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# H949

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## User Guide

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## H949 Single Harmonizer®



## H949 Dual Harmonizer®



## 1.1 About This Product

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Thank you for your purchase of the Eventide H949 Harmonizer® plug-in. The product recreated in this plug-in was among the first introduced by Eventide, and among the world's first commercially available professional recording products. For over 40 years, innovative products like these have made Eventide an industry leader, and we are extremely proud that they continue to be in demand today. This package includes a stunning recreation of the H949 Harmonizer®, as well as a Dual H949 version, which recreates the popular technique of running two H949 units in parallel to create lush doubling and other interesting effects.

We'll get into more depth on the product soon but, before you forget, please take a few minutes to register online. This helps us keep you informed of any important software updates, and any special offers that may only be available to registered users.

**Production Dates: 1977 – 1984**

The Eventide Clockworks H949, which debuted shortly after the H910, was the world's first "de-glitched" Harmonizer® product - and may even have been the world's first multi-effect audio product. It not only offered 3 octaves of pitch change, but also featured Micro and Random pitch, Delay only, Flange and unique Reverse modes. When used with a tape recorder, it also made time expansion and compression possible for the first time ever.

All of the original features and sound are recreated here. Spend some time with the controls, and you will find a wide range of sound effects can be created using the few front panel controls. Also, be sure to audition the two pitch algorithms provided for the variety of sources you may feed into it.

The original H949 hardware unit featured two outputs - a MAIN OUTPUT, which passed the effected signal, and a DELAY ONLY OUTPUT, which passed a delayed (but otherwise non-effected) signal. These are recreated in the plugin, with the level of each controlled by the MAIN LEVEL and DELAY LEVEL knobs.

## 2.1 H949 Single Harmonizer® Controls

### Main H949 Panel



#### LINE

When the LINE control is IN the unit is actively processing audio; when it is OUT the unit is bypassed and passes audio directly from input to output.

#### INPUT LEVEL

This is used to set the optimum operating level for the system. The knob acts as a conventional volume control. Five level indicators provide visual cues as to the actual level of the incoming signal. In normal operation, the yellow PRESENT LED indicates that a low-level signal (-60dBfs) is being applied to the input. The 3 green NORMAL LEDs illuminate in sequence (-12 dBfs, -6dBfs, -3dBfs) to indicate a minimal driving signal, and increasing levels within the normal range. The red LIMIT LED lights within 0.5 dBfs of clipping. Note that all of these indicators are peak-responsive and will light on "peaky" material even if the average signal level is quite low. The ideal setting will drive all of the green LEDs, with no flashes of the red LED. Note that the level indicators are after the feedbacks, i.e. they measure Input + Main Feedback + Delay Only Feedback, to indicate any digital clipping at the pitch shifter input.

## REPEAT

This locking pushbutton is used to capture and repeat audio segments. Pressing it captures the last 400 ms of audio and recirculates it until REPEAT is pressed again.

Remember that pressing REPEAT captures the signal content of the current memory buffer. If you are listening to a delayed output, part or all of the segment heard immediately before pressing REPEAT may be lost. To avoid this, monitor either the input signal or a nondelayed output when attempting to capture precise segments.



*In some plug-in formats, stopping or starting playback will clear plug-in tails, and thus the REPEAT buffer.*

*If REPEAT is engaged and tails are cleared, you may hear silence on the next playback. In this case you will need to toggle REPEAT to recapture the audio for repeating.*

## FEEDBACK

The Feedback controls route a portion of the output signal back to the input. The output of these controls is mixed with the input signal, but is independent of the gain adjustment provided by INPUT LEVEL. Gains are normalized so that, with EQ controls approximately centered, the feedback level varies from 0 to 100% (loop gain of unity or "infinite" sustain) as the LEVEL knobs are advanced from OFF to MAX.

**MAIN LEVEL** – adjusts the feedback from the MAIN OUTPUT to the input.

**DLY ONLY** – adjusts the feedback from the DELAY ONLY OUTPUT to the input.

**LOW EQ** – adjusts the relative level of bass frequencies present in the feedback mix. When the knob is turned counterclockwise, lows are cut; when turned clockwise, lows are boosted.

**HIGH EQ** – adjusts the relative level of high frequencies present in the feedback mix. When the knob is turned counterclockwise, and boosting them when the knob is turned clockwise.

When both EQ knobs are centered, the frequency response of the feedback chain is approximately flat.

