Sonimus SonEQ 1.2

Thank You

SonEQ is the result of hours of hard work, research, and development. We at Sonimus proudly continue to pursue our passion for creating products to optimize your mixing experience. We are confident you will enjoy it.

Sincerely,

Sonimus Staff

License

Introduction:

SonEQ is a digital equalizer that simulates certain musical qualities of some "vintage" equalizers. It is modeled on two classic analog devices: the API 550 and the Pultec EQP, with some of the best characteristics of both provided in a single versatile unit. SonEQ has 3 bands: bass, middle and treble, as well as a pre-amp section that can provide analog style “warmth”.

Installation

Mac

Open the SonEQFree.dmg, run the installer, and follow the on-screen prompts. If you would like to customize your installation, at the *“Installation Type”* step, please click on the *“Customize”* button.

Windows

Open your downloaded .zip file, run the installer and follow the given steps.

Specifications

Supported platforms

Audio Unit, VST 2.4, VST 3, AAX, RTAS. All platforms support both 32 and 64 bit operation.

Supported Operating systems

- Mac OSX 10.6 or newer
- Windows XP or newer

Technical specifications

- **Sample Rate Support**: up to 192 khz.
- **Bit Depth**: 64 bits (floating point).

- **Channels**: Mono and Stereo.
- **Latency**: Zero.

Shortcuts:

- **Using CTRL key or SHIFT key**, you can get finer control of the movements of the knobs. Using the mouse **scroll wheel** also provides fine control of the knobs.

- By right clicking the center of a knob, you can view the current setting and set it to a new a value manually using the computer keyboard (Windows Only).

- Double clicking the center of a knob resets it to its nominal value.

Controls:

1 **INPUT/OUTPUT:** These control the input and output levels. These controls, in conjunction with the DRIVE control (see paragraph 7 below), are useful for saturation control − higher level of the INPUT control provides more saturation while the OUTPUT control can be used to compensate the output level.

2 **OUTPUT CLIP:** When the output of SonEQ exceeds 0 dBfs, this LED is switched on. Note: SonEQ does not clip at 0 dBfs because it works internally at 64 bits; but the LED is useful for knowing when the signal has exceeded 0 dBfs which may be helpful if other plug-ins in the signal path cannot accept inputs exceeding 0 dBfs.

3 **HIGHPASS/LOWPASS:** These controls along the bottom edge of the front panel provide very soft and musical filters that assure sonorous quality. When these controls are set to a frequency value, the displayed frequency is the -6dB point of the filter. The LOWPASS filter is a high quality design: it does not become deformed at the Nyquist frequency. You can use these filters boldly because they assure you high quality audio results.

4 **LOW: BOOST/ATTEN:** These are unique bass controls that provide boost or attenuation of low frequencies. The BOOST and ATTEN(uate) frequency curves are not perfectly aligned so that it is possible to get useful and surprising effects using both knobs together. The LOW FREQ selector below the BOOST and ATTEN knobs changes how the boost and attenuation filters interact when both controls are used. When only one of the bass controls is used, the control shifts the frequency of boost or attenuation.

5 **MID GAIN/FREQ:** The MID GAIN control knob adjusts the gain of the mid frequency from -12dB to +12dB. The MID FREQ slide control below the GAIN knob adjusts the frequency of the maximum peak or dip from 150 Hz to 4khz. The **MID HIGH Q** switch along the bottom edge of the front panel controls the bandwidth of mid frequency peak or dip; when this switch is 'on' (LED on) the bandwidth of the filter will narrow.

6 **HIGH GAIN/FREQ:** The HIGH GAIN control knob adjusts the gain of a high frequency shelf filter from approximately -12dB to +12dB. The HIGH FREQ selector control below the GAIN

knob adjusts the frequency of the “knee” of the shelf.

