

914 Fixed Filter Bank User's Guide

Audio Damage, Inc.
Release 1.0



The information in this document is subject to change without notice and does not represent a commitment on the part of Audio Damage, Inc. The software described by this document is subject to a License Agreement and may not be copied to other media except as specifically allowed in the License Agreement. No part of this publication may be copied, reproduced or otherwise transmitted or recorded, for any purpose, without prior written permission by Audio Damage, Inc.

© 2006 Audio Damage, Inc.

All rights reserved.

Credits

Software Design and Construction, Documentation

Chris Randall
Adam Schabtach

Field Testing

Mike Fisher
Steve Hamman
Don Mennerich
Robert Rich
Henry Stamerjohann

Made Possible By

Tracie Bork
Lisa Randall

Fuzzy Logic

Alex
Chica
Fatty
Pablo
Penny
Widget

License Agreement

BY INSTALLING THE SOFTWARE, YOU ARE CONSENTING TO BE BOUND BY THIS AGREEMENT. IF YOU DO NOT AGREE TO ALL OF THE TERMS OF THIS AGREEMENT, THEN RETURN THE PRODUCT TO THE PLACE OF PURCHASE FOR A FULL REFUND.

Single User License Grant: Audio Damage, Inc. ("Audio Damage") and its suppliers grant to Customer ("Customer") a nonexclusive and nontransferable license to use the Audio Damage software ("Software") in object code form solely on a single central processing unit owned or leased by Customer.

Customer may make one (1) archival copy of the Software provided Customer affixes to such copy all copyright, confidentiality, and proprietary notices that appear on the original.

EXCEPT AS EXPRESSLY AUTHORIZED ABOVE, CUSTOMER SHALL NOT: COPY, IN WHOLE OR IN PART, SOFTWARE OR DOCUMENTATION; MODIFY THE SOFTWARE; REVERSE COMPILATE OR REVERSE ASSEMBLE ALL OR ANY PORTION OF THE SOFTWARE; OR RENT, LEASE, DISTRIBUTE, SELL, OR CREATE DERIVATIVE WORKS OF THE SOFTWARE.

Customer agrees that aspects of the licensed materials, including the specific design and structure of individual programs, constitute trade secrets and/or copyrighted material of Audio Damage. Customer agrees not to disclose, provide, or otherwise make available such trade secrets or copyrighted material in any form to any third party without the prior written consent of Audio Damage. Customer agrees to implement reasonable security measures to protect such trade secrets and copyrighted material. Title to Software and documentation shall remain solely with Audio Damage.

LIMITED WARRANTY. Audio Damage warrants that for a period of ninety (90) days from the date of shipment from Audio Damage: (i) the media on which the Software is furnished will be free of defects in materials and workmanship under normal use; and (ii) the Software substantially conforms to its published specifications. Except for the foregoing, the Software is provided AS IS. This limited warranty extends only to Customer as the original licensee. Customer's exclusive remedy and the entire liability of Audio Damage and its suppliers under this limited warranty will be, at Audio Damage or its service center's option, repair, replacement, or refund of the Software if reported (or, upon request, returned) to the party supplying the Software to Customer. In no event does Audio Damage warrant that the Software is error free or that Customer will be able to operate the Software without problems or interruptions.

This warranty does not apply if the software (a) has been altered, except by Audio Damage, (b) has not been installed, operated, repaired, or maintained in accordance with instructions supplied by Audio Damage, (c) has

been subjected to abnormal physical or electrical stress, misuse, negligence, or accident, or (d) is used in ultrahazardous activities.

DISCLAIMER. EXCEPT AS SPECIFIED IN THIS WARRANTY, ALL EXPRESS OR IMPLIED CONDITIONS, REPRESENTATIONS, AND WARRANTIES INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, NONINFRINGEMENT OR ARISING FROM A COURSE OF DEALING, USAGE, OR TRADE PRACTICE, ARE HEREBY EXCLUDED TO THE EXTENT ALLOWED BY APPLICABLE LAW.

