Radiator

Tube Mix Channel

User's Guide

Version 5 : For Mac and Windows

soundtoys

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Figure 1: Radiator's Control Panel

Warmth: it's the elusive and hard to quantify character that we're all striving for in modern, digital productions. Radiator was designed for this very task, turning up the HEAT on your mixes, based off of one of the warmest devices we know of: the Altec 1567A Mixer Amplifier.

The original Altec 1567A hardware, introduced in the early 1960s, was a rack-mounted five-input tube mixer. It featured removable transformers, a simple two-knob EQ, and a whopping 97 dB of gain, all behind an unmistakable and very green faceplate.

Altec gear, specifically the 1566A (off of which Radiator's younger sibling, Little Radiator is based) and the larger 1567A played a big part in shaping the sound of Motown between 1961 and 1964. Songs by greats like The Four Tops, The Marvelettes and The Supremes all went through the five-channel 1567A located in the control room at Motown Studio A.

By today's standards, the sound of the Altec is colored and gritty, with a generous amount old-fashioned hardware noise. The EQ was about as simple as it gets, one knob for Bass, another for Treble. As the recording industry chased ever-increasing fidelity through the '60s and '70s, these now rather antiquated tube mixers found themselves replaced with more feature-rich, transistor-based consoles by manufacturers such as Neve and API. A lot of 1567A's found their way into the PA racks of churches and school auditoriums across the USA.

Eventually, aficionados of the analog sound began seeking out the 1566A and 1567A as inexpensive sources for a real-life tube front end. Producers like Matt Wallace, Butch Vig, and Billy Bush found the warm

and punchy 1567A to be a sleeper classic for injecting that nebulous concept of "warmth" we mentioned earlier. With bands like the Black Keys (who had a custom console made from Altec 1567As) utilizing these little pieces of studio history the demand, and price, for these funky little color boxes have soared.

Radiator brings the heat-generating properties of the 1567A to your digital setup with more options and flexibility versus the original units. In addition to being a faithful recreation of the saturation and harmonic properties of the original hardware (based on multiple 1567A and 1566A units at Soundtoys HQ), Radiator accurately models the bass and treble tone controls from the original unit. A mix control is added for easy parallel processing as well as a selectable Mic/Line mode switch mirroring the 1567A's extremely level-dependent frequency response.

With Radiator you can bring classic tube warmth to every input channel and every bus, without the hassle of procuring collector-priced hardware. Radiator and Little Radiator are the prefect tools to crank up the heat on your mixes.

Figure 2: Radiator's Control Panel

RADIATOR'S CIRCUIT

Before we discuss Radiator's controls it is beneficial to mention the path that audio takes as it flows through Radiator. The signal path of Radiator matches that of the original Altec 1567A hardware and responds accordingly. Unlike the original circuit however, Radiator features a modern Wet/Dry, control giving the option to balance affected sound with original audio - whereas the output of the hardware would be equivalent only to 100% processed (wet) audio.

The clean input signal given to Radiator is fed into the first tube saturation stage with the drive level determined by the input control. From the first stage output, the signal then flows into a 2-band EQ section with Bass and Treble controls. After the tone stack, the signal reaches the second saturation stage. This is controlled by the front panel's Output knob. Finally, the processed signal is fed into one channel of the Wet/Dry mixer.

INPUT

The input control of Radiator determines the gain of the signal entering Radiator's (virtual) circuit path. As gain is increased, saturation will increase accordingly along with output level. The Input control determines the amount of drive into the first tube saturation stage. The drive level from the Input control is then fed into the tone stack section of Radiator.

MIC / LINE SWITCH

A source selection switch, labeled Line and Mic, is included on the front panel. The Altec 1567A has a very impedance dependent response in regards to the input, which we included while building Radiator. The Mic and Line modes represent the differences in behavior observed with a 150ohm impedance (Mic) vs. 600ohm (Line) signal.

Figure 3 shows the overall frequency response differences as they relate to source selection.
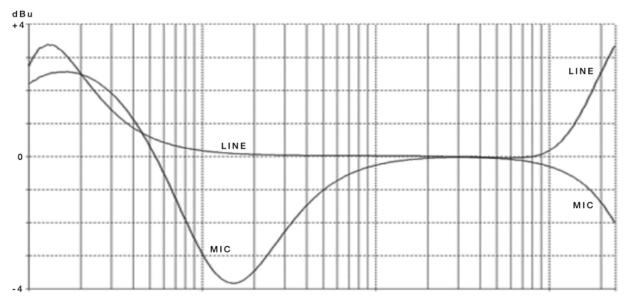

Figure 3: Mic/Line Frequency Response

NOISY / CLEAN SWITCH

The 1567A has a significant amount of circuit noise even at low saturation levels, and this noise was modeled and included in Radiator. It averages -68dBu at the maximum measured settings, and is reduced by 10dB with the "Line" source selected. However this circuit noise can be completely suppressed by selecting "Clean" using the front panel Clean/ Noisy switch.

