Syd Vocoder 1.0.0 user manual

Syd Vocoder is a free vocoder plugin (VST3 instrument) by Lloyd Stellar (lloydstellar.nl). It is inspired by the classic vocoder of the Clavia Nord Modular and recreates its sound as closely as possible.



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1. Overview

A vocoder needs two signals. Your voice (the modulator) shapes the sound, and a synth (the carrier) gives it pitch. Syd Vocoder has the synth built in. You play it from a MIDI keyboard and sing or speak into a microphone at the same time, and the synth takes on the shape of your words.

The plugin is played like a Nord Micro Modular with a patch loaded: you pick a preset and shape it with seven knobs and a Morph knob. There is no patching. Each preset sets what the knobs do, and their labels change with it.

Why it sounds like the Micro Modular

Syd Vocoder recreates the Nord Modular vocoder as closely as possible. In practice that means:

- The same vocoder: 16 bands, with an envelope follower per band that reacts fast in the high bands and slower in the low ones, and the same optional high-frequency emphasis on the voice.
- The same arithmetic. The plugin computes in 24-bit fixed point, like the original hardware, with the same rounding and the same small side effects.
- The same sounds around the vocoder. The presets are vocoder patches written for the Nord Modular in the late 1990s, with the oscillators, envelopes, filters, compressors, gates, phaser and chorus they used. One preset, Noise Choir, is new and uses the same building blocks.
- The same feel. The knobs glide to a new value like the hardware's, the voices are assigned to notes by the same rules, and Morph works the same way.
- The same converters, if you want them. In the default HARDWARE mode, Micro, the voice passes through a model of the Micro Modular's 16-bit input converter (including its hard clipping) and the output through a model of its 18-bit output converter.

2. Installing

Syd Vocoder is a VST3 plugin for Windows, macOS and Linux. On macOS it comes with an installer. On Windows and Linux the plugin is a folder called `Syd Vocoder.vst3` that you copy to the VST3 folder of your system. Then start your host and let it scan for plugins. Syd Vocoder shows up as an instrument from the maker Lloyd Stellar.

Close the host before you install or update. Some hosts, Ableton Live among them, only pick up a new version after a restart.

macOS

The download holds `Install Syd Vocoder.pkg`, this manual and `INSTALL.txt`. The plugin runs natively on Apple silicon and Intel Macs with macOS 11 or newer.

1. Close your DAW.
2. Double-click `Install Syd Vocoder.pkg`. The installer is not registered with Apple (Syd Vocoder is a free project without an Apple developer account), so the first time macOS stops it with a message that it was "Not Opened" or "cannot be opened". That is expected. Click Done.
3. Allow the installer once. On macOS 15 (Sequoia) or newer: open the Apple menu, System Settings, Privacy & Security, and scroll down to Security. It says that "Install Syd Vocoder.pkg" was blocked. Click Open Anyway, enter your Mac password (or use Touch ID) and click Open Anyway once more. On macOS 14 (Sonoma) or older: hold Control and click the installer (or right-click it), choose Open, and click Open in the message.
4. The installer starts. Click Continue and Install, and enter the password you use to log in to your Mac. Click Close when it is done.
5. Start your DAW. Live finds the plugin by itself when "Use VST3 Plug-In System Folders" is on (see section 3).

The installer puts the plugin in `/Library/Audio/Plug-Ins/VST3/`, for all users of the Mac. To update, close the DAW and run the installer of the new version; it replaces the old one. If you once copied a test version into your own Library folder by hand, delete that copy, or the DAW may list Syd Vocoder twice: in the Finder choose Go, Go to Folder, type `~/Library/Audio/Plug-Ins/VST3` and drag `Syd Vocoder.vst3` to the Bin.

To uninstall, choose Go, Go to Folder in the Finder, type `/Library/Audio/Plug-Ins/VST3` and drag `Syd Vocoder.vst3` to the Bin.

Tested on a recent MacBook with Ableton Live 12.4.

Windows

Copy the folder `Syd Vocoder.vst3` to:

```
C:\Program Files\Common Files\VST3\
```

You need administrator rights to copy into that folder. Copy the whole folder, not only the file inside it.

Linux

Copy `Syd Vocoder.vst3` to `~/.vst3/` (create the folder if it does not exist). Syd Vocoder has not been tested in a Linux host yet.

3. Setting it up in Ableton Live

Syd Vocoder is an instrument. It goes on a MIDI track, and your voice comes in through its sidechain input. So you need two tracks: an audio track for the microphone and a MIDI track with Syd Vocoder. The steps below were tested in Ableton Live 12.4 on Windows and on macOS.

Before you start

- **Audio interface.** Check that Live uses your audio interface: on macOS open Live, Settings, Audio; on Windows Options, Settings, Audio. Choose your interface as Audio Input Device and Audio Output Device. Sing into the microphone: the interface's own level meter should move.
- **MIDI keyboard.** In Settings, Link, Tempo & MIDI, switch on Track for your keyboard under Input Ports (on older Live versions this page is called Link/MIDI).
- **Plugins.** In Settings, Plug-Ins, switch on "Use VST3 Plug-In System Folders" and click Rescan. Syd Vocoder then appears in the browser under Plug-Ins, VST3, Lloyd Stellar.

