

# Waves PuigChild

## User Manual



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# Chapter 1 – Introduction

## 1.1 Welcome

Thank you for choosing Waves! In order to get the most out of your new Waves plugin, please take a moment to read this user guide.

To install software and manage your licenses, you need to have a free Waves account. Sign up at [www.waves.com](http://www.waves.com). With a Waves account you can keep track of your products, renew your Waves Update Plan, participate in bonus programs, and keep up to date with important information.

We suggest that you become familiar with the Waves Support pages: [www.waves.com/support](http://www.waves.com/support). There are technical articles about installation, troubleshooting, specifications, and more. Plus, you'll find company contact information and Waves Support news.

## 1.2 Product Overview



### About the Fairchild 670

Among gear aficionados, the stereo Fairchild 670 is considered the most coveted of all compressors, not only because of its pristine sound, but also its rarity and price: 670s routinely go for tens of thousands of dollars on the vintage market. (They originally cost less than \$1000.) With 20 vacuum tubes and 11 hand-wired transformers in a hefty 6 rack-space chassis, these hard-to-find units weigh in at a robust 65 lbs.

Designed by Estonian-born Rein Narma in the early 1950s, both the stereo 670 and its mono counterpart the Fairchild 660 use single push-pull amplification stages with extremely high control voltages. Both variable-mu limiters are unique in that they use tubes for gain reduction as well as amplification. Compression takes place directly in the audio path, rather than being routed to a separate circuit.

Prior to the 660 and 670, Narma's Gotham Audio Developments had built consoles and components for such luminaries as Rudy Van Gelder and Les Paul. Shortly after Paul asked Narma to build a limiter, Sherman Fairchild caught wind of the project, licensed the design, and hired Narma to come onboard as the company's chief engineer. After his stint at Fairchild, Narma relocated to the San Francisco Bay Area and became vice president of Ampex, pioneers of multitrack recording equipment.

## 1.3 About the Modeling

Many different elements contribute to the unique sonic characteristics of analog gear such as the Fairchild 670. Waves painstakingly modeled and incorporated these elements into the PuigChild in order to fully capture and replicate the sound and performance of the original equipment.

These are some of the most important elements of analog behavior:

- **Total Harmonic Distortion**

Perhaps the most important analog behavior is Total Harmonic Distortion or THD, which is defined as the ratio of the sum of the powers of all harmonic components to the power of the fundamental frequency. THD is usually caused by amplification, and changes signal shape and content by adding odd and even harmonics of the fundamental frequencies, which can change the overall tonal balance. THD can also change peak output gain, usually by no more than +/- 0.2-0.3 dB.

- **Transformers**

Some hardware uses transformers to stabilize or change Input/Output loads and signal levels. In earlier days, transformers did not have a flat frequency response, and often introduced low and super-high frequency roll offs. The original Fairchild has four transformers, so if you encounter a low or extremely high frequency loss, this is due to the modeled transformers.

- **Long Release Times**

The Fairchild includes settings which use long time constants of several seconds. This might cause short looped passages to sound different during successive playbacks, because the Release never returns to unity. This is identical to the original hardware performance, and should not be a cause for concern.

- **Hum**

Waves modeled both 50Hz power current and 60Hz power current. If you listen closely, you will hear that there is a difference in hum level between 50Hz and 60Hz. Since hum is unique to each region and dependent upon the local electrical conditions, you may find that the modeled hum is different than the hum already present in your studio, and may not be suitable for your particular use.

## 1.4 Components

WaveShell technology enables us to split Waves processors into smaller plug-ins, which we call **components**. Having a choice of components for a particular processor gives you the flexibility to choose the configuration best suited to your material.

The PuigChild has two component processors:

**PuigChild 670 Stereo** – Two channel compressor, with two separate sets of detectors and compression paths.

**PuigChild 660 Mono** – One channel compressor, based on the left channel of the 670.

## 1.5 WaveSystem Toolbar

Use the bar at the top of the plugin to save and load presets, compare settings, undo and redo steps, and resize the plugin. To learn more, click the icon at the upper-right corner of the window and open the WaveSystem Guide.

