Kombinat User's Guide
Audio Damage, Inc.
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Introduction

Thank you for purchasing Kombinat, Audio Damage's multi-destruction toolbox. Kombinat is named with the Russian term for a conglomeration, as it is not a single effect, but rather a group of effects that work towards a defined end. This plug-in includes an Isolator (otherwise known as a DJ EQ or "band killer"), three distortion engines, a lowpass filter, and a compressor. Each effect can be used individually, but they combine to give Kombinat a distinct sound, not entirely unlike accidentally dropping a piece of sheet metal into a paper shredder.

Before going in to the individual controls in detail, here is a brief synopsis of how Kombinat works in a general sense, and how to get the best results from it. Kombinat comes with sixty-four presets, and these are grouped in two ways. The first half are general examples, both of multi-mode and series mode. (The series mode presets all begin with "Series" in the name.) The second half are grouped in to general categories that we found mostly worked, for vocals, synths, bass, and guitar. It is worth remembering that Kombinat is extremely input-dependent, and these presets are not meant to describe how the plug-in should be used in any particular context; rather, they are merely starting ideas.

How Kombinat works on any given signal is dependent on several factors; these include, in no particular order, how hot the input signal is and how much of the frequency spectrum it occupies, how much gain the input knob is sending to the various effects, how much gain the Isolator bands are adding or removing, and how hard the compressor is working. You'll find that the sound of the unit can be drastically changed on almost any preset merely by changing the setting of the input knob, and we recommend some experimentation in this regard. All the gain knobs will boost the signal’s loudness, up to 7dB per knob, so it is possible to heavily overload the individual distortion engines, the filter, and the compressor.

Finally, you should remember that at high levels of gain, Kombinat is somewhat unpredictable. This is by design; the filter can be overdriven to the point of breaking up, the individual distortion engines can be overdriven in to strange territory, and the compressor can be overloaded to the point where it is also a distortion engine.

All of these factors come in to play to create a plug-in that is essentially unique in every context. Unlike a traditional filter or EQ, which will generally only remove things from your sound, or a traditional distortion-based effect, which will generally only color what already exists, Kombinat can (and will) add its own personality in each instance. It is almost instrument-like in this regard, and rather than just programming it, we suggest you actually think about playing it.

System Requirements

Kombinat is provided as both a VST and an AudioUnit plug-in for Windows and MacOS X. The MacOS X version is a Universal Binary, compatible with both Intel- and Motorola-based Macs. To use Kombinat, you'll need a Steinberg VST-compatible host application which conforms to the VST 2.0 specifications, and a computer capable of running it. For the AudioUnit version of Kombinat, 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 XP or Vista
- 512 MB RAM
- Pentium III 600 MHz CPU
- High Color S-VGA Display

For use with Apple Macintosh:

- Mac OS X version 10.4 or newer
- 512 MB RAM
- Motorola G4/G5 or Intel CPU
- Display capable of "thousands of colors"

Installation

Double-click the Kombinat Installer icon and follow the instructions. During the installation process the installer will ask you to enter your registration code. 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, simply delete the plug-in from your VST folder, which is usually located at `C:\Program Files\Steinberg\VstPlugins`.

Operation

Kombinat can be used in either a stereo or mono context in your host DAW software. If you use a stereo input, the left and right channel separation of the input signal is preserved in the output signal. Kombinat is meant to be used as an insert effect but there's no reason you can't use it as a send/return effect if doing so suits you.

Kombinat's knobs respond to vertical mouse-pointer movements; that is, click on a knob and drag upwards and downwards to rotate the knob. If you're using the VST version of Kombinat, your host software may override this behavior.

Here is a screenshot of Kombinat, followed by detailed descriptions of its controls. We'll describe the controls roughly in order of moving from left to right across the screen.

Isolator

The Isolator section of Kombinat is a DJ-style 3-band equalizer. It splits the incoming signal into three frequency ranges: high (treble), middle, and low (bass). The ***CROSSOVER*** knobs control the operating frequencies of the filters in the crossover network which divide the incoming signal into separate frequency ranges. The **HIGH** knob sets the dividing point between the high and middle frequencies. Rotating the knob clockwise increases the frequency, narrowing the high range of frequencies and widening the mid range. The **LOW** knob sets the dividing point between the middle and low frequencies. Rotating the knob clockwise increases the frequency, narrowing the mid range and increasing the low range.

