.6 **MOD. SPEED** – Modulation Speed dial

This dial controls the speed of the modulation if Modulation Source is set to **LFO**. The speed of the LFO can be set between 0 Hz and approx. 10 Hz. If the **MOD. SOURCE** popup menu is set to something other than **LFO**, this dial has no effect.



The Modulation Speed Dial

6.2 The **FILTERS** section

This section is located to the right of the Oscillator B section. It contains two stages, a lowpass filter and a distortion effect used to further process the mixed signal of the two oscillators. Please note that the signal of the two oscillators is mixed together before passing the filters section. This allow for some very interesting effects when using the **DISTORTION** dial (just check out the **1000 FLUTES** preset for a demonstration.)



The Filters Section

A low pass filter is a filter that is used to dampen all frequencies above a certain cutoff frequency. OrangeVocoder uses a 24dB/Oct. (4-pole) filter, which is commonly used in analog synthesizers to create a warm and “fat” sound.

6.2.1 ***DISTORTION*** dial

As its name indicates, you can use this dial to add distortion to the oscillator output signal. The signal of the two oscillators is mixed together before being processed by the distortion effect. This allows for very interesting cross-modulation effects, especially when both oscillators are using similar waveforms and pitches. Please note that this effect sounds best when used with simple waveforms (e.g. those waveforms offered by the ***SAMPLES/WAVES*** setting set to ***WAVES***.) Using the distortion effect with the waveforms offered under the ***SAMPLES*** setting usually yields a very rough and irregular sound - but there may still be situations where you like to have exactly this kind of sound, so don't hesitate to experiment even with the “strangest” settings.

6.2.2 ***LP CUTOFF*** – Low Pass Cutoff dial

Use this dial to set the Low Pass filter's cutoff frequency, i. e. the frequency above which the output signal is dampened. Doing “Filter sweeps” together with a higher resonance value is a very cool sounding effect which can be realized by using this dial together with automation (see the corresponding chapter later on.)

6.2.3 ***LP RESONANCE*** – Low Pass Resonance dial

This dial lets you set the resonance of the filter (the “peak” around the cutoff frequency in the filter's frequency response.)

6.3 **OSC CONTROL** section

This section on the right hand side of the synthesizer panel holds a few general controls concerning the oscillators.



The Oscillator Control Panel

6.3.1 **SAMPLES / WAVES** switch

With this switch you can choose what kind of basic waveforms are available in the oscillator's wave popup menus. In **WAVES** mode, the oscillators generate **periodic waveforms**, much like an old analog synthesizer's VCO (Voltage Controlled Oscillator.) In **SAMPLES** mode, short pre-recorded and looped samples are played back continuously.

Please note that the setting of this switch always applies to both oscillators simultaneously, that is, it is not possible to use one oscillator in **WAVES** mode while using the other in **SAMPLES** mode.

Refer to paragraph 6.1.1 for an **overview** of the waveforms and samples available.

-
- For Oscillator Sync (**SYNC A>B**) and the **RING** Modulator to work (see below), the **SAMPLES/WAVES** switch must be set to **WAVES**. When the oscillators are set to **WAVES**, the **SYNC A>B** and **RING** switches have no effect on the sound. This is because these effects need **periodic** waveforms to work correctly.
-

6.3.2 **MSTR TUNE** – Master Tune

This control lets you change the master pitch of the synthesizer. This can be used to adapt the synthesizer’s tuning to the other tracks and instruments in your arrangement.

The default setting of 440.0 Hz (a’) can be tuned upwards or downwards by 10 Hz, in one tenth of a Hz increments.

To change the master tune value, click & drag inside the frequency display while moving the mouse up or down.

6.3.3 **SYNC A>B** – Oscillator Synchronization

Using this switch you can do a “hard sync” coupling of both oscillators. This effect is very well known from the world of analog synthesizers and is very popular among synth sound enthusiasts.

In sync mode, oscillator B is “slave coupled” to oscillator A, which is the master oscillator. This means that whenever A has completed its waveform cycle, B’s waveform cycle is also reset, regardless of its current phase (position within one waveform cycle). With this trick, many different variations of a single waveform of the slave oscillator can be achieved, depending on the ratio between the master’s and the slave oscillator’s frequencies. Simply put, in sync mode the pitch of the master oscillator A controls the perceived pitch of the sound, while the pitch of the slave oscillator B controls the character of the sound.

For Oscillator Sync (**SYNC A>B**) and the **RING** Modulator to work, the **SAMPLES/WAVES** switch must be set to **WAVES**.

6.3.4 **RING** – Ring Modulator

Use this switch to activate the “Ring Modulator” effect. When ring modulation is off, the output signals of Oscillators A and B are just added (mixed). When it is active, one oscillator modulates the other with its output. What actually happens here is that the signals of the two oscillators are multiplied with each other instead of just added. This means that each oscillator’s pitch influences the pitch of the other oscillator, resulting in a very complex and often disharmonic sound. The key point here is that the ratio (integer or fractional) of the oscillators’ frequencies determines if the output signal is harmonic or inharmonic.

The ring modulator can be used to give the sound a “metallic” type of char-

acter. using this type of disharmonic sound as carrier sound source is a very impressing effect especially with spoken words as modulator signal.

6.3.5 The Soft Keyboard

With the “soft keyboard” in this section you can activate and deactivate notes (up to 8 simultaneously) which the synthesizer will play. Clicking on a inactive key will activate it (and vice-versa) and the corresponding note will start playing. The notes will play until you switch of the corresponding keys. Unless you turn up the **CARR** fader in the mixer to listen to the carrier signal, nothing will be heard at the output until a modulator signal is coming in.