7 **DRIVE:** Controls saturation and the “bass exciter” feature which adds harmonics to low and mid frequencies without creating harsh high frequency harmonics. You can turn off the bass exciter (DRIVE ON/OFF switch set to off) to operate SonEQ without generating harmonics (“clean” EQ mode) or set the drive control at low values for slight “warmth” to low and mid frequencies. Note the DRIVE control interacts with the INPUT control in creating more harmonics when both controls are set to high values (both controls set to full clockwise creates the most harmonics). The DRIVE control does not affect the level of the fundamental signal itself so that adjusting DRIVE after INPUT and OUTPUT levels are set will only change the harmonic content of the output signal making it easy to hear the effect without being influenced by a level change.

8 **VU METER:** Displays a visual indication of the distortion amount. Readings from -20 to -10 indicate a soft saturation, which is ideal for buses or softening of an entire mix. From -10 to -4 the effect is more "bold", giving more "edge" to the sound. Readings from -3 to +1 provides stronger saturation with more high harmonic content, but still avoid "breaking up". Use readings over +1 at your own risk!

9 **WOOW:** This control is an “all-pass filter” which generates a phase distortion to create a psycho-acoustic sound-round effect. This is only suitable to be used in a final mix, and should not be used on individual tracks. Using this control incorrectly may cause phase cancellation of some sounds.

SonEQ Equalizer Controls

Frequency Response Plots for SonEQ Settings

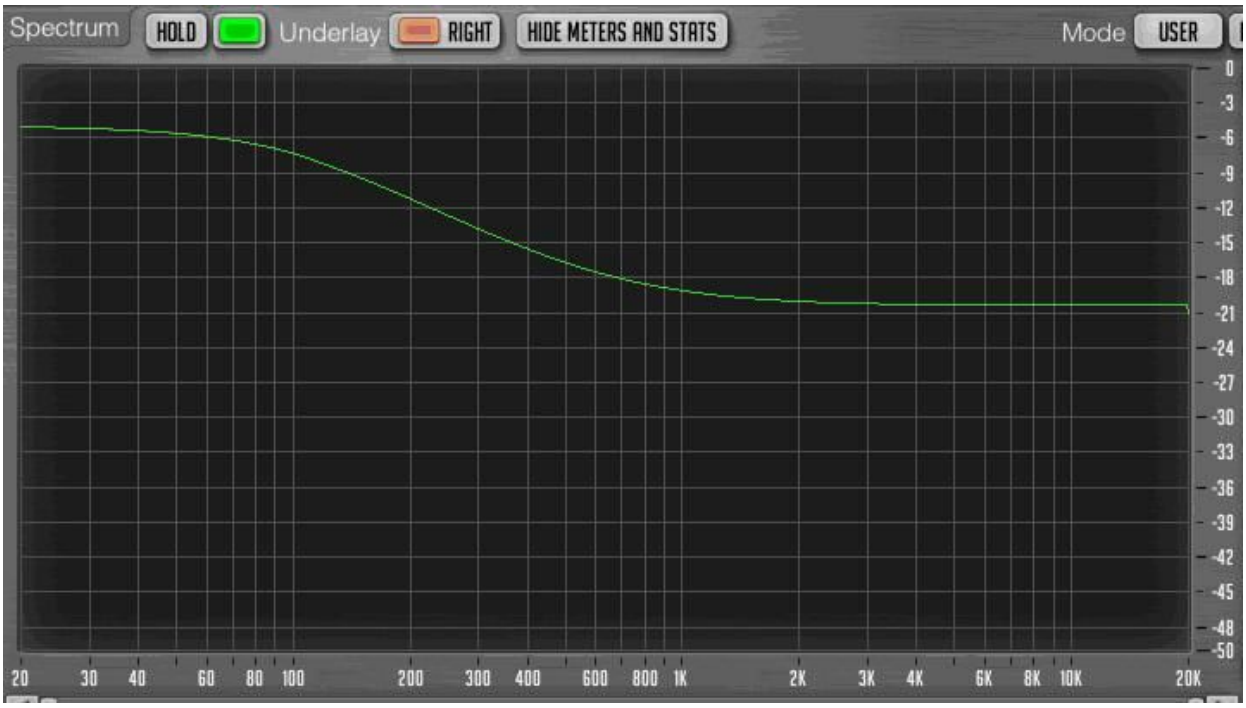
SonEQ provides musical tonal control with a number of unique curves available. SonEQ is intended for gentle sculpting of sound, not precise surgical correction as one obtains using a parametric EQ. Although frequency and gain values are shown on the SonEQ controls, ***best results will usually be found using your ears to adjust the final settings!***

The following examples show frequency response plots for a sample of equalizer settings to provide an idea of how SonEQ shapes frequency response. Note the nominal level for the following frequency response plots is approximately -20 dB.