Step by step

1. **Voice track.** Create an audio track (Create menu, Insert Audio Track). In its In/Out section, set Audio From to Ext. In, and below it the input your microphone is plugged into: "1" for input 1, "2" for input 2. Choose the single number, not the pair "1/2". Set Monitor to In, so the microphone signal runs through the track even when you are not recording. If you do not see Audio From and Monitor, show the In/Out section: press Cmd+Option+I on macOS or Ctrl+Alt+I on Windows.
2. **Instrument track.** Create a MIDI track (Create menu, Insert MIDI Track) and drag Syd Vocoder onto it from the browser. Arm the track (the record button on the track) or set its Monitor to In, so that it plays from your MIDI keyboard. Its MIDI From should say All Ins.
3. **Sidechain.** At the bottom of the screen you see the Syd Vocoder device. In its title bar, click the small sidechain toggle to show the sidechain section and switch Sidechain on. Set its Audio From to the voice track (it is listed by its track name, for example "1-Audio"). Choose Post FX if you put a compressor or EQ on the voice track, so the vocoder hears the processed voice.
4. **Play.** Hold a note or a chord on the keyboard and sing. You hear the vocoder.
5. **Check.** If you hear nothing, click DIAG on the panel. "Voice read from" should say "Main input", the "Main input" line should show a level while you sing, and the MIDI event count should go up when you play. See Troubleshooting.

Live hands the sidechain signal to the plugin on its main input. That is expected: Syd Vocoder reads the voice from whichever input carries it (see section 4).

Monitoring

- With the voice track on Monitor In and its output on Master, you hear your dry voice next to the vocoder. If you do not want that, set the voice track's Audio To to Sends Only. The sidechain still gets the signal.

- Use headphones. Every sound that reaches the microphone opens the vocoder bands, the speakers included.

Recording

Record your voice on the audio track and the notes on the MIDI track. On playback, the recorded voice feeds the sidechain and the recorded notes play the synth, so you can still change the preset and the knobs afterwards. When you are happy with it, record the result to audio: set a new audio track's Audio From to the Syd Vocoder track and record, or freeze and flatten the instrument track.

Latency

What you hear while playing live is delayed by your audio interface buffer plus the plugin's own latency. The plugin's part is small:

Sample rate	HARDWARE Micro	HARDWARE Off
44.1 kHz	143 samples (3.2 ms)	116 samples (2.6 ms)
48 kHz	147 samples (3.1 ms)	108 samples (2.3 ms)
88.2 kHz	108 samples (1.2 ms)	108 samples (1.2 ms)
96 kHz	78 samples (0.8 ms)	0

The plugin reports this delay to the host, so recorded material lines up on playback. For live playing, set a small buffer in Live's audio settings (128 samples or less if your computer allows it). Live's Options menu also has "Reduced Latency When Monitoring", which can help while you record.

The vocoder itself adds a little delay on top, as the Nord did, and this part is not reported: the low bands react up to about 7 ms later than the high bands. That is part of the sound.

4. Other hosts

Only Ableton Live 12.4 has been tested, on Windows and on macOS. The notes below describe how it should work elsewhere. If you try another host, please report what worked (see section 12).

Syd Vocoder has a stereo main input and a stereo sidechain input. When the host has switched the sidechain input on, the voice is read from the sidechain. Otherwise it is read from the main input. The choice depends only on which input the host has enabled, never on the signal, so it cannot switch in the middle of a phrase.

The left channel carries the voice. Two presets (cylon vocoder and Vocoder 2) mix the left and right channels; a mono voice sent to both channels, which is what a mono track does in most hosts, is right for every preset.

So in any host you have two options:

- **Sidechain.** Switch the plugin's sidechain input on and route the voice track to it.
- **Main input.** Leave the sidechain off and get the voice onto the plugin's main input, for example with a send from the voice track to the instrument track, if the host allows audio into an instrument.

In every host, the instrument track must also receive MIDI from your keyboard.

Host	Status	How it should work
Ableton Live 12	tested (12.4, Windows and macOS)	Section 3.
Reaper	untested	Put Syd Vocoder on a track that receives MIDI. Send the voice track to it: to channels 1/2 for the main input, or to 3/4 and use the plugin's sidechain pins.
Bitwig Studio	untested	Put Syd Vocoder on an instrument track and pick the voice track as the sidechain source in the device.
Cubase	untested	Put Syd Vocoder on an instrument track, activate its side-chain input in the plugin window and add the voice track as the side-chain source.
FL Studio	untested	Load Syd Vocoder as a generator. Route the mixer track with the microphone to Syd Vocoder's mixer track as a sidechain, then select that sidechain as the plugin's input in the wrapper.

5. The panel



The panel has four parts:

- the display strip at the top, with the preset display, the preset buttons and VOICES;
- the HARDWARE, ABOUT and DIAG buttons on the red band below the right end of the strip;
- the row of seven preset knobs plus Morph;
- the bottom row with INPUT, CLIP and OUTPUT.

The window can be resized from 75 % to 200 % by dragging its lower right corner. The size is saved with your project.

Preset display



The first line shows the preset number and name, the second line the author. While the mouse is over a control, or while you drag it, the second line shows that control's value instead:

- a preset knob shows the value of the parameter it sets, for example "Release: 68";
- Morph shows what it moves, its value and the MIDI controller that also plays it, for example "Morph Vibrato: 89 (aftertouch)";
- INPUT and OUTPUT show dB, HARDWARE shows Micro or Off, VOICES shows the number of voices;
- the buttons say what they do.