The ***GAIN*** knobs control the level (loudness) of each frequency band. The **HIGH**, **MID**, and **LOW** knobs, as you can probably figure out for yourself, control the levels of the high, middle, and low frequency bands respectively. Turning the knob clockwise boosts the signal, turning it anti-clockwise makes it quieter.

The illuminated **ON** buttons to the right of the level knobs act as "kill" switches for each frequency band. If the band's switch is off (greyed out rather than glowing orange), the band is completely silenced. Click the switches with your mouse to turn them on and off.

Distortion

The heart of Kombinat is its three distortion processors, which we call *engines*. Each engine can operate in one of seven different types, each of which mangles signals in a different manner.

The routing of signals through the engines depends on the **MODE** switch in the lower left of Kombinat's window. In **MULTI** mode, each engine operates on its corresponding band of frequencies, and the engines operate in parallel. The top engine processes the high frequencies, the bottom engine processes the low frequencies, and the middle engine processes the mid-range frequencies. The outputs of the three engines are added together; this mixed signal is then sent to the output filter. In ***SERIES*** mode, the engines are connected in series, with the output of the top engine connected to the input of the middle engine and the output of the middle engine connected to the input of the bottom engine. In ***SERIES*** mode, the three outputs of the Isolator are added together; the isolator operates more or less like a three-band parametric equalizer. The signal filtered by the Isolator enters the top engine, passes through the middle engine, leaves from the bottom engine, and then makes its way to the output filter. Click the **MODE** buttons to switch back and forth between the two modes.

Each engine has a level meter, labeled **LVL**, near its left edge. These meters reflect the level of the signal entering the engine. This means that the meters will display different levels depending on the setting of the

MODE switch. In **MULTI** mode the meters reflect the levels of the signals for the three separate frequency bands, since the three outputs of the isolator are sent individually to the three engines. If you kill a band altogether with its on switch, you'll see the corresponding engine's meter stay at zero. In ***SERIES*** mode, generally speaking, all three meters will be active since the signal passes through all three engines.

The **TYPE** selector near the left side of each engine's pane shows which distortion type the engine employs. Click on the **TYPE** selector to choose the engine type. Each type has one to three parameters which are controlled by the pie-graph knobs to the right of the **TYPE** selector. Click and drag vertically on the knobs to change the parameter values. The engine types operate as follows:

THRU: This is actually not a distortion type as such, but essentially a bypass switch for the engine. If the engine type is set to **THRU**, the signal passes through the engine without alteration. Choose **THRU** in **MULTI** mode if you want a band of frequencies to be left unscathed by its engine, and choose **THRU** in ***SERIES*** mode if you find that you don't need all three engines to create the effect you're looking for. Since the **THRU** engine type obviously has no parameters, it also does not have any knobs.

FUZZ: The **FUZZ** engine type is derived from Audio Damage's wildly popular freeware fuzz pedal plug-in, Fuzz+. It is based on a mathematical model of a fuzz pedal near to the hearts of many guitarists. If you've enjoyed using Fuzz+ but have yearned for a multi-band version, now you have it.

FUZZ has a single knob labeled **AMT** (short for Amount) which increases the signal level and hence the amount of distortion. The **FUZZ** type is perhaps most interesting at lower settings of the **AMT** knob, where it imparts a somewhat grainy distortion to signals regardless of their level. At high **AMT** settings the fuzz and ***SAT*** types are mostly indistinguishable.

SAT: The ***SAT*** type, short for saturation, simulates the distortion created by overloading a transistor-based gain circuit such as a pre-amp. At low signal levels the ***SAT*** type has no effect. As the signal level increases the top and bottom of the signal wave are flattened, creating a bright-sounding distorted signal.

SAT has a single knob labeled **AMT** which increases the signal level and hence the amount of distortion.

DIST: The **DIST** type, short for distortion (you probably guessed that one), distorts the signal at both its peaks (like the **SAT** type) and at very small values near zero. This zero-crossing distortion imparts a sort of gate-like effect that is typical of contemporary boutique guitar pedals.

DIST has two knobs labeled **AMT** and **GAIN**. **AMT** acts as a "mix" knob, varying the amount of the original signal and the distorted signal. Turning up the amt knob increases the distortion. The **GAIN** knob changes the level of the signal before it is distorted. Generally speaking, turning up the gain will also increase the distortion.