SonEQ Nominal Flat Settings

With all controls reset to nominal values, and DRIVE turned off, the response of SonEQ is flat.

SonEQ Bass Boost



LOW BOOST set to maximum with LOW FREQ set to 100 Hz. This produces a smooth low shelf boost affecting frequencies below approximately 1000 Hz with the maximum boost at approximately 100 Hz.

SonEQ Bass Boost

LOW BOOST set to maximum with LOW FREQ set to 20 Hz. This produces a smooth low shelf boost affecting frequencies below approximately 200 Hz with the maximum boost at approximately 20 Hz.

SonEQ Bass Attenuation

LOW ATTEN(uation) set to maximum with LOW FREQ set to 100 Hz. This produces a smooth low shelf attenuation affecting frequencies below approximately 1000 Hz with the maximum attenuation at approximately 100 Hz.

SonEQ Bass Boost and Attenuation

Both LOW BOOST and ATTEN set to maximum with LOW FREQ set to 100 Hz. The BOOST and ATTEN frequency curves are not perfectly aligned so that it is possible to get useful and pleasing effects using both knobs together. The BOOST curve is slightly lower than the ATTEN curve so that using both controls at equal settings will result in a bass boost followed by a gentle dip. Using different settings will create variations that can be useful for strengthening bass while reducing “boxy” frequencies. As always, your ears are the best judge of the best settings.

SonEQ Bass Boost and Attenuation

Both LOW BOOST and ATTEN set to mid range with LOW FREQ at 100 Hz. These settings produce a curve similar to the previous settings, but with less intensity.

SonEQ Mid Gain and Frequency

MID GAIN set to maximum (+12 dB) with MID FREQ set to 150 Hz provides a “peaking” filter centered at 150 Hz with a maximum gain increase of 12 dB. Note LOW BOOST and ATTEN have been reset to 0 dB (off). Using more than one band of control at the same time (i.e., LOW BOOST and MID GAIN and HIGH GAIN) will combine their effects – these illustrations will show the results of one band at a time for clarity.

SonEQ Mid Gain and Frequency

MID GAIN set to maximum (+12 dB) with MID FREQ set to 4000 Hz provides a “peaking” filter centered at 4000 Hz with a maximum gain increase of 12 dB.

SonEQ Mid Gain and Frequency

MID GAIN set to minimum (-12 dB) with MID FREQ set to 999 Hz provides a “dipping” filter centered at 999 Hz with a maximum “dip” of -12 dB.

SonEQ High Gain and Frequency

HIGH GAIN at maximum with HIGH FREQ set to 6 kHz. This produces a smooth high shelf filter that starts rising at about 1 kHz and reaches maximum near 6 kHz.

SonEQ High Gain and Frequency

HIGH GAIN at maximum with HIGH FREQ set to 15 kHz. This produces a smooth high shelf filter that starts rising at about 2 kHz and reaches maximum near 15 kHz. Note that setting lower gains or negative gains produce similar curves with maximum or minimum shelf levels proportional to the GAIN setting.

HIGHPASS Filter

HIGHPASS filter set to 200 Hz produces roll-off as frequency decreases, reaching a -6dB level at 200 Hz.

LOWPASS Filter

LOWPASS filter set to 6.0 kHz produces roll-off as frequency increases, reaching a -6dB level at 6 kHZ.

SonEQ Preamp

The **pre-amp** section has been carefully designed to provide sonic “warmth”, and at the same time keep the effect subtle if you wish. The preamp’s saturation stages do not simulate any particular device, but the design is based on tube circuit characteristics of vintage audio gear. The first tube emulation stage brings up the harmonics and gives the sound depth, punch and width; at the same time, the second stage smoothes the upper harmonic levels. The result is a warm distortion, controllable from subtle to strong levels, that creates a sensation of amplitude and “punch”.