Preset menu, previous and next

Click the display or the menu button (three lines) to open the list of presets. The current preset has a tick. The arrow buttons step to the previous and next preset, and wrap around at the ends.



The presets are also offered to the host as programs, so a host's own program list or program change can select them.

VOICES

The red display shows how many voices the synth plays, from 1 to 32. Use the up and down buttons next to it. A new instance starts with 4 voices, enough for chords. Set 1 to play single lines, as most patches did on a Micro Modular.

VOICES is a playing setting, not part of a preset: it stays where you set it when you change the preset. Most presets run a complete vocoder for each voice and play at most 16 voices; above 16, the display adds "this preset plays 16". Noise Choir and VC_WanVocoder2 share one vocoder between all voices and play up to 32.



The seven preset knobs



What each knob does depends on the preset. The label above it names the parameter. Where the original patch had knob assignments, they are used; where it had fewer than seven, the most useful parameters for the vocoder sound were added. A knob that a preset does not use is dimmed and has an empty label.

- Drag up and down, or left and right. 200 pixels cover the whole range.
- The mouse wheel works too.
- Double-click returns the knob to the value stored in the preset.

The knobs run from 0 to 127, like the knobs of a Nord, and the display shows the value the parameter gets, which may have a smaller range (a waveform switch, for example, has only a few values). Your host sees the knobs as "Knob 1" to "Knob 7" and can automate them or map MIDI controllers to them.

Morph



On the Nord, Morph moves a group of parameters at once, each by its own amount. Syd Vocoder does the same. The label box says MORPH and, below it, what Morph moves in this preset. If a preset has no Morph, the knob is dimmed (left in the picture).

In some presets a MIDI controller plays Morph as well:

Preset	Morph follows
Vocoder 2	channel aftertouch
ChordVoc, ManhattanTrans, PulseVoc, SawVoc, VC_WanVocoder2	CC 1, the modulation wheel

The knob and the MIDI controller share one value. Whichever moved last wins; they do not add up. A thin track runs around the Morph knob. An amber arc along that track shows Morph as it is being played, from the minimum to the current value, so you can see aftertouch or the mod wheel move it even though the knob itself stays put. At 0 the track stays dark.

Double-click returns Morph to the preset's value. Your host sees it as "Morph".

HARDWARE



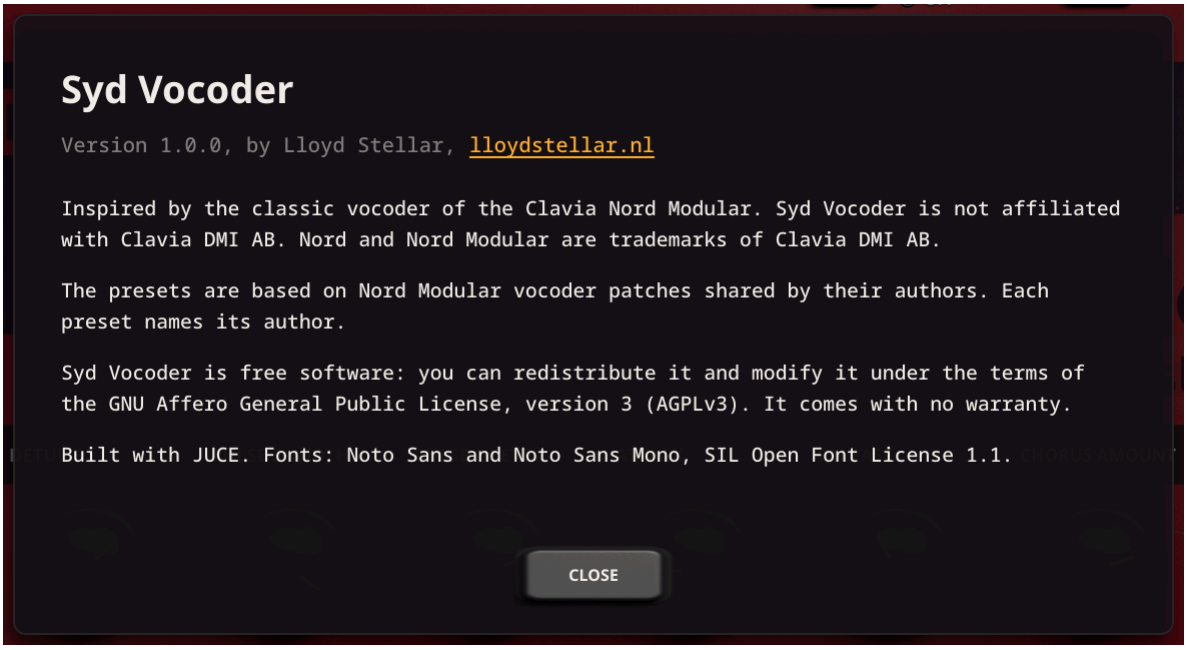
The button switches the hardware character between Micro and Off. The green LEDs show the state.

- **Micro** (the default) puts a model of the Micro Modular's converters around the vocoder: the input converter with its filter, hard clipping and noise, and the output converter with its 18-bit resolution and slight treble roll-off.
- **Off** feeds the vocoder a clean digital signal and takes its output as it is.