CLIP: The **CLIP** type simply clips off the peaks of the signal. The level at which the signal is clipped can be set independently for the positive and negative peaks of the signal. Since audio signals are usually not symmetric, clipping the positive half of the signal can sound different than clipping the negative half. Even if the signal happens to be symmetric, clipping only one half will sound different than clipping both halves. Some diode-based guitar pedals exhibit asymmetric clipping behavior in which the positive or negative half of the signal is clipped more than the other half.

The **CLIP** type has three knobs: **GAIN**, **LO**, and **HI**. **GAIN** simply changes the signal level before it is clipped. **LO** sets the clipping point for the negative half of the signal, and **HI** sets the clipping point for the positive half. Both of these knobs set the clipping point relative to zero; that is, as you turn them up, the clipping level moves *away* from zero. This means that if you leave them both at zero, you won't hear anything at all from this engine because both the positive and the negative halves of the signal wave are chopped off at zero. If you turn them both all the way up you won't hear much of any effect because the clipping levels are both set beyond the peaks of the wave. (You will hear clipping nonetheless if you crank up the signal enough with the gain knob.)

WARP: The **WARP** type, technically speaking, distorts the signal by using a sinusoid as a non-linear transfer function. In less technical terms, it makes odd noises by wrapping the signal around a sine wave. It creates harsh distortion that can sound like hard clipping, or add metallic-sounding overtones somewhat like ring modulation.

WARP has a single knob, **FREQ**, which varies the frequency of the sine wave, and hence varies the timbre of the distorted signal.

BITZ: The **BITZ** engine type applies several different forms of digital signal destruction. **BITZ** creates the popular "lo-fi" sample-rate reduction and bit-crusher digital effects we've all come to know

and love despite having 24-bit audio converters and 64-bit signal-processing math readily available to us.

BITZ has three knobs. The first knob, **RATE**, controls a sample-rate reducer. As you turn this knob up, the signal is resampled at a lower rate than your host's current sampling rate. If this knob is turned all the way anti-clockwise, the resampling process has no effect on the signal. As you turn the knob up, the signal is sampled at a lower rate. If you turn this knob all the way clockwise, the signal is sampled at 1/100th of your host's sampling frequency (e.g., 441Hz if you use the usual sampling frequency of 44100Hz). You may find that the **RATE** knob has the most noticeable effect when used in the high-frequency-band processing engine, since higher frequencies will be affected first by lowering the sampling rate.

The second knob, **BITS**, controls a bit-depth reduction or "bit-crushing" process. If you leave the knob turned fully anti-clockwise, the signal is passed with full resolution. (Kombinat uses 32 bits to represent signals internally, but your host software may use 16, 24, or 32 bits.) As you rotate the knob, the number of bits used to represent the signal first drops to 16, and then decreases all the way to one as you turn the knob fully clockwise.

The third knob, ***ERR***, is an Audio Damage original. It introduces errors in the bits used to represent the signal. The knob controls how long the errors persist, and hence how much they damage the audio. If the knob is rotated fully anti-clockwise, no errors are added to the signal. As you rotate the knob, progressively more persistent errors are added to the signal, creating digital-sounding noise. The **BITS** and **ERR** knobs are somewhat complementary in that the effect of the ***ERR*** function is less noticeable at high settings of the **BITS** knob.

RING: The ***RING*** engine type is a ring modulator. Ring modulators are familiar to many users of synthesizers and guitar effects; they produce "clangorous" or inharmonic tones by multiplying the input signal with the output of a built-in oscillator. Ring modulation is actually a form of amplitude modulation; "ring" refers to the arrangement of diodes in analog circuits originally used to create the effect.

RING has three knobs. The first knob, ***AMT***, controls the amount that the incoming signal is modulated (affected) by the oscillator. Turning this knob up increases the overall intensity of the effect. The second knob, ***FREQ***, controls the frequency of the oscillator. Rotating this knob changes the timbre or tone of the effect. The third knob, ***SHAPE***, varies the shape of the oscillator's wave. At its fully anti-clockwise position, the wave has a smooth sinusoidal shape.

As you turn the ***SHAPE*** knob up, the shape becomes more and more squared off. Turning the knob up makes the effect brighter and more digital-sounding.