## DELAY ONLY OUTPUT

Controls the delay time of the DELAY ONLY OUTPUT. This output only adds delay to the original input signal - the PITCH CONTROL section has no effect. The locking pushbuttons can be activated in any combination. Delay times are selected in 6.25 ms increments to a maximum of 393.75 ms (6.25 + 12.5 + 25 + 50 + 100 + 200).



*Use caution when adjusting the feedback controls until you are fully familiar with their interaction.*

*They can easily be set to a point where loop gain exceeds unity at various frequencies, and create uncontrolled oscillation.*

**PITCH  
CONTROL/READOUT**

This block of controls is associated primarily with manual/remote control of the output pitch ratio vs. the input signal.

**PITCH RATIO** – indicated on a 4-digit display showing the numerical pitch ratio between input and output. Note that, just as in the original unit, when the knob is set between two values, the display will “jitter” between the two. This is visual jitter only, and does not affect the audio.

**MANUAL** – adjusts the pitch ratio from 2 octaves down to 1 octave up, and also determines the rate of delay change in Flange and Random modes.

**REMOTE** – This switch allows remote control via MIDI. In Manual mode, the manual knob controls the PITCH RATIO. When MIDI is selected, the pitch ratio will be determined by receipt of MIDI Note On and Pitch Bend messages. (For more information, see: “Working with the Harmonizer®”.)

**FUNCTION SELECT**

The FUNCTION SELECT button and the 4 switches to its right allow you to select the basic operating modes of the H949. When pressed IN, the 4 switches function as labeled in red below each switch. When the FUNCTION button is OUT, the switches function as labeled in green above the switches. LEDs indicate which switch is selected and show (by lighting red or green) which function is active. The functions controlled by these switches fall into two major groups: Pitch Change effects (activated when the FUNCTION button is IN) and Delay/Reversal effects (activated when the FUNCTION button is OUT). The effect in Reverse and Extend modes is most apparent with large delay times.

**PITCH CHANGE FUNCTIONS**

*(FUNCTION button IN, red labels apply)*

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**NORM** – normal pitch change mode. Adjusting the MANUAL knob over its full range gives pitch ratios from 0.250 (2 octaves down) to 2.000 (1 octave up).

**EXTEND** – permits extension of the length of the audio segment over which pitch change will be affected, up to the full extent of the H949 memory (400 ms). Note that MAIN OUTPUT delay is not available in EXTEND mode – the MAIN OUTPUT delay switches are instead used to determine the length of the audio segment used for pitch change.

**μPC (Micro Pitch Change)** – SHARP and FLAT modes operate in a manner similar to normal Pitch Change, except that the range of pitch ratios is restricted to about 1:1.07 (SHARP) and 1:0.93 (FLAT). In these modes, pitch ratio is closest to 1:1 when the MANUAL knob is fully counterclockwise. In SHARP, clockwise rotation increases the pitch; in FLAT, clockwise rotation decreases the pitch.

### **DELAY/REVERSAL FUNCTIONS**

*(FUNCTION button OUT, green labels apply)*

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**DELAY** – In this mode, the MAIN OUTPUT button allow you to add successive amounts of delay before the main output.

**RANDOM** – causes the output delay to vary between the maximum limits of 0-25 ms at a constant rate of change, though the actual delay limits will typically be smaller on any given excursion and are chosen pseudo-randomly. This simulates the random variations of double-tracking, or of multiple musicians or singers performing simultaneously, without the “mechanical” sound of a fixed delay. The desirable effect of having performers slightly out of tune is automatically achieved due to the fact that the pitch alters slightly as the delay changes. MANUAL knob controls the rate at which the delay varies from the upper to lower limit, thus changing the amount of pitch alteration.

**FLANGE** - This switch sets the H949 into automatic flanging mode. Flanging is the effect created by frequency cancellations when a signal with a varying delay is added to another constant signal. The lowest frequency affected is roughly reciprocal of the time delay (0-10 ms), so a 1ms delay causes a cancellation at 1kHz and multiples thereof. In this mode, **MANUAL** controls sweep, the rate at which the variable delay changes.

**REVERSE** - causes short signal segments (up to the 400 ms memory capacity of the system) to be played back in time-reversed order. Note that **MAIN OUTPUT** delay is not available in **REVERSE** mode - the **MAIN OUTPUT** delay switches are instead used to select the length of the reversed segments.