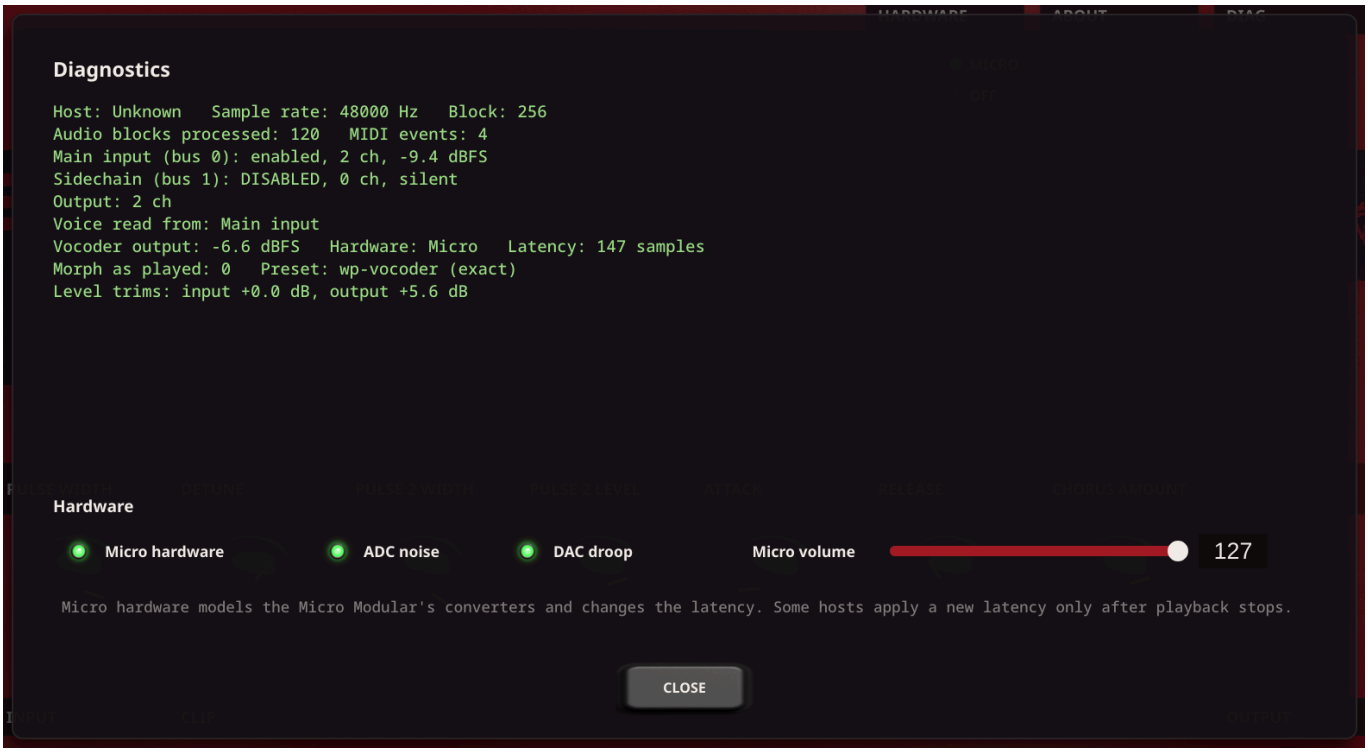
The vocoder and the synth are the same in both modes. Micro has a little more latency at 44.1 and 48 kHz (see the latency table in section 3). Switching resets the converter models and changes the latency; some hosts apply a new latency only after playback stops. HARDWARE cannot be automated. Section 7 has the details.

ABOUT

Shows the version, the credits, the licence and the trademark notice. Click lloydstellar.nl to open Lloyd Stellar's website in your browser. Click CLOSE, or anywhere outside the box, to close it.



DIAG



DIAG shows what the plugin receives from the host. Use it when you hear nothing.

- the host name, the sample rate and the block size;
- the number of audio blocks and MIDI events received (the MIDI count should rise when you play);
- for the main input and the sidechain: enabled or disabled, number of channels, and the peak level;
- "Voice read from": the input the voice comes from;
- the vocoder output level, the hardware mode and the latency reported to the host;
- Morph as played, the internal name of the preset and its level trims.

If the host runs at a sample rate the plugin cannot use, the output line says SAMPLE RATE NOT SUPPORTED. 44.1, 48, 88.2 and 96 kHz all work.

The lower part holds the hardware settings: Micro hardware (the same switch as HARDWARE), ADC noise, DAC droop and Micro volume. They are explained in section 7. Click CLOSE or outside the box to close it.

INPUT and CLIP



INPUT sets the level of your voice going into the vocoder, from -24 to +24 dB. At 0 dB, a full-scale signal from the host (0 dBFS) reaches the full scale of the vocoder's input. Double-click to return to 0 dB.

In Micro mode, INPUT is the drive into the model of the Micro Modular's input converter, like the microphone preamp in front of the real unit. Below full scale nothing happens to your voice except the converter's 16-bit resolution and its faint noise. Above full scale the converter clips hard.

CLIP lights for half a second whenever the input clips. Clipping adds harmonics, and the vocoder's bands pick them up like any other part of your voice. Some presets sound better driven a little, others get harsh. Use CLIP to see when it happens and INPUT to choose. In Off mode the input also clips at full scale, without the converter model around it.

OUTPUT



OUTPUT sets the level after the vocoder, from -24 to +24 dB, default 0 dB. It is a clean gain and does not change the sound. Double-click to return to 0 dB.