Preamp with DRIVE off

Preamp with DRIVE on and low settings of INPUT and DRIVE

Preamp with DRIVE on and high settings of INPUT and DRIVE

There are a wide range of “warming” effects possible based on the settings of both the INPUT control and the DRIVE level control. If the DRIVE switch is off, as shown on the left above, there will be no harmonics created and the EQ will be a “clean” digital style. With DRIVE on, the combination of the INPUT setting and DRIVE setting will determine the levels of the odd and even harmonics created by the preamp model. Low settings that yield meter indications in the -20 to -10 range as shown in the middle figure above will provide a very subtle warming distortion. On the other hand, using high settings on both the INPUT and DRIVE controls, as shown on the right, can create audible overtones for a lot more punch. The next section will show the harmonics generated by specific settings of the INPUT and DRIVE controls.

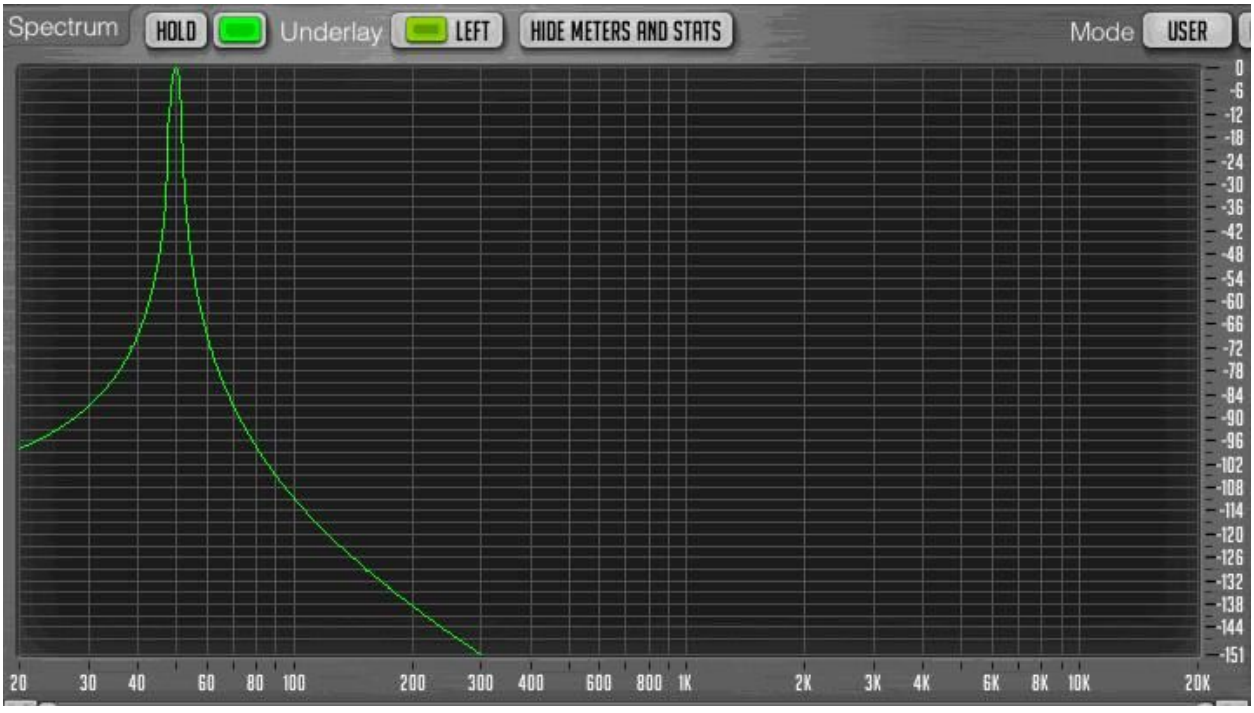
Note that the preamp described above follows the EQ controls in the signal path, so that the effect on harmonics, when the DRIVE circuit is used, will be influenced by the EQ settings.

