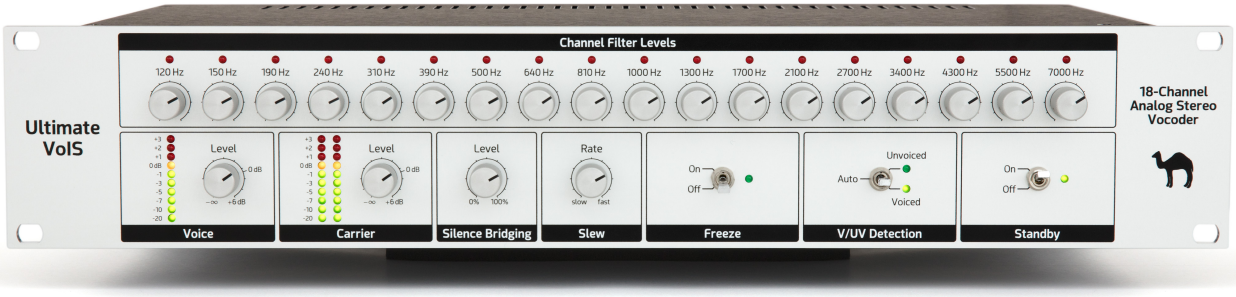
Ultimate VoIS

18–Channel Analog Stereo Vocoder

User's Manual



http://vocoder.hoerold.com

Read all safety warnings and all instructions. Failure to follow the warnings and instructions may result in electric shock, fire, or serious injury.

This symbol warns that uninsulated voltage inside the unit is high enough to cause electric shock. Do not touch any parts inside the unit.

This symbol indicates that important information on operation and maintenance is included. Read this manual carefully to avoid problems.

CAUTION

- TO PREVENT FIRE OR SHOCK HAZARDS, DO NOT EXPOSE THIS UNIT TO RAIN OR MOISTURE.
- THIS UNIT IS FOR INDOOR USE ONLY.
- DO NOT USE THIS UNIT'S POLARIZED PLUG WITH AN EXTENSION CORD RECEPTACLE OR OTHER OUTLETS UNLESS ALL PRONGS CAN BE FULLY INSERTED.
- TO REDUCE RISK OF ELECTRIC SHOCK, MAKE SURE THE POWER CORD IS UNPLUGGED FROM THE WALL SOCKET.
- TO FULLY DISENGAGE THE POWER FROM THE UNIT, DISCONNECT THE POWER CORD FROM THE AC OUTLET.
- DO NOT REMOVE ANY COVERS FROM THE UNIT AS THERE ARE HIGH–VOLTAGE COMPONENTS INSIDE. THERE ARE NO USER SERVICEABLE PARTS INSIDE.
- REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

Caution: If a power cord is not supplied with this device, use a power cord that matches the AC of the power outlet and has been approved by and complies with the safety standards of your particular country. Only power cords with earth connection must be used. The AC voltage of the power outlet must be in the range of 100 V to 240 V AC.

Contents

Safety Precautions

FOR SAFE AND RELIABLE OPERATION,
PLEASE NOTE THE FOLLOWING:

Power Supply

- Use only the supplied power cord or one that meets local safety standards.
- Connect the vocoder to a grounded outlet. The power connector is the primary means of disconnecting the unit, so install it near an easily accessible outlet.
- Unplug the unit during lightning storms or when it will not be used for an extended period.
- Do not bend, crush, or place heavy objects on the power cord. Replace the cord if it becomes damaged.

Environment

- Do not use the vocoder outdoors or in areas with high temperature, humidity, dust, or oil.
- Keep the unit away from water and do not spill liquids into the cabinet.
- Ensure adequate ventilation. Do not cover the vents or place the unit near radiators or heat sources.

Handling

- Do not insert objects into cabinet openings.
- Do not place objects on top of the vocoder.
- Place the unit on a stable, level surface to avoid injury or damage from falls.
- Handle with care during transport. Keep the original packaging for reuse.

Service

Turn off power, unplug the unit, and refer servicing to qualified personnel if:

- The power cord or plug is damaged.
- Liquid or foreign objects enter the unit.
- The unit has been dropped or the cabinet is damaged.
- The unit emits smoke, an unusual odor, or abnormal noise.
- The unit has been exposed to rain or moisture.
- The unit does not operate normally even after following the instructions.