IN NO EVENT WILL AUDIO DAMAGE OR ITS SUPPLIERS BE LIABLE FOR ANY LOST REVENUE, PROFIT, OR DATA, OR FOR SPECIAL, INDIRECT, CONSEQUENTIAL, INCIDENTAL, OR PUNITIVE DAMAGES HOWEVER CAUSED AND REGARDLESS OF THE THEORY OF LIABILITY ARISING OUT OF THE USE OF OR INABILITY TO USE THE SOFTWARE EVEN IF AUDIO DAMAGE OR ITS SUPPLIERS HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. In no event shall Audio Damage's or its suppliers' liability to Customer, whether in contract, tort (including negligence), or otherwise, exceed the price paid by Customer. The foregoing limitations shall apply even if the above-stated warranty fails of its essential purpose. SOME STATES DO NOT ALLOW LIMITATION OR EXCLUSION OF LIABILITY FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES.

The above warranty DOES NOT apply to any beta software, any software made available for testing or demonstration purposes, any temporary software modules or any software for which Audio Damage does not receive a license fee. All such software products are provided AS IS without any warranty whatsoever.

This License is effective until terminated. Customer may terminate this License at any time by destroying all copies of Software including any documentation. This License will terminate immediately without notice from Audio Damage if Customer fails to comply with any provision of this License. Upon termination, Customer must destroy all copies of Software.

Software, including technical data, is subject to U.S. export control laws, including the U.S. Export Administration Act and its associated regulations, and may be subject to export or import regulations in other countries. Customer agrees to comply strictly with all such regulations and acknowledges that it has the responsibility to obtain licenses to export, re-export, or import Software.

This License shall be governed by and construed in accordance with the laws of the State of Illinois, United States of America, as if performed wholly within the state and without giving effect to the principles of conflict of law. If any portion hereof is found to be void or unenforceable, the remaining provisions of this License shall remain in full force and effect. This License constitutes the entire License between the parties with respect to the use of the Software.

Introduction

Thank you for purchasing the 914 Fixed Filter Bank (hereafter referred to simply as “914”), Audio Damage’s plug-in emulation of the Moog 914 Fixed Filter Bank module. This plug-in creates a variety of tonal effects by passing its input signal through twelve band-pass filters, one low-pass filter and one high-pass filter. The relative output levels of these filters can be adjusted independently, creating peaks and dips in the frequency spectrum of the signal. Quoting from the owner’s manual for the Moog Modular:

“The Fixed Filter Bank is often referred to as a formant filter because it can be set to emphasize or attenuate midrange frequencies which fall within a particular band, no matter how the frequencies of the signal are moved. Like many acoustic instruments, a characteristic set of formants are always a part of the resultant output (given a particular complex waveform).”

Moog Modular Owner’s Manual, by Dan Wyman. Moog Music, Inc. 1981

Our 914 plug-in is a faithful recreation of the Moog hardware filter bank, accurately reproducing both the frequency responses and phase-shift characteristics of its filters. Of course, it also provides all of the modern conveniences of a software plug-in, such as a true stereo signal path, zero background noise, preset storage and recall, parameter automation, remote MIDI control, and as many instances as your CPU can handle.

Because of the tolerance ranges of the components used to manufacture the original Moog synthesizers, there is quite a bit of tonal variation between modules of the same type such as the 914. The degradation of some components (capacitors in particular) over time also contributes to changes in performance. Our software recreation represents an idealized instance of the original hardware in its factory-new condition.

To avoid possible confusion, a couple of things are worth mentioning explicitly. First, despite the presence of a bunch of knobs marked with frequencies, the 914 is *not* an equalizer. If the term equalizer was coined to describe devices which amplify or attenuate ranges of frequencies to even out (that is, equalize) the overall frequency content of a signal, the 914 might accurately be described as an unequalizer. Second, the 914 had a completely different filter architecture and implementation than the filter found in the Minimooog, and hence does not possess “that Moog filter sound”.

System Requirements

To use 914, you'll need a Steinberg VST-compatible host application, preferably conforming to the VST 2.0 specifications, and a computer capable of running it. For the AudioUnit version of 914, you'll need an application capable of hosting AudioUnit plug-ins, and a computer capable of running it. The following specifications represent minimum requirements.