Harmonic Distortion Examples

The following graphic examples show the harmonic content provided for various settings of INPUT and DRIVE levels using a sine wave input of 50 Hz. A sine wave with no distortion has no harmonics, only the fundamental frequency. This can be seen in the first example with DRIVE turned off. The examples following shows increased levels of even and odd harmonics.

In all examples the fundamental frequency output level is 0 dB on the spectrogram and harmonics are shown as low as -151 dB for illustration. Note that harmonics lower than about -70 dB will not create audible distortion but harmonics in the range of -60 dB to -40 dB may contribute to a sense of slight" warming". Harmonics higher than -40 dB may create perceptible audio tones and strong "fattening" of the audio signal.

Clean Mode – No Harmonics



50 Hz sine wave input – DRIVE OFF exhibits no harmonics in output signal.

Low Level Harmonics

50 Hz sine wave input – DRIVE ON with low INPUT and DRIVE settings exhibits relatively low second and third harmonics (100 Hz and 150 Hz) in output signal. The second harmonic (100 Hz) is about 50 dB lower than the fundamental 50 Hz signal creating a barely perceptible "warming" of the signal. **Note that the harmonic levels are dependent not only on the INPUT and DRIVE control settings, but also on the level of the signal at the input of SonEQ.** The best visual indication of the level of harmonics being generated, other than spectral plots as shown in this manual, is the VU meter. The *very best* indication of how the harmonics being generated work for your sound are your ears!

Moderate Level Harmonics

50 Hz sine wave input – DRIVE ON with high INPUT and low DRIVE settings exhibits increased second and third harmonics, and additional harmonics through the 7th harmonic (350 Hz) in output signal. Note the second harmonic (100 Hz) is only 30 dB lower than the fundamental 50 Hz tone and the VU meter is displaying a level of about -10. This level of harmonics is clearly audible as a slight “fattening” of the 50 Hz tone.

High Level Harmonics

50 Hz sine wave input – DRIVE ON with high INPUT and moderate DRIVE settings exhibits increasing levels of second through 12th harmonics in output signal. The second harmonic (100 Hz) is only about 20 dB lower than the fundamental 50 Hz test tone and the VU meter is reading near 0. This level of harmonics creates a strong “fuzzy” effect that if used on a single bass track can help pull up bass sounds to better play on small speakers while still pushing the low fundamental on large speakers.

Maximum Harmonics at 50 Hz

50 Hz sine wave input – DRIVE ON with maximum INPUT and DRIVE settings exhibits the highest level of harmonics possible in the output signal. This level of harmonics is very audible producing a “gritty” effect that may be useful on guitar tracks and some other instrument tracks, but not a pleasant experience for the master buss! Note the VU meter is pinned to the right – it actually hit the red +3 mark at in input level 10 dB lower than the input level signal used in the plot above. This is extreme distortion! Use at your own risk!