CAUTION

- Allow adequate ventilation so that heat can dissipate.
- Do not block ventilated openings or place objects on the vocoder.
- Keep the unit close to a power outlet that is easy to reach.

Contents

- 18–channel analog stereo vocoder in a rack–mountable aluminum cabinet (2U height)
- User's manual (this document)

Product Features

- **18 adjustable channels**, distributed across left and right stereo outputs
- **Precision analog band–pass filters**, designed for consistent, high-fidelity performance
- **Line-level inputs** with independent gain controls and peak program meters
- **Silence bridging**, filling pauses with filtered carrier signal to maintain continuous output
- **Slew control** for expressive slurring and articulation effects
- **Voiced/Unvoiced detection** improves intelligibility by substituting pink noise during unvoiced sounds such as "s" or "t"
- **Balanced XLR connectors** on the rear panel for professional audio integration
- **Fully analog signal path**, covering the entire audio chain from input to output for uncompromised fidelity
- **No compression or decompression**, preserving the natural dynamic range of the input signal for transparent, expressive results

Advanced configuration mode allows fine–tuning of voiced/unvoiced detection and other parameters to adapt the vocoder to different setups.

Care and Maintenance

Your vocoder is designed for long service life with minimal maintenance. The cabinet and controls are made of aluminum for durability and a precise tactile feel.

Cleaning

- Unplug the power supply before cleaning.
- Wipe the cabinet with a soft cloth slightly dampened with water and a neutral detergent, then dry with a clean cloth.

Caution: Do not use benzene, thinner, alkaline cleaners, alcohol–based solvents, glass cleaner, wax, polish, soap powder, or insecticide. These can damage the surface finish.

Maintenance

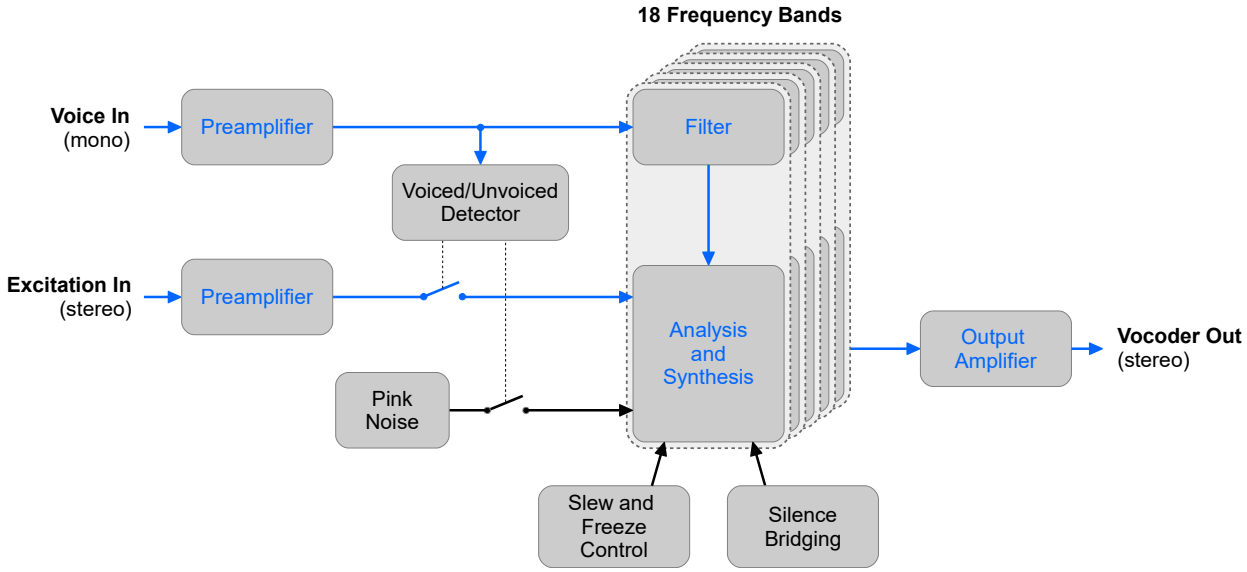
- The vocoder is largely maintenance–free.
- If the fuse on the rear panel requires replacement, refer to Section "Troubleshooting".
- For best performance, allow the unit to warm up for at least 30 minutes before use.