The presets are calibrated: each one has its own level trim, measured with a loud and very dynamic voice (peaks just below full scale, soft passages around -40 dBFS), chords and a single-note line, at 4 voices. With OUTPUT at 0 dB, every preset peaks between -6 and -3 dBTP with that voice, so you have at least 3 dB of headroom and switching presets does not change the peak level by more than 3 dB. Within that window the presets are matched in loudness as far as the window allows. Presets with sharp peaks, such as Noise Choir and Deep Vocoder, come out a few dB quieter; VC_WanVocoder2, which compresses its output, comes out louder. With a quieter or compressed voice, or with fewer voices, the presets come out quieter. Raise OUTPUT if you need more.

What a preset change does

Choosing a preset, from the panel, the host or a saved project, loads it. The seven knobs and Morph go to the values stored in the preset. VOICES, INPUT, OUTPUT and the hardware settings stay where they are. The preset's level trims change with it, without a click.

A saved project restores the preset with the knob and Morph values you had.

6. Playing

MIDI

Syd Vocoder listens on all MIDI channels.

Message	Effect
Note on and off	Play the synth. Velocity has no effect, as in all the original patches.
Pitch bend	Bends by the preset's own range: 1, 2 or 12 semitones (see the preset table).
Channel aftertouch	Morph in Vocoder 2.
CC 1 (modulation wheel)	Morph in ChordVoc, ManhattanTrans, PulseVoc, SawVoc and VC_WanVocoder2.
CC 64 (sustain pedal)	Holds released notes until the pedal goes up. Any value above 0 counts as down.
CC 121 (reset all controllers)	Sets a Morph that follows CC 1 back to 0.
CC 120 (all sound off) and CC 123 (all notes off)	Release every note.

Polyphonic aftertouch and other controllers do nothing by themselves, but you can map them to the knobs with your host's MIDI mapping.

Voices and chords

Each voice is one copy of the preset's synth playing one note. With one voice the synth is monophonic: a new note takes over, and when you release it the voice is free again, even if you still hold an older key. It does not return to the older note.

With more voices you can play chords. A new note goes to the voice that has been free longest. When all voices are busy, a new note usually takes the oldest one. These are the Nord's own rules.

In most presets each voice runs its own complete vocoder, as on the Nord, so every extra voice costs CPU time (see section 11). Noise Choir and VC_WanVocoder2 mix all voices into one vocoder and cost much less per voice.

Drones

Some patches have no envelope that closes the synth when you let go of a key. In those presets the synth keeps playing at the last note after you release it, and the vocoder lets it through whenever you sing. You hear the vocoder with no key down. This is how the original patches work, and it is useful: play a note or chord once and then just sing.

The drone presets are BasicVocoder, ChordVoc, ManhattanTrans, NoiseVoc, PulseVoc, RobotVoc, SawVoc, Squares, unvoiced, UnvoicedVocoder02, VocalEncoder03 and WierdAccent. In cylon vocoder the output opens with your voice rather than with the keys, so it behaves the same way.

With more than one voice, every voice drones. A voice that has not played a note yet sounds at a start note stored in the patch (often E4), so with VOICES at 4 you may hear more pitches than you played. Play a chord with as many notes as there are voices, or set VOICES to 1 for a single line. In NoiseVoc, RobotVoc and WierdAccent the keys do not set the pitch at all, so all voices sound all the time: these presets get louder with more voices.

Envelopes and gates

The other presets close when you release the keys: Deep Vocoder, 2vocringmod, HarmonySisters, keyedvocoder, Noise Choir, VC_WanVocoder2 and Vocoder 2 stay silent with no key held (2vocringmod's ring-modulated voice excepted). Several presets also have a gate or expander that keeps the output quiet between phrases.

Sustain pedal

The sustain pedal (CC 64) holds released notes until you lift it.

Pitch bend and glide

Pitch bend uses the range of the original patch: 12 semitones in VC_WanVocoder2, 2 in cylon vocoder, HarmonySisters, Noise Choir and Squares, and 1 in the others.

unvoiced and Vocoder 2 have a Glide knob. In unvoiced the pitch always glides. In Vocoder 2 it glides only when you play legato; after you have released all keys, the next note starts at its own pitch.

Knobs glide too

When you turn a knob, the parameter does not jump to the new value. It glides there in small steps, the way the Nord moved its parameters: a large jump takes some tens of milliseconds. This keeps knob moves free of clicks and matches the feel of the hardware. A few switch-like parameters, such as a waveform choice, change at once.

Preset changes

A preset change resets the knobs and Morph to the preset (see What a preset change does) and restarts the voices. Notes you hold during the change are not carried over: play them again.

In Micro mode the output fades in over about 47 ms after every preset load, as the Micro Modular's volume does after a patch change.

Every preset load starts the oscillators, LFOs and noise at random phases, as the Nord does. Two renders of the same project can therefore differ slightly, in phase only.

7. The hardware character

The HARDWARE switch decides what sits around the vocoder: a model of the Micro Modular's converters (Micro) or a clean digital path (Off). The synth and vocoder in the middle are identical in both modes.

What Micro adds

On the way in, the model follows the Micro Modular's 16-bit input converter:

- a high-pass filter that removes DC;
- hard clipping at full scale;
- the converter's anti-alias filter;
- converter noise at -92 dBFS (setting: ADC noise);
- 16-bit resolution at a 48 kHz converter rate.