Historical note: if you happen to be a user of Audio Damage's venerated Master Destrukto plug-in, you'll recognize the **CLIP**, **WARP**, and **BITZ** engine types. These engine types were lifted directly from Master Destrukto (although the err parameter in **BITZ** is a new invention).

Filter

The filter in Kombinat is a four-pole lowpass model of the type commonly found on many analog synthesizers. The **FREQ** knob controls the cutoff frequency, and the **REZ** knob controls the resonance. Turn the **FREQ** knob anti-clockwise to dull the sound, or clockwise to brighten it. Turn the **REZ** knob up to emphasize frequencies near the setting of the **FREQ** knob, making the sound more "synthy".

This filter has some unique characteristics which should be noted. First, this filter can self-oscillate at high resonance, resulting in a tone with the pitch determined by the setting of the frequency knob. This is not common in software-based filters, and may surprise you the first time you hear it. To get the filter to self-oscillate, just turn the **REZ** knob all the way up and you'll hear the oscillation tone. Turn the **FREQ** knob back and forth and it will change the pitch of the tone accordingly. Note that when the filter is receiving input, the tone is blended with the input, and will be more apparent the lower the input signal.

The second odd characteristic is that the filter will break apart at extremely high input levels, resulting in an odd semi-digital gating effect. If you are adding a significant amount of gain to your input, via the **INPUT** knob or the **GAIN** knobs of the Isolator section, or both, and you turn the resonance all the way up, you'll note that at high frequency settings (above 15kHz or so) the filter ceases to "filter" and starts to "gate." It is a strange effect, and whether it is useful or not is up to you. It is both easy to avoid if you don't want it (just turn the resonance down) and easy to achieve if you do. Rest assured that it is not a bug, but a feature.

Compressor

The compressor in Kombinat only has one control, ***AMOUNT***. Thus, it is fairly obvious how to use it. If you want more of the compression effect, simply turn the knob clockwise. This will have the effect of evening out the signal coming out of the filter, so that the parts of the signal that would be low in volume are much more apparent, and nearly as loud as the loudest parts of the signal. This will also add a couple dB of level to the overall signal, and make it a bit more "knocky." As with the filter, when you send the compressor extremely high-level signals, it begins to operate in an unpredictable manner, and will add distortion to the signal.

For the technically inclined, the compressor is always on, the attack is always 5ms, the release is always 50ms, and the ratio is always 1000:1. At the left-most setting, the threshold is 0dB. When the knob is completely clockwise, the threshold is -30dB, and the input and output gains are raised to compensate.

Levels

The **INPUT** and ***OUTPUT*** level knobs provide overall gain control of the signals entering and leaving the plug-in. Turning the knobs clockwise increases the amplitude of the signals. The **INPUT** knob has a range of -40 to +6dB; the ***OUTPUT*** knob has a range of -60 to +6dB. Since many of Kombinat's engine types operate in part by boosting signals to high levels, you may find the ***OUTPUT*** level knob handy for keeping things under some semblance of control. Also, since the effects created by the engines are all very much dependent on the level of the signals they process, you may find that simply rotating the **INPUT** knob can radically alter what you hear coming out of Kombinat.

MIDI Controllers

The VST version of Kombinat 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 Kombinat's parameters.

Kombinat has a simple "MIDI Learn" mode for assigning its controls to MIDI controllers. To assign a control to a MIDI controller:

- First, 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 control. 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.

- Next, move the MIDI controller to send a continuous controller message—turn the knob, press the button, move the slider, whatever is appropriate.

- The white square will disappear. Now the control will move when you manipulate the MIDI controller.

Kombinat 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 Kombinat recognizes the controller and assigns it to the desired control.

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 Kombinat'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.

Kombinat's MIDI controller assignments apply to all presets and instances of Kombinat, in all host applications that you use. The MIDI assignments are stored in a special file on your hard drive. The contents of this file are read when Kombinat is loaded by your host. If you have two or more instances of Kombinat in use at once, any MIDI assignments you make will not be propagated to the other instances until the next time that your host loads the plug-ins.

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 for us 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.

Automation

All of Kombinat's parameters can be automated using your host's automation features. Consult your host's documentation for information on how to use these features.

And Finally...

Thanks again for purchasing Kombinat. 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.