Operating Principle

Vocoders are used in sound production and are best known for creating the characteristic robotic voice effect. In simple terms, vocoding works by extracting the envelope of the voice signal and applying it to a carrier signal.

This vocoder divides the voice and carrier inputs into 18 frequency bands using band–pass filters. The envelope of the voice signal in each band is applied to the carrier signal in the same band, and the sum of all bands produces the characteristic vocoder sound.

With a stereophonic carrier input, the vocoder produces a stereophonic output. Each synthesized frequency band is assigned to one of the two audio channels, enhancing the spatial impression of the sound.



Vocoder block diagram

To improve intelligibility, a **voiced/unvoiced detector** distinguishes between voiced sounds (such as *a*, *e*, *i*, *o*, *u*) and unvoiced sounds (such as *s*, *f*, *t*, *k*). During unvoiced sounds, where the spectrum is broader than the carrier signal, intelligibility is enhanced by substituting the carrier with pink noise.

Silence bridging fills pauses in speech with filtered carrier signal. This keeps the carrier's frequency characteristics, set through the individual channel level controls, consistent during both silent and articulated passages.

Slew rate control adjusts how quickly the voice envelope follows the input. A slower slew rate produces slurring effects. Freezing the rate locks the articulation, effectively turning the vocoder into a pitch–adjustable formant filter.

The block diagram illustrates the signal flow: the analog path (shown in blue) runs from voice and carrier inputs to the vocoder outputs, while a microprocessor manages auxiliary functions for higher precision.

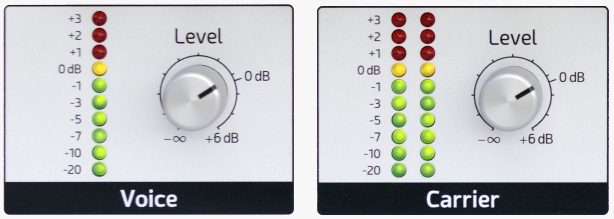
Functions and Controls

Channel Filter Levels

18 band–pass channels form the core of the vocoder, covering center frequencies from 120 Hz to 7 kHz.

Each channel has an individual level control and an LED that lights when the signal reaches 0 dB. This allows precise monitoring and helps optimize signal–to–noise ratio. Once an LED is lit, the output matches the input, with a +3 dB headroom before clipping. For stereo operation, each band is assigned to either the left or right output channel.

Voice and Carrier Level Controls



Input gain controls adjust the levels of the mono voice input and stereo carrier input.

Gain can be set from $-\infty$ to +6 dB. The peak program meters (PPM) show the actual signal levels.

The rear–panel inputs accept professional line levels only. An external preamplifier is required if you want to use a microphone.

Silence Bridging

Silence bridging passes filtered carrier signal to the output during pauses in the voice input.

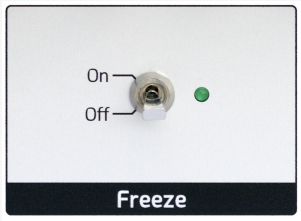
The amount is adjustable between 0% (off) and 100% (maximum).

Slew Rate

Slew rate control adjusts how quickly the voice envelope follows the input signal.

Set to **Fast** (fully clockwise), the control has no effect. Turning it toward **Slow** reduces the rate, creating slurring effects. Fully counter–clockwise, the envelope is held, effectively freezing articulation.

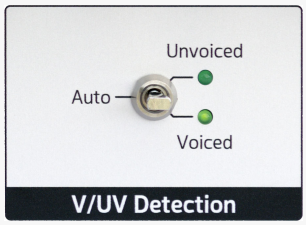
Freeze



Freeze switch instantly holds the envelope signal.

This has the same effect as turning the slew rate control fully counter–clockwise. The LED indicates when the signal is frozen.

Voiced/Unvoiced Detection



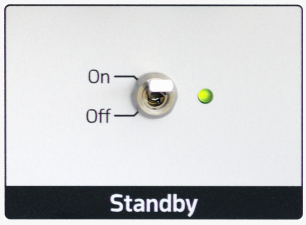
Voiced/unvoiced detector enhances intelligibility.