On the way out, it follows the 18-bit output converter:

- the Micro's master volume (setting: Micro volume);
- 18-bit resolution;
- the slight treble roll-off of the converter (setting: DAC droop; about -0.1 dB at 8.5 kHz and -0.6 dB at 20 kHz);
- a high-pass filter for the output coupling.

A few analog details of the original circuit board are not known exactly. Those parts follow the data sheets of the converter chips.

The other hardware settings

These sit in the DIAG panel because you will rarely need them.

Setting	Default	What it does
Micro hardware	on	The same switch as HARDWARE.
ADC noise	on	The input converter's noise floor at -92 dBFS. Off makes silence exactly silent.
DAC droop	on	The output roll-off described above. It mainly affects wideband sound such as the chorus; the vocoder output itself stops at about 9 kHz.
Micro volume	127	The Micro's VOLUME knob. It scales the signal digitally before the 18-bit converter, so lower settings use fewer bits (about one bit per 6 dB). Leave it at 127 unless you want that.

The hardware settings belong to the plugin instance, not to a preset.

Sample rate

The vocoder runs at the same internal rate whatever the project rate. At 44.1 and 48 kHz the host has already removed the highest frequencies of the voice (above about 22 to 24 kHz). On the Micro, some of that range, mostly sibilance, folded down into the top vocoder band. A project at 88.2 or 96 kHz comes a little closer to the hardware in that respect. The difference is small.

Faithful down to the smallest step

Syd Vocoder keeps the Nord's arithmetic, small flaws included. One you may notice: after very loud input, the envelope of the lowest band can stay stuck at a tiny value, so a trace of the synth leaks through about 47 dB down. The Nord does the same.

8. Presets

Twenty-one presets come with Syd Vocoder. Twenty are based on Nord Modular vocoder patches; seven of those are factory patches of the Micro Modular, credited "Clavia (Micro Modular factory bank)". The credit names the author of the original patch; "unknown author" means the patch carried no name. Deep Vocoder is Lloyd Stellar's version of WP Vocoder, a patch by an unknown author. Noise Choir is new, by Lloyd Stellar.

Deep Vocoder is loaded when the plugin starts.

#	Preset	Author	What it is	The knobs and Morph
1	Deep Vocoder	Lloyd Stellar, based on WP Vocoder (unknown author)	Two pulse waves with an envelope and chorus. Sounds two octaves below the keys you play.	Pulse Width, Detune, Pulse 2 Width, Pulse 2 Level, Attack, Release, Chorus Amount. No Morph.
2	2vocringmod	Roland Kuit, after Kees van der Maarel	Voice compressor, vocoder with chorus, plus a ring-modulated copy of your voice that an LFO pans from side to side. You hear the ring path whenever you speak. The original used an external carrier; here the internal synth plays a saw with an envelope.	Level, Pan Rate, Ring Level, Ring Pitch, Ring Depth Mod, Vocoder Level, Chorus Amount. No Morph.
3	BasicVocoder	jsd	Drone. An oscillator and a detuned pulse, then a phaser and chorus.	Level, Osc Coarse, Vocoder Level, Waveform, Pulse Detune, Phaser Center, Chorus Amount. No Morph.
4	ChordVoc	Clavia (Micro Modular factory bank)	Drone. Four saws on one key play a chord; chorus, and an expander after it keeps the output quiet between phrases.	Vibrato, Chord Note, Pitch, Vibrato Rate, Fifth Detune, Carrier Highpass, Chorus Amount. Morph: Vibrato (depth and rate), also on the mod wheel.
5	cylon vocoder	unknown author	One oscillator whose output opens with your voice, not with the keys. Mixes both input channels.	Osc Coarse, Pitch Mod, Follow Attack, Follow Release, Attack, Release, Level. Morph: PW Mod (pulse-width modulation depth).

#	Preset	Author	What it is	The knobs and Morph
6	HarmonySisters	Tommi Lindell	A formant oscillator with vibrato and a second oscillator, through a bank of three formant filters, with a key envelope. Voice EQ and compressor.	Input Boost, EQ Freq, EQ Gain, Comp Threshold, High Level, Band Level, Low Level. Morph: Octave Down (moves the second oscillator an octave down).
7	keyedvocoder	unknown author	One oscillator; after the vocoder, a low shelving EQ, an envelope on the keys and chorus. Dry/Wet mixes in your voice.	Osc Coarse, Dry/Wet, Low Freq, Low Gain, Attack, Release, Chorus Amount. No Morph.
8	ManhattanTrans	Clavia (Micro Modular factory bank)	Drone. Four saws; the loudness of your voice moves the pitch of two of them in steps. Gate on the output.	Osc Pitch, Saw Pitch, Track Range, Track Gain, Vibrato Rate, Carrier Highpass, Gate Threshold. Morph: Vibrato, also on the mod wheel.
9	MultiVoc	Rob Hordijk	A pulse wave plus two squares that are divided from it, one and two octaves lower, so they stay locked to the pulse: an organ-like sound. A short fade on the keys opens and closes each voice. A lowpass on the voice. One vocoder for all voices.	Pulse Level, Sub 1 Level, Sub 2 Level, PWM Depth, PWM Rate, Gate Smooth, Voice Lowpass. No Morph.
10	Noise Choir	Lloyd Stellar	Hold a chord: two coloured noises in the modulator make it breathe without a voice. Sing to turn the breath into words. Phaser and chorus. One vocoder for all voices.	Voice Level, Breath, Hiss, Attack, Release, Phaser Rate, Chorus Amount. Morph: Pulse Width (narrows the square wave).
11	NoiseVoc	Clavia (Micro Modular factory bank)	Noise as the carrier: a whisper. The keys do nothing. Chorus and an expander.	Noise Color, Voice Highpass, Dry Voice, Carrier Highpass, Gate Threshold, Chorus Rate, Chorus Amount. No Morph.