#### **ALGORITHM SELECT**

The H949 allows you to select one of two pitch change algorithms in order to support optimal pitch change with a variety of source material. In general, Algorithm 2 is glitch free, but will add varying degrees of coloration to the signal, and is more suitable for extreme pitch ratios. Algorithm 1 may cause glitches with increasing frequency as the pitch ratio deviates from 1:1, and is generally more appropriate for smaller pitch ratios. We recommend experimentation to determine which algorithm is most appropriate for any given program material and pitch ratio. The two algorithms converge in audible effect as pitch ratios approach an octave in either direction, and both will perform identically at these extremes.

#### **MAIN OUTPUT**

Controls the delay time of the **MAIN OUTPUT**. The locking push-buttons can be activated in any combination. Delay times are selected in 6.25 ms increments to a maximum of 393.75 ms (6.25 + 12.5 + 25 + 50 + 100 + 200).

#### **POWER**

When the **POWER** button is **IN** the unit is powered up and operational, when it is **OUT** the unit is powered off and the plug-in bypasses.

## Expansion Panel Controls



- DELAY LEVEL** This parameter controls the level of the DELAY ONLY OUTPUT from the H949 unit.
- MIX LEVEL** This parameter sets the overall balance of wet signal to dry signal.
- MAIN LEVEL** This parameter controls the level of the MAIN OUTPUT (pitch shifted output) from the H949 unit.

## 2.2 H949 Dual Harmonizer® Controls

The H949 Harmonizer® plug-in comes bundled with the H949 Dual Harmonizer® plug-in, which recreates two H949 units running in parallel, an application that was frequently used in the hardware version to create doubling effects. Of course, you can also use the H949 Dual to create a wide variety of other interesting sounds. The H949 Dual includes two Main Panels (as described above), and an Expansion Panel with several additional controls.

### Expansion Panel Controls



#### STEREO FEEDBACK

The three buttons in this group allow you to control the feedback routing between the two H949 units. In MONO mode, the output from a single unit only feeds back into that unit. In STEREO mode, the output from the top unit feeds back into the bottom unit, and vice versa. In BOTH mode, the output of each unit feeds back into both itself and the other unit. An interesting application of these modes is when using feedback combined with pitch shifting: based on the Pitch Ratios of the bottom and top units, can cause the incoming signal to shift up/down continuously, shift up and then down continuously, or shift away from a Pitch Ratio of 1 in both directions.

#### STEREO LINK

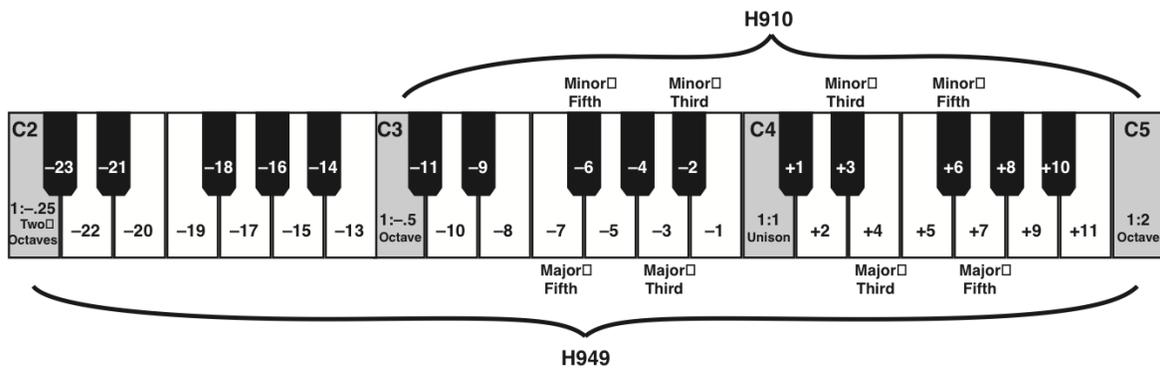
The three buttons in this group allow you to more easily control the plug-in, by linking corresponding controls in the bottom and top units. In MONO mode, all controls can be set independently. In LINK mode, changing a control on one unit will cause the corresponding control on the other unit to follow that change. REVERSE LINK mode behaves much like LINK mode, but changing the Pitch Ratio on one unit will cause the other unit's Pitch Ratio to move in the opposite direction. This is especially useful for creating stereo detuned and doubling effects.

Note that the POWER and LINE are always linked, regardless of the STEREO LINK setting.

<b>STEREO WIDTH</b>	Allows you to control how “wide” the output of the plug-in is, from mono to full stereo.
<b>DELAY LEVEL</b>	This parameter controls the level of the DELAY ONLY OUTPUT from the H949 units.
<b>MIX LEVEL</b>	This parameter sets the overall balance of wet signal to dry signal.
<b>MAIN LEVEL</b>	This parameter controls the level of the MAIN OUTPUT (pitch shifted output) from the H949 units.