If you want to adjust the raw sound of the synthesizer without listening to the vocoder effect, use the controls in the mixer section to turn down the vocoder effect (the **FILT** fader) and turn up the carrier signal with the **CARR** fader (remember that the **USE SYNTH** switch has to be active, otherwise the synthesizer will not work at all.)

Of course, if your sequencer application supports sending MIDI data to an effect plugin, you can also play the internal synthesizer via MIDI input, regardless of this MIDI data coming from a recorded MIDI track or from the live MIDI input generated by your “real” keyboard.

-
- To quickly deactivate all the keys on the soft keyboard, just hold down the command key on your computer’s keyboard while clicking somewhere inside the soft keyboard.
-

-
- Keep in mind that the notes which you have activated on the “soft keyboard” in the OrangeVococer window are independent of any notes played via the MIDI input, that is they are playing **in addition** to those played via MIDI (although the total number of voices played is always limited by the 8-voice polyphony). This means that when playing the OrangeVocoder synthesizer through its MIDI input, you should make sure that there are no keys lit on the soft keyboard – unless you explicitly want to do this, of course.
-



The Soft Keyboard

6.3.6 **OCTAVE** Selector

This switch has five positions, each of those positions corresponding to an octave transposition. Together with the two octaves offered by the keyboard, you can select notes to play within a total range of **six octaves**.

Note however that changing the octave setting does actually not transpose the “visible 2-octave range” of all the available six octaves on the keyboard (otherwise the active keys on the soft keyboard would disappear and reappear when changing the octave setting), but instead the octave selector just sets the basic pitch of the oscillators to one of five different octave settings.

This also means that - at least when using the soft keyboard only - you cannot activate two keys on the keyboard that are more than 2 octaves away from each other (please also see note below.) Obviously this limitation does not apply when playing the synthesizer over MIDI. Here the whole range of notes (0 to 127) is of course available simultaneously.

A note for nit-pickers: Actually, the soft keyboard has an invisible “buffer zone” of 4 semitones below its lowest and above its highest key. Exploiting this buffer zone is only possible in combination with using the arrow keys on the computer keyboard to transpose the current setting. You will notice that notes that are shifted off the left edge (and therefore not being visible any more) can still be shifted by up to 4 semitones to the left (and then back to the right into the visible area) without them “falling off” the edge of the range of available notes. The same applies for the right edge. Thus the available range of simultaneously playable notes actually comprises four octaves and four semitones.

7 Advanced Usage

7.1 Tips and Tricks

Following are a few practical hints and techniques that will be of interest for you while using OrangeVocoder:

- If you want to “fatten” the sound when using pad sounds, try adding a little Carrier signal by raising the **CARR** fader in the Mixer.
- Using the mixer faders and the reverb you can create a mix where you hear the unprocessed carrier signal in the foreground and the processed signal coming from the reverb only, so that the actual vocoder sound becomes very diffuse in the stereo sound space instead of being prevalent. This setting is suitable for many more applications than the “raw” vocoder effect itself. For example, it can be used to “brighten up” the lead vocals in the reverb phase and give them some sort of “ethereal” attitude, without being to “flashy” on the listener, like the raw vocoder effect itself would be.
- You can achieve a sinusoidal amplitude modulation of the oscillators if you set them to the same waveform, detune them a little bit and turn the distortion all the way up.
- Use the Copy & Paste buttons to quickly generate a row of settings where just the graphic EQ has a different setting, thus being able of somewhat “automating” it (see below: the setting of the graphic equalizer is subject to certain restrictions on some platforms.)
- When using your voice as (realtime) modulator, don’t just modulate the formants of your voice (that is, pronouncing different words or vocals) but also use the **pitch** of your voice. Modulating a fat pad sound with a (sung) pitch sweep actually lets you do an effect similar to a flanger effect on the pad sound just with the pitch of your voice - this sounds very cool!
- Actually, you can have the same flanger effect on your own voice! Just

use your voice as a carrier signal instead of as modulator (use **INPUT FLIP** if necessary) and play a pitch sweep with a one- or two-note sawtooth sound on your synth, then use the pitch bend wheel (possibly set to a 12 semitones range) and - while speaking into the microphone - pull the pitch wheel slowly upwards and downwards. Please note that for this effect you have to use an external synthesizer in addition to the signal to be processed, since you cannot use the built-in synthesizer as modulator (even the **INPUT FLIP** switch won't let you do this – see the diagram at the beginning of section 5 for an explanation.)

7.2 Automation

If your sequencer host software supports automation of plugin parameters, then you can use this feature to create dynamic evolutions and modulations of most of the parameters that OrangeVocoder offers.

Due to technical reasons, the selection of parameters that are automatable differs slightly depending on the host software you use the plugin with. Nevertheless, all parameters whose automation capability would be crucial to provide all the flexibility you might every need are automatable in every compatible host software.

In **ProTools/LE** you can automate every control except

- the **GRAPHIC EQUALIZER**
- all popup menus (oscillator waveforms, modulation sources, preset menu)
- the **COPY&PASTE** buttons
- the soft keyboard

Not being able to automate the soft keyboard in ProTools is not really much of a limitation since you can simply drive the synthesizer through MIDI.

In **Cubase and other VST compatible hosts** you can automate every parameter, though some of those may not be sensible automating or they may be difficult to control. For example, the nodes of the **GRAPHIC EQUALIZER** are each stored as two parameters, one for the X and one for the Y axis. While it is of course possible to record automation by moving the controls inside the plugin's window directly, there are some situations where it is important to operate on the single parameter values using the automation track editor. Here,

the graphic EQ can very easily be brought into a state where the position of the nodes relative to each other does not make sense (for example, no crossing lines are allowed.) In these situations, it is not defined what frequency response the EQ will provide. As long as you remain within certain limits while recording automation data, though, the EQ automation can be used to your advantage.

7.3 Support

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