Maximum Harmonics at 500 Hz

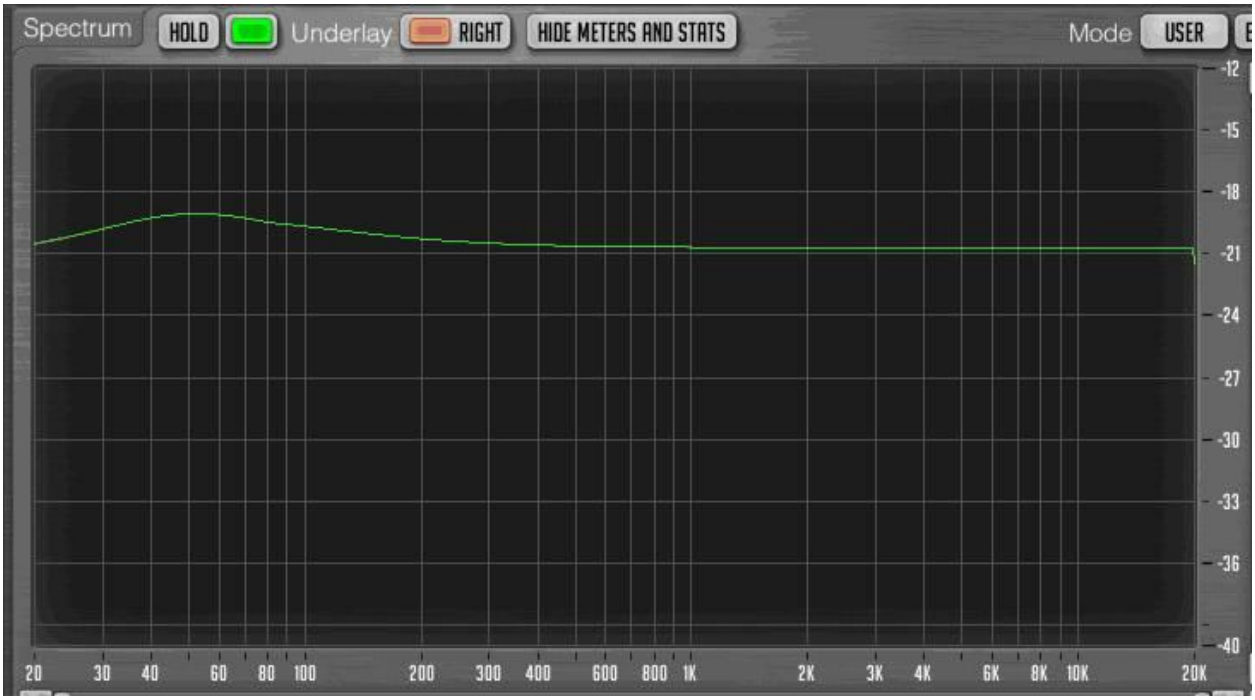
500 Hz sine wave input – DRIVE ON with maximum INPUT and DRIVE settings exhibits the highest level of harmonics possible at this frequency. Note that as the fundamental input frequency increases, the number and relative amplitude of harmonics at any INPUT and DRIVE setting decreases, providing smoother distortion across the audio frequency range than a constant number and amplitude of harmonics would create. Again, the settings in the example above are extreme (VU meter is pinned in the “red” and the signal level is about 10 dB above the +3 mark), but the same reduction of harmonics, as frequency increases, will apply to any reasonable settings with the VU meter in the -20 to 0 range.

Maximum Harmonics at 5 kHz

5 kHz sine wave input – DRIVE ON with maximum INPUT and DRIVE settings exhibits the highest level of harmonics possible in the output signal. Note how much lower the harmonic levels are than the previous example at 500 Hz. At this fundamental frequency the harmonic distortion is essentially inaudible (second harmonic is about 72 dB below the fundamental signal) even though both INPUT and DRIVE are at maximum and the VU meter is pinned hard in the “red”. Again, the same reduction of harmonics, as frequency increases, will apply to reasonable settings with the VU meter in the -20 to 0 range. The SonEQ preamp provides “warmth” and “fattening” for low to medium frequencies, but not harsh overtones from high input frequencies.

Bass Exciter Mode of DRIVE Circuit

The DRIVE portion of the SonEQ preamp creates a lifting of the bass frequencies in addition to generating harmonics. This 2 dB to 3 dB rise in the 30-120 Hz frequency range is in addition to any frequency shaping from the BASS BOOST control.



Bass excitation with DRIVE control at minimum level provides a gentle rise of approximately 2 dB at 50 Hz.

Bass Exciter Mode of DRIVE Circuit

Bass excitation with DRIVE control at mid level provides a gentle rise at about 3 dB at 50 Hz. Note that the INPUT level interacts slightly with the DRIVE level for the Bass excitation as long as the VU meter readings are not driven into the RED zone. If the VU readings “pin the meter” to the right, the Bass excitation level will drop significantly, but at such drive levels the upper harmonics will increase to a very audible level (see Maximum Harmonics at 50 Hz above) so that bass will no longer be the predominant audio frequency.

Keep in mind, the ***best results will be found using your ears to adjust the final settings!*** **Enjoy using SonEQ!**

Credits

- English Operating Instructions by Dennis Wilkins
- GUI design by Scott Kane **https://www.behance.net/Scottkane**