Three settings are available:

- **Auto** detects voiced and unvoiced input automatically
- **Voiced** treats all input as voiced
- **Unvoiced** replaces the carrier with pink noise

In **Auto**, the LEDs indicate the detected sound type.

Standby



Standby switch reduces the vocoder to low–power mode.

The LED shows when the unit is powered on. To switch power off completely, use the mains switch on the rear panel.

First Setup

1. Connect Voice In

Connect a voice source to the XLR input jack **Voice In** on the rear of the vocoder.

Tip: Avoid using a microphone at first, since speaking and listening simultaneously is difficult.

2. Connect Carrier In

Connect a stereo carrier source to the two XLR input jacks **Carrier Left** and **Carrier Right** on the rear of the vocoder.

Tip: Use a carrier signal rich in harmonics, such as a sawtooth or square wave. Avoid sine or triangle waves because they lack harmonics and will not drive the 18 band–passes effectively.

3. Connect Vocoder Out

Connect the XLR output jacks **Vocoder Left** and **Vocoder Right** on the rear of the vocoder to an amplifier with speakers.

4. Set Up the Vocoder

Turn all 18 band–pass levels fully clockwise. Set Silence Bridging to **0%** and Slew Rate to **fast**. Switch Freeze **Off** and V/UV Detection to **Auto**. Switch Standby **Off**.

5. Power Up the Vocoder

Connect the power cord to the AC socket on the rear of the vocoder. Switch Standby **On**. The green power LED should light.

6. Adjust the Levels

Turn on the voice and carrier signal sources and adjust the Voice and Carrier Levels to reasonable levels on the PPMs. For good intelligibility, choose a carrier signal in the 40–100 Hz range.

Tip: For the best signal–to–noise ratio, aim for as many green LEDs on the PPM as possible, ideally reaching the yellow LEDs. Avoid the red LEDs unless you want to use the built–in margin of +3 dB. Beyond that, distortion occurs.

7. Enjoy and Experiment

Use the knobs and switches to explore the features of the vocoder and listen to their effects.

Tip: If individual channel LEDs light up, this indicates overload. This may add character to the sound, but if not desired, lower the affected channel levels.

Advanced Settings

The vocoder is preconfigured for reliable operation and will perform well in most situations. However, voice characteristics, input signals, and environmental factors can differ from case to case. Configuration mode provides access to advanced parameters, allowing the unit to be adapted to specific setups.

Enter configuration mode

With the **Freeze** switch set to **Off**, move the **V/UV** switch from **Voiced** to **Auto** five times within three seconds. The **Freeze** switch must remain **Off**, and the **V/UV** switch must stay in **Auto** while configuration mode is active.

Controls in configuration mode

Several front–panel controls take on configuration functions while configuration mode is active:

- **Silence Bridging** knob – select option.
- **Slew Rate** knob – adjust value.
- **Left LED meter** – indicates which option is selected.
- **Right LED meter** – shows the current value.
- **Freeze** and **V/UV** switches – used to exit configuration mode.

Adjust settings

In configuration mode the vocoder operates normally. Adjustments take effect immediately and can be monitored in real time. Voice and carrier inputs must be active during configuration.

Note on knob behavior: The **Silence Bridging** and **Slew Rate** knobs use a soft–pickup mechanism. When entering configuration mode, stored values remain active until the knob position matches. For **continuous** settings, the knob must be moved close to the stored position to take control. For **on/off** settings, control is taken once the knob passes the center position. This prevents sudden jumps when configuration mode is activated.

The following options can be fine–tuned:

1. **V/UV Balance** adjusts balance between voiced (vowels) and unvoiced sounds (‘’s”, ‘’f”).
2. **V/UV Hysteresis** controls switching behavior between voiced and unvoiced sounds.
3. **V/UV Threshold** sets minimum input level for detection.
4. **V/UV Noise Level** adjusts controlled noise level for unvoiced sounds.
5. **Permanent Noise Level** sets fixed noise level when V/UV switch is **Unvoiced**.
6. **Noise Source** selects **pink noise** (default) or **white noise**.
7. **LED Meter Type** selects **PPM** (default) or **VU meter**.

When adjusting the **Permanent Noise Level** or **Noise Source**, the V/UV detector is temporarily forced to **Unvoiced**, so the results can be monitored directly.

