Waves PuigChild

User Manual
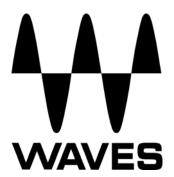
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Chapter 1 – Introduction

1.1 Welcome

Thank you for choosing Waves! In order to get the most out of your Waves processor, please take the time to read through this manual.

In conjunction, we also suggest that you become familiar with www.wavesupport.net. There you will find an extensive **Answer Base**, the latest **Tech Specs**, detailed **Installation** guides, new **Software Updates**, and current information on **Authorization** and **Registration**.

By signing up at www.wavesupport.net, you will receive personalized information on your registered products, reminders when updates are available, and information on your authorization status.

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.

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 to10
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.

Chapter 4 – The WaveSystem

4.1 The WaveSystem Toolbar

All Waves processors feature the WaveSystem toolbar which takes care of most administrative functions you will encounter while working with your Waves software. The features of the WaveSystem toolbar are the same on practically all Waves processors, so familiarity with its features will be helpful whichever processor you are using.

Toolbar Functions

Undo	Undoes the last 32 performed action. The PuigTec supports multiple undo levels.
Redo	Redoes the last 32 undone action
Setup A/B	Toggles between two presets. This is useful for close comparison of different parameter settings
Copy A->B	Copies the current settings to the second preset register
Load	Recalls presets from file
Save	Saves presets in the Waves file formats
?	Opens the manual for the processor you are using

4.2 Preset Handling

Preset Types

Factory Presets are permanent presets in the Load menu. Factory presets cannot be over-written or deleted. When applicable, different component plug-ins may have different factory presets.

User Presets are your favorite settings of the plug-in saved as a preset in the Load menu, under 'User Presets'. User Presets can be over-written and deleted.

Setup Files may contain more than one preset. For example, a single file can contain all the presets for a session. When you open a Setup File, all its setups become part of your Load pop-up menu for fast access. This can be particularly useful with multiple instances of a plug-in in a single session. By saving all the settings you create into a single Setup File, they can all be quickly available for every instance of that plug-in.

Loading Presets and Setups

`Load`

Click-and-hold on the Load button to see the Load pop-up menu. The menu is divided into four sections. If a section is not currently available it will not appear in the Load pop-up menu.

Open Preset File…   Select to open any setup or preset file, whether from the Library or your own creations.
'Filename.xps':   Displays any currently loaded Setup File and its presets.
Factory Presets: Displays the default Factory Presets.
User Presets: Displays any loaded User Presets.

Saving Presets and Setups

`Save`

Click-and-hold on the Save button to see the Save pop-up menu. Four options are available. If an option is not currently available it will be grayed out and inaccessible.

Save to New File…   Select this to start a new Setup file. There are two prompts - first for the setup filename, then for the preset name. You must provide a name for both the setup file and the preset. Click OK (ENTER) to complete the save. It is a good idea to create a folder in which to save several setup files for a project.
Save 'File Name' – "Preset Name"   Overwrites the settings of the loaded preset (whether a User Preset or a preset from a Setup File) with the current settings. If a Setup File is currently loaded, the name of the Setup File is displayed followed by the name of the preset itself. If a User Preset is loaded, its name is displayed.
Save to 'File Name' As…   Saves the current settings as a new preset into the Setup file that is open (if one is not open, the option is grayed out). You will be prompted to give the preset a name.
Put into Preset Menu As…   Save the current settings into a User Preset that will always be in your Load menu (until deleted). You will be prompted to give this preset a name. User Presets are stored in the plug-in's preference file.

Deleting Presets

You may delete User Presets and presets within a Setup File. Factory Presets and Setup Library files cannot be deleted or overwritten.

1. Hold the Command (Mac)/Control (PC) key down.
2. Click-and-hold the Load button to see the pop-up menu.
3. While still holding the Command/Control key, select the preset or setup to delete.
4. A confirmation box will appear, allowing you to cancel or 'OK' the deletion.

A/B Comparison and Copying

The Setup A/Setup B button may be clicked to compare two settings. If you load a preset in the Setup B position, this will not affect the preset loaded into the Setup A position, and vice-versa.

If you want to slightly modify the settings in Setup A, you can copy them to Setup B by clicking on the Copy to B button, then alter Setup A and compare with the original Setup B.

The name of the current setup will be shown in the title bar (on platforms which support it), and will switch as you change from Setup A to Setup B.

Note: an asterisk will be added to the preset name when a change is made to the preset -

4.3 Interface Controls

Controls can be in one of three states:

- **Not Selected** where the control is not the target of any user entry
- **Selected** where the control is the target of mouse control entry only
- **Selected and Active** where the control is the target for both mouse and keyboard entry

Toggle Buttons

Toggle buttons display the state of a control, and allow switching between two or more states. **Single-click** to change the control's state. Some toggle buttons have a text display which updates with the current setting, and others (bypass, solo, or monitoring toggles) illuminate when the control is active.

Some processors have **link buttons** between a pair of toggle buttons, allowing click-and-drag adjustment while retaining the offset between the controls.

Value Window Buttons

Value windows display the value of a control and allow **click-and-drag** adjustment, or **direct control via the keyboard**.

- **Using the mouse**, click-and-drag on the value window to adjust. Some value windows support left/right, some up/down (as you hover over a button, arrows will appear to let you know which direction of movement that button supports).
- **Using the arrow keys**, click once with mouse to select the button, and then use up/down – left/right (depending on the direction supported by that button) to move in the smallest incremental steps across the button's range (holding down the arrow keys will move faster through the range).
- **Using key entry**, double click on the button to open the value window, and directly enter the value from your keyboard. If you enter an out of range number, the button stays selected but remains at the current setting (system beeps? If system sounds are on?)

Some processors have **link buttons** between a pair of value windows, allowing click-and-drag adjustment while retaining the offset between the controls.

Sliders

Click on the slider itself or anywhere within the sliders track. The numerical value of the slider settings is displayed in a hover window above the slider path.

Hover Box

Hovering boxes will appear and display the control value when hovering with the mouse over the control.

Multiple Selection of Controls

One of the most powerful features of the WaveSystem is the ability to select and adjust many controls at the same time. Using the mouse, simply drag-select the desired group of button or graphic controls by clicking and holding at a point outside the controls and forming a rectangle to include the controls you wish to adjust. Alternatively, you can hold down Shift while clicking the mouse on any control you wish to link. This second method is useful when you want to select two (or more) controls that are separated on the GUI by other controls you do not wish to select.

TAB Functions

TAB moves the 'selected' status to the next control, with shift-TAB moving in the reverse direction.

Additionally, the Mac has an option-TAB function for 'down' movement and shift-option-TAB for 'up' movement where applicable.

If you have several Value Window Buttons selected, TAB functions will take you through the selected controls only.

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