#	Preset	Author	What it is	The knobs and Morph
12	PulseVoc	Clavia (Micro Modular factory bank)	Drone. Three pulse waves, chorus and an expander.	Vibrato, Pulse 2 Detune, Pulse 3 Detune, Pulse 1 Width, Pulse 2 Width, Carrier Highpass, Chorus Amount. Morph: Vibrato (deeper and faster), also on the mod wheel.
13	RobotVoc	Clavia (Micro Modular factory bank)	A saw at one fixed pitch, whatever key you play, with a wobble LFO and a high-passed dry voice mixed in.	Robot Pitch, Wobble, Wobble Rate, Dry Level, Dry Highpass, Carrier Highpass, Chorus Amount. No Morph.
14	SawVoc	Clavia (Micro Modular factory bank)	Drone. Three detuned saws, chorus and an expander.	Vibrato, Saw 2 Detune, Saw 3 Detune, Vibrato Rate, Voice Highpass, Carrier Highpass, Chorus Amount. Morph: Vibrato (deeper and faster), also on the mod wheel.
15	Squares	Skeleton	Drone. Two pulse oscillators with vibrato and pulse-width modulation from two LFOs, plus noise.	Vibrato 1, Vibrato 2, PWM 1, PWM 2, LFO 1 Rate, LFO 2 Rate, Noise Level. No Morph.
16	unvoiced	James J. Clark	Drone. Switches the carrier from a three-note pulse chord to noise on "s", "f" and other unvoiced sounds, so they come through. Voice compressor. Glide always on.	Level, Noise Color, Glide, Voiced Lowpass, Unvoiced Highpass, Comp Threshold, Vocoder Level. Morph: Pulse Width (all three pulses).
17	UnvoicedVocoder02	James Clark	Drone. A variant of unvoiced that blends between pulses and noise instead of switching. One pulse stays at E4.	Noise Color, UV Switch, Voiced Lowpass, Unvoiced Highpass, Comp Threshold, Vocoder Level, Pulse Detune. Morph: Third Pulse (its width and level).
18	VC_WanVocoder2	Wan Kemper	Three oscillators with an envelope. Voice EQ and gate, compressor on the output. One vocoder for all voices.	EQ Freq, EQ Gain, Gate Threshold, Attack, Release, Comp Threshold, Booster. Morph: Vibrato, also on the mod wheel.

#	Preset	Author	What it is	The knobs and Morph
19	VocalEncoder03	James Clark	Drone. A square and two pulse waves with pulse-width modulation; compressed voice.	Vocoder Level, Osc Coarse, PWM Rate, PWM Depth, Pulse Detune, Comp Threshold, Comp Ratio. No Morph.
20	Vocoder 2	krc	A pulse wave whose width follows your voice, with an envelope. Sounds one octave below the keys. Glide when played legato. Mixes both input channels.	Pulse Width, PW Follow, Glide, Follow Attack, Follow Release, Vibrato Rate, Release. Morph: Vibrato, also on aftertouch.
21	WierdAccent	Clavia (Micro Modular factory bank)	Three pulse waves whose pitch does not follow the keys: it follows the loudness of your voice, with a glide. Chorus and an expander.	Accent, Pulse 2 Detune, Accent Glide, Accent Release, Accent Band, Pulse 1 Width, Chorus Amount. Morph: Pitch (moves the pitch up).

Pitch-bend range: 12 semitones in VC_WanVocoder2; 2 in cylon vocoder, HarmonySisters, MultiVoc, Noise Choir and Squares; 1 in all others.

Presets 5 and 20 mix the left and right input channels, as their patches mixed the Nord's two audio inputs. Send the voice on both channels (a mono voice track does this in most hosts), or the voice is quieter.

9. Tips for a good vocoder sound

Articulate the consonants. The band followers are fastest in the high bands: the top band rises in about 0.4 ms and falls in about 8 ms, the lowest band takes about 5 ms and 67 ms. Consonants live high in the spectrum, so they come through sharply if you pronounce them clearly. Mumbled words turn into vowels.

Compress the voice, or not. A compressor before the vocoder keeps quiet syllables, word endings and breaths from dropping out, so the result sounds less choppy. Put one on the voice track and take the sidechain after it (Post FX in Live). 2vocringmod, HarmonySisters, unvoiced, UnvoicedVocoder02 and VocalEncoder03 already have a compressor inside, and VC_WanVocoder2 compresses its output. Without compression the vocoder follows your dynamics more closely, which can sound more natural on a dynamic performance.

Set INPUT by ear. Start where CLIP stays dark on your loudest phrases. Then try a few dB more and listen: the Micro's input converter clips hard, and some presets sound better driven. A voice far below full scale drives the vocoder weakly; raise INPUT or the gain on your interface.