Most options allow a continuous range of values, shown across the right LED meter. For **Noise Source** and **LED Meter Type**, the right LED meter shows one of two choices:

- Lowest LED = default (**pink noise** or **PPM**)
- Highest LED = alternative (**white noise** or **VU meter**)

For these on/off options, control is taken once the **Slew Rate** knob passes the center position.

Exit configuration mode

1. To **save changes**, briefly switch **Freeze** to **On**.
2. To **discard changes**, flip the **V/UV** switch from **Auto** to **Voiced**.
3. To **reset to factory defaults**, set the **V/UV** switch from **Auto** to **Unvoiced** and hold for three seconds. Switching back sooner interrupts the reset.

After exiting, the **Silence Bridging** and **Slew Rate** knobs must be readjusted for normal operation.

Troubleshooting

Step	Problem	Possible Reason	Solution
1	Power LED is off	1. Standby is Off	Turn Standby On
		2. Mains switch is Off	Turn on mains switch
		3. No power cable plugged in	Plug in power cable
		4. The fuse in the power entry module is blown	Replace the fuse with the correct rating as indicated on the rear panel
2	No signal indicated on Voice PPM	1. No cable connected to Voice In XLR jack	Connect voice cable to XLR jack
		2. No signal sent on cable connected to Voice In XLR jack	Increase signal level on source
		3. Voice Level is too low	Turn Voice Level knob clockwise until reasonable levels are observed on PPM
		4. Power LED is off	Check Step 1
3	No signal indicated on Carrier PPM	1. No cables connected to Carrier In XLR jacks	Connect carrier cables to XLR jacks
		2. No signal sent on cable connected to Carrier In XLR jacks	Increase signal levels on source
		3. Carrier Level is too low	Turn Carrier Level knob clockwise until reasonable levels are observed on PPM
		4. Power LED is off	Check Step 1
4	No vocoder sound	1. No signal indicated on Voice PPM	Check Step 2
		2. No signal indicated on Carrier PPM	Check Step 3
		3. Some or all Channel Levels are turned down	Check settings of Channel Levels
		4. No cables plugged into Vocoder Out XLR jacks	Connect cables to Vocoder Out XLR jacks
		5. Subsequent equipment not set up properly	Make sure the equipment connected to the Vocoder Out XLR cables is set up properly
		6. Slew knob is turned fully counter–clockwise (“slow”)	Turn slew knob clockwise
		7. Freeze switch is turned On	Turn Freeze switch Off
		8. Power LED is off	Check Step 1

Technical Specifications

Line inputs

Type	Balanced XLR connector
Impedance	48 kΩ
Gain	$-\infty$ to +6 dB

Line output

Type	Balanced XLR connector
Impedance	50 Ω
Gain	Appr. +6 dB

Power

Voltage range	100 ~ 240 V AC 50/60 Hz
Fuse	T 3.15 A 250 V
Mains connection	IEC C14 receptacle

Dimensions

Height × width × depth	Appr. 80 mm × 483 mm × 265 mm
Weight	Appr. 3.1 kg (6.8 lbs)

Channel Assignments

Frequency range	Appr. 108 Hz to 7.6 kHz
Left line output center frequencies	Appr. 120 Hz, 190 Hz, 310 Hz, 500 Hz, 810 Hz, 1300 Hz, 2100 Hz, 3400 Hz, 5500 Hz
Right line output center frequencies	Appr. 150 Hz, 240 Hz, 390 Hz, 640 Hz, 1000 Hz, 1700 Hz, 2700 Hz, 4300 Hz, 7000 Hz

Warranty Information and Contact Details

This product is assembled, tested, and calibrated with care. While no formal warranty is offered, reasonable support will be provided in case of manufacturing defects or issues during normal use.

For assistance, inquiries, or documentation requests, please contact: vocoder@hoerold.com.

Disposing of the Equipment

Within the European Union (European Directive 2012/19/EU):

Do not dispose of this unit with household waste. Instead, take it to a designated collection point for the recycling of electrical and electronic equipment. Proper disposal helps protect the environment and human health. For more information, contact your local waste disposal authority or the dealer where you purchased the unit.

Outside the European Union:

Outside the European Union, contact your local authority for guidance on proper disposal of electrical and electronic products.