For use with Microsoft Windows:

- Windows NT, 2000, or XP
- 512 MB RAM
- Pentium III 600 MHz CPU
- High Color S-VGA Display

For use with Apple Macintosh:

- Mac OS X version 10.3.9 or newer
- 512 MB RAM
- Motorola G4 or Intel CPU
- Display capable of "thousands of colors"

Installation

Double-click the 914 Installer icon, and follow the instructions. During the installation process the installer will ask you to enter your registration code. You received this code in the email message you received after placing your order. Your registration code uniquely identifies your purchase, and you will need it if you need to reinstall your plug-in (for example, after upgrading to a new computer). Keep a copy of the code in a safe location and please don't share it with your friends. We're delighted if you like our products so much that you want to share them, but please ask your friends to buy their own copy so that we can keep making new products.

To un-install from OS X, simply delete the plug-in from your VST folder, which is usually located at `/Library/Audio/Plug-Ins/VST/`, and your AudioUnits folder, which is located at `/Library/Audio/Plug-Ins/Components/`. To un-install from Windows, use the included un-installer application.

Operation

Like its hardware predecessor, the 914 plug-in is simple to operate. There are no mysterious modulators, no critical level-dependent settings, no hidden windows or menus. Just turn the knobs until you like the way it sounds. Simple, eh? If you'd like a more detailed explanation of what it does, read on.

We assume that you are familiar with using plug-ins with your particular host. If you have general questions about using VST or AudioUnit plug-ins with your host, please refer to its documentation. 914 is a true stereo processor that can process either mono or stereo signals, and can be used as an insert effect or on an effects-send channel in your host's mixer. If used in a stereo context (for example, as an insert on a stereo channel in your DAW's mixer), the left and right channels are processed independently with no summing.

The 914 contains fourteen filters: twelve band-pass filters, a low-pass filter, and a high-pass filter. These names refer to how the filter blocks signals of some frequencies and passes signals of other frequencies. A band-pass filter permits only a range (or band) of frequencies to pass through, blocking frequencies above and below its center frequency. A low-pass filter passes signals below its corner frequencies and blocks higher-frequency signals. A high-pass filter does the opposite: it passes signals above its corner frequency and blocks lower-frequency signals.

The filters in 914 operate in parallel; that is, the input signal is fed to all of the filters simultaneously, and their outputs are mixed together. Each filter has a knob which attenuates its output, controlling the amount of its signal that is present in the plug-in's output. The original 914 had passive filters; they only removed frequencies from the input signal, not boosted them.

The Controls

1. The **LOW PASS** knob controls the level of the output of the low-pass filter. The low-pass filter's corner frequency is 80Hz, so this knob controls the loudness of all signal content with a frequency of 200Hz or below.
2. The group of knobs in the middle of the panel controls the levels of the outputs of the band-



pass filters. Each knob is labeled with the center frequency of its filter. The frequencies are 125, 175, 250, 350, 500, 700, 1000, 1400, 2000, 2800, 4000, and 5600Hz. Each knob controls the loudness of signal content with frequencies near these center frequencies.

3. The **HIGH PASS** knob controls the level of the output of the high-pass filter. The high-pass filter's corner frequency is 8000Hz, so this knob controls the loudness of all signal content with a frequency of 3800Hz or above.

The filter-level knobs in our software recreation of the 914 behave in the same manner as the original. If you rotate a knob fully clockwise, the output of the corresponding filter is passed to the plug-in's output without attenuation. As you rotate the knob counter-clockwise, the level of the filter's output is reduced. If you rotate the knob fully counter-clockwise, the filter's output is attenuated by 64dB, which nearly silences the filter.*

The following controls are not present in the original Moog hardware. We added them to our software version partly in response to comments made by users of our first filter-bank plug-in, the 907A, and to make this plug-in more versatile:

4. The **BANDWIDTH** knob varies the shape of the band-pass filters. When the knob is rotated fully counter-clockwise, the band-pass filters have a broad response shape, gently attenuating frequencies on either side of the center frequency indicated by the knob's label. As you rotate this knob clockwise, the filters become narrower and more sharply reduce frequencies away from the center frequency. The result is that the filters have more drastic and audible effects as you rotate the knob clockwise. This also reduces the overall output signal level of the filters, which you can compensate for by turning up the wet level knob.
5. The **WET LEVEL** knob controls the loudness of the filtered output signal of the plug-in. If the knob is rotated fully counter-clockwise, the signal is attenuated by 80dB, which makes the filtered signal inaudible. As you rotate the knob clockwise, the filtered signal becomes louder. Rotating the knob fully clockwise boosts the filtered signal by +15dB, which compensates for the attenuation of the filters. Note that this means you can potentially overload your host's mixer (or whatever the output of the plug-in is connected to). If you hear crackling or other distortion when you use this plug-in, try turning this knob counter-clockwise.

* In case you're wondering, we didn't just pull -64dB out of the air. -64dB is the rated signal bleed-through amount of the original hardware.

6. The **DRY LEVEL** knob controls the amount of the original, unfiltered input signal that is present in the output of the plug-in. If the knob is rotated fully counter-clockwise, the signal is attenuated by 80dB, which makes the original signal inaudible. As you rotate the knob clockwise, more and more of the unfiltered input signal is mixed into the output signal. If the knob is rotated fully clockwise, the input signal is passed to the output without any reduction.

During your initial experimentation with this plug-in you will find it useful to use an input signal with wide frequency content, such as a buzzy synthesizer pad. For example, if you turn all of the knobs fully counterclockwise, then turn up the knob labeled **1000**, you will hear only signals with frequency content at or around 1000Hz. If your input signal doesn't have any frequency content near 1000Hz, you won't hear anything at all.

MIDI Controllers

The VST version of 914 responds to MIDI continuous controller messages. You can use hardware MIDI controllers, such as MIDI slider boxes or the knobs found on some MIDI keyboards, to adjust 914's parameters.

The VST version of 914 has a simple "MIDI Learn" mode for assigning its knobs to MIDI controllers. To assign a knob to a MIDI controller:

1. Hold down the **SHIFT** and **CTRL** keys on your PC's keyboard, or **SHIFT** and **CMD** keys if you're using a Mac, and click once on the knob. A white box will be drawn around the control to indicate that it is ready to learn which MIDI controller it will be assigned to.
2. Move the MIDI controller to send a continuous controller message—turn the knob, press the button, move the slider, whatever is appropriate.
3. The white square will disappear. Now the 914's knob will move when you manipulate the MIDI controller.

914 waits until it has received two consecutive continuous controller messages with the same controller number before it makes an assignment. This filters out extraneous data sent by some MIDI controllers. If you are assigning a button or switch on a MIDI controller, you may have to press or move the switch twice before 914 recognizes the controller and assigns it to the desired knob.

- To assign a different MIDI controller to a control, repeat the same procedure using a different controller.
- To cancel MIDI Learn mode without assigning a controller, hold down the SHIFT and CTRL keys (SHIFT and CMD keys on a Mac) and click in any empty area in 914's window (i.e., don't click on another control). The white box will disappear.
- To remove a MIDI controller assignment from a control, SHIFT and CTRL keys, (SHIFT and CMD keys on a Mac) click on the control once so that the white box appears, then click again on the same control.

914's MIDI controller assignments are stored with the plug-in's preset data. If you use MIDI controllers frequently, you may find it helpful to store a template preset that contains the controller assignments that you usually use. Use this template preset as a starting point when making new presets so that you do not have to reassign the MIDI controllers every time.

The AudioUnit version does not provide the same MIDI assignment features as the VST version. Almost all AudioUnit hosts provide their own mechanism for assigning MIDI controllers to parameters, so it would be redundant to implement MIDI controller assignments in the plug-in itself. Consult the documentation for your AudioUnit host to learn how to use its MIDI features.

And Finally...

Thanks again for purchasing 914. We make every effort to ensure your satisfaction with our products, and want you to be happy with your purchase. Please write support@audiodamage.com if you have any questions or comments.