Choose the carrier preset for the job. A bright carrier with many harmonics gives the most intelligible words. Narrow pulse waves and saws work better than soft waveforms, and a little noise helps the "s" and "t" sounds. In the presets, try a narrow Pulse Width, the noise controls (Squares has Noise Level) or unvoiced and UnvoicedVocoder02, which switch to noise for sibilants. For pads behind a voice, Noise Choir and the chorus presets are a good start; for a single robot line, RobotVoc or a preset at VOICES 1.

Test with a recording of your own voice. Record a phrase, loop it, and turn the knobs while it plays. You hear the effect of every knob without having to sing at the same time.

Mind the material. A mix with voice, bass and drums vocodes well when you use it as the modulator, because the bass and drums sit outside the voice's range. Guitars and synths in the same range as the voice make it muddy. EQ helps.

Keep stage noise out. Every sound in the microphone opens the bands. Use headphones, keep the microphone close, and prefer a preset that closes with the keys (Deep Vocoder, keyedvocoder, Noise Choir, VC_WanVocoder2, Vocoder 2) or has a gate (ManhattanTrans, VC_WanVocoder2, and the expander in the factory presets). No gate helps when the room is as loud as your voice; then you need a more directional microphone.

10. Troubleshooting

No sound

You hear the vocoder only when the synth plays and your voice comes in at the same time (in drone presets, a note played once is enough). Open DIAG and check:

- **MIDI events** should count up when you play. If not, the instrument track does not get your keyboard: arm it, or check its MIDI input.
- **Voice read from** should name an input, and that input should show a level while you sing. If it says "nothing", or the level stays "silent", the routing is wrong. In Live, check that Sidechain is on, that its Audio From points to the voice track, and that the voice track is on Monitor In (or armed). In other hosts, switch the sidechain on or send the voice to the main input (section 4).
- **Vocoder output** shows whether the plugin produces sound. If it does and you still hear nothing, check the track's volume and routing in the host.
- **SAMPLE RATE NOT SUPPORTED**: change the project sample rate (44.1, 48, 88.2 and 96 kHz all work).

On macOS, if the host does not list Syd Vocoder at all, see section 2.

Too quiet

- Turn OUTPUT up. It goes to +24 dB above the preset's calibrated level.
- Check Micro volume in DIAG. It should be 127.
- Many presets have a Level or Vocoder Level knob.
- Raise INPUT if your voice arrives at a low level.
- In presets with a gate or expander (Gate Threshold knob), a quiet voice may not open it. Lower the threshold or raise INPUT.

Distorted

- If CLIP lights a lot, lower INPUT or the gain on the voice track.
- The Nord's internal stages saturate when they get too hot, as on the hardware. Lower a Level or Vocoder Level knob, or INPUT.
- If the host's meter goes over 0 dB, lower OUTPUT.

A faint synth sound when you stop singing

- In drone presets this is normal: the synth keeps playing, and a trace gets through.
- After very loud input the lowest band can stay open a little (section 7). It is about 47 dB down.
- Room noise in the microphone opens the bands. Use headphones, a gate on the voice track, or a preset that closes with the keys.

Notes keep sounding

Check the sustain pedal. Stopping playback in most hosts sends "all notes off" or "all sound off", and Syd Vocoder releases every note on both. In drone presets the synth keeps sounding by design.

More pitches than you played

In drone presets, every voice sounds, also the ones you have not played yet. Set VOICES to the number of notes you play, or to 1 (Drones).

Too much latency

- Lower the buffer size in the host's audio settings.
- At 44.1 and 48 kHz, HARDWARE Off saves about 0.6 to 0.8 ms. At 96 kHz Off adds no latency at all.
- Some hosts take a latency change into account only after playback stops.

11. CPU load

The cost grows with VOICES in the presets that run a vocoder per voice, which is all of them except Noise Choir and VC_WanVocoder2. As a guide, on a laptop with an Intel Core i7-1195G7 at 44.1 kHz, one voice takes about 4 to 5 % of one CPU core, and BasicVocoder at 16 voices roughly 36 %. Noise Choir and VC_WanVocoder2 cost far less per voice.

If the audio drops out, lower VOICES to what you need (4 is enough for most chords), or raise the host's buffer size.

12. Credits, licence and source code

Syd Vocoder is made by Lloyd Stellar: lloydstellar.nl.

The presets are based on Nord Modular vocoder patches shared by their authors: Roland Kuit and Kees van der Maarel (2vocringmod), jsd (BasicVocoder), Tommi Lindell (HarmonySisters), Rob Hordijk (MultiVoc), Skeleton (Squares), James J. Clark (unvoiced, UnvoicedVocoder02, VocalEncoder03), Wan Kemper (VC_WanVocoder2), krc (Vocoder 2), Clavia (the Micro Modular factory patches ChordVoc, ManhattanTrans, NoiseVoc, PulseVoc, RobotVoc, SawVoc and WierdAccent), and the unknown authors of WP Vocoder, cylon vocoder and keyedvocoder. Deep Vocoder and Noise Choir are by Lloyd Stellar.

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Licence

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Source code

The source code is on GitHub: github.com/lloydstellar/syd-vocoder. Bug reports and reports from other hosts are welcome there.

Trademarks

Syd Vocoder is inspired by the classic vocoder of the Clavia Nord Modular. It is an independent project, not affiliated with, endorsed by or connected to Clavia DMI AB. Nord, Nord Modular and Nord Micro Modular are trademarks of Clavia DMI AB. Syd Vocoder contains no Clavia program code.

"Nord" is Swedish for north. "Syd" is south.