## 3.1 Playing the Harmonizers with a MIDI Keyboard

A MIDI keyboard set to send MIDI on the H949's MIDI Channel can be used to control the pitch ratio in discrete musical steps. Middle C on the keyboard will set Unison on the Harmonizers; 1.000 on the display. Playing the E above Middle C will produce a harmony of a Major 3rd. Playing the E-Flat above Middle C will produce a Minor 3rd and so on. Refer to the graphic below and the chart on the following page.



The Harmonizers respond to MIDI Note On and Pitch Bend messages. The bend range covers two octaves, from 0.500 to 2.000. The MIDI response for all plug-ins is OMNI, i.e. messages received on \*any\* of the 16 channels will be accepted.

Figure 3.1: Pitch Ratio Readouts for Various Musical Relationships

<b>-3/4</b>	<b>-1/2</b>	<b>-1/4</b>	<b>Note</b>	<b>Relationship</b>		<b>Note</b>	<b>+1/4</b>	<b>+1/2</b>	<b>+3/4</b>
.958	.972	.986	1.000	Unison		1.000	1.015	1.029	1.044
.904	.917	.930	.944	-1	+1	1.060	1.075	1.091	1.106
.853	.866	.878	.891	-2	+2	1.123	1.139	1.155	1.172
.805	.817	.829	.841	-3	+3	1.189	1.207	1.224	1.242
.760	.771	.782	.794	-4	+4	1.260	1.278	1.297	1.316
.717	.728	.738	.749	-5	+5	1.335	1.354	1.374	1.394
.677	.687	.697	.707	-6	+6	1.414	1.435	1.456	1.477
.639	.648	.658	.667	-7	+7	1.498	1.520	1.542	1.565
.603	.612	.620	.630	-8	+8	1.587	1.611	1.634	1.658
.569	.578	.586	.595	-9	+9	1.681	1.706	1.731	1.756
.537	.545	.553	.561	-10	+10	1.781	1.808	1.834	1.861
.507	.515	.522	.530	-11	+11	1.888	1.915	1.943	1.971
.479	.486	.493	.500	Octave		2.000			
.452	.459	.465	.472	-13		<p style="text-align: center;"><b>NOTE</b></p> <p>The lowest octave is only available with the H949.</p> <p>For use with the H910, round each figure to 2 decimal places.</p>			
.427	.433	.439	.446	-14					
.403	.407	.414	.420	-15					
.380	.381	.391	.397	-16					
.359	.364	.369	.375	-17					
.339	.344	.349	.354	-18					
.320	.324	.329	.334	-19					
.302	.306	.310	.315	-20					
.285	.289	.293	.297	-21					
.269	.273	.277	.281	-22					
.254	.257	.261	.265	-23					
			.250	Two Octaves					

## 3.2 Preset Bar

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Located at the top of the H949 Harmonizer® Plug-In, the Preset Bar lets you load and save presets, along with several other features.

When H949 Harmonizer® is installed, a library of settings is placed into the <user>/Music/Eventide/H949 Harmonizer/Presets folder (Mac) or the <user>/Documents/Eventide/H949 Harmonizer/Presets folder (Windows). These presets have a .tide extension and can be saved or loaded from the H949 Harmonizer® preset bar in any supported DAW.

In many DAWs there is an additional generic preset bar that saves DAW-specific presets to a separate location. We recommend saving your presets using the Eventide preset bar to ensure that your presets will be accessible from any DAW. You can also create sub-folders inside the preset folders, if you wish.

<b>LOAD/SAVE</b>	Use these buttons to load and save your presets in .tide format.
<b>COMPARE</b>	Click to toggle between two different settings for the plug-in. This is useful for making A/B comparisons.
<b>MIX LOCK</b>	Pressing this will enable a global mix value that will be the same on every preset that is loaded. This is especially useful on an effect return track where the mix should always be set to 100.
<b>INFO</b>	Click this button to open this manual.
<b>SETTINGS</b>	Opens a drop-down menu with various user interface settings. <ul style="list-style-type: none"><li>• <b>Scaling</b> – Sets the overall size of the plugin.</li><li>• <b>Always Show Values</b> – Sets knob values to be displayed at all times. This setting will apply to all instances of the plugin.</li></ul>

We hope you enjoy the H949 Harmonizer® plug-in and put it to good use in all of your mixes. Please be sure to check out Eventide's other native plug-in offerings for more unique and interesting effects.