## Chapter 2 – Quickstart Guide



The PuigChild offers a wide variety of musical colors using just a few simple controls.

- Use the Input controls to set the amount of signal running into the compressor.
- Use the Threshold controls to set the amount of signal compression.
- Use the gain reduction Meter to monitor the amount of gain reduction applied to the signal.
- Use the Time Constants controls to set the fixed Attack and Release settings.
- Use Output to adjust the output (makeup) gain of the signal.



## Chapter 3 – Interface and Controls

### 3.1 PuigChild Interface





## 3.2 PuigChild Controls

**Input** controls the volume of the signal entering the audio compression path.

**Range**

-20 to 0

**Resolution**

1dB steps

**Default**

-14 (unity gain, input = output).

**Threshold** sets the amount of signal compression.

**Range**

0 to 10

**Resolution**

0.1 steps

**Default**

0 (no compression)

Please note:

The scale is not linear and has been adjusted to conform to the exact scaling of the modeled unit. Thus, there may be more compression than expected at certain steps, as with analog gear.

**Time Constant** controls the fixed Attack and Release lengths.

**Range**

1 to 6

**Resolution**

1, 2, 3, 4, 5, 6.

**Default**

1

The following values are based on the original values, as publicized by Fairchild. Our measurements, however, differed considerably from the values given. Therefore, we suggest using these values as a rough guide, based on 10dB of compression.

**Position 1**

Attack: .2 ms

Release: 0.3 seconds

**Position 2**

Attack: .2 ms

Release: 0.8 seconds

**Position 3**

Attack: .4 ms

Release: 2 seconds

**Position 4**

Attack: .4 ms

Release: 5 seconds

**Position 5**

Attack: .4 ms

Release: Automatic based on program material—2 seconds for individual peaks, 10 seconds for multiple peaks

**Position 6**

Attack: .2 ms

Release: Automatic based on program material—0.8 seconds for individual peaks, 10 seconds for multiple peaks, 25 seconds for consistent high program level

**Link** controls the relationship between the left (upper) channel and the right (lower) channel.

**States**

Left/Right, Linked, Lateral/Vertical

**Default**

Linked

**Left/Right:** The compressor acts as two completely separate compressors, with the option to separately adjust all controls per channel. This mode can significantly change the stereo image of a stereo signal.

**Link:** Both channels are linked to one another. Upper channel controls both channels, while lower channel settings are grayed out. The compression detector will calculate the maximum level of the two channels combined, and compress both channels according to the maximum level. This mode better preserves the stereo image of a signal.

**Lateral/Vertical:** Feeds the stereo signal through a sum/difference matrix which splits the stereo signal into sum (fed to the upper/left channel) and difference (fed to the lower/right channel). The input level is set after the matrix, so the relationship between the sum and the difference channels can be controlled. At the compressor output, the signal passes through a second matrix which turns it back into a Left/Right stereo signal. (Output gain occurs before the second matrix).

**Mains** controls analog characteristics caused by noise floor and hum, based on the power supplies of the original units.

**Range**

Off, 50Hz, 60Hz

**Default**

60Hz

**On/Off** turns the compression On/Off but leaves Analog modeling.

**Range**

On/Off

**Default**

On

**Output** controls the output level.

**Range**

-18dB to +18dB (in 0.1dB steps)

**Default**

0dB

**Meters** display gain reduction, from 0 to 20dB of gain reduction.



## Appendix A – PuigChild Controls

Control	Range	Default
Input Gain	-20 to 0	-14
Threshold	0 to 10 (0.1 steps)	0
Time Constant	1, 2, 3, 4, 5, 6	1
On/Off	On, Off	On
Mains	Off, 50Hz, 60Hz	60Hz
Link	Left/Right, Linked, Lat/Ver	Linked
Output	-18dB to 18dB (0.1 steps)	0dB