Figures 4 and 5 show a 0dBFS (18dBu) 1kHz sine wave processed through both Radiator (with Line selected) and the 1567A. The FFT plot shows the 20dB difference in the noise floor as well as the first through tenth harmonics.
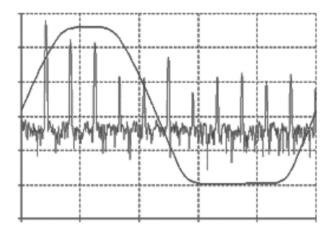

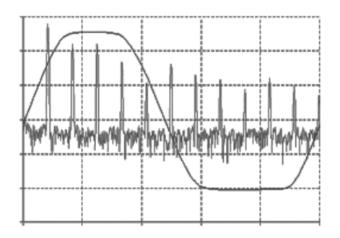*Figure 5:* Altec 1567A Waveshape and FFT

Figure 4: Radiator Waveshape and FFT

BASS

Radiator includes a two-band EQ section which is post-input stage and pre-output stage. Both the Bass and Treble controls allow for a +/-10dB boost/cut. The "0" value of the Bass and Treble controls are at the 12 o'clock position with a clockwise motion used to increase the value and a counter-clockwise motion used to decrease the value.

Figure 6 on the next page shows the frequency responses, ranging from 10Hz to 24kHz, for the minimum and maximum gain of the Bass control.

BASS (continued)

The frequency response behavior mirrors that of the original 1567A with a wide curve for bass frequency cut and more of a sloping boost.
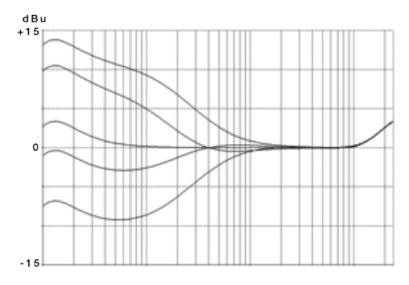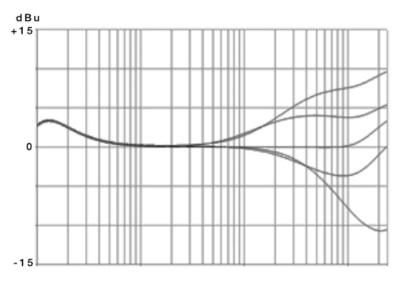

Figure 6: Bass Frequency Response

gain of the Treble control. The frequency response behavior for the Treble control also mirrors the operation of the original control on the hardware 1567A.

Figure 7: Treble Frequency Response

TREBLE

The Treble control works similarly to the Bass control. The "0" value of the Treble control is at the 12 o'clock position with a clockwise motion used to increase the value and a counter-clockwise motion used to decrease the value. A +/-10db boost/cut is available with this control. Figure 8 shows the frequency responses for the minimum and maximum

OUTPUT

The Output control determines the audio level coming out of Radiator. This control is useful not only for adjusting the level of the signal in your mix but also to compensate for any increase in level from using the Input control to increase the level going into the first stage of tube saturation.

OUTPUT (continued)

Keep in mind that this control determines the level of post-tone stack audio entering the second stage of saturation before being fed into the wet/dry mix. This means that, true to the original unit, additional saturation of the signal can be achieved through boosting the output. However, as this control also determines output level, adjusting the level of the track in your host application (or with a trim plug-in) may be necessary at extreme output settings.

MIX

One major addition to Radiator vs. the original hardware is the Mix control. This allows the unprocessed (dry) signal to be mixed in with the processed (wet) signal. The 0% to 100% range corresponds to the output level percentage of the processed audio. The Mix control allows for parallel processing to occur directly within Radiator without the need for external bussing.

HEAT METER

The Radiator front panel also includes a specialized VU-style meter based on the aesthetics of the 1567A which displays the "HEAT" amount. The HEAT meter is calibrated to the 1567A VU meter settings meaning that Radiator and the 1567A have the same output level and saturation characteristics.

Figure 8: The Heat Meter - Turn it up!

SUPPORT INFORMATION

Now that you've taken the time to learn all about Radiator, have fun, experiment, and make greatness! If our plug-ins helped you take your production to the next level, let us know, we'd love to hear from you and what you were able to create with our software.

If along the way however you should run into any hiccups or anything unexpected, we offer free technical support for all registered users.

Our FAQ contains many helpful answers. you can find it at:

http://support.soundtoys.com

If you need further support you can find our Customer Support contact form at:

https://www.soundtoys.com/forms/support

You can also reach our support staff by e-mail at:

support@soundtoys.com

If neither of those options work for you, our office can be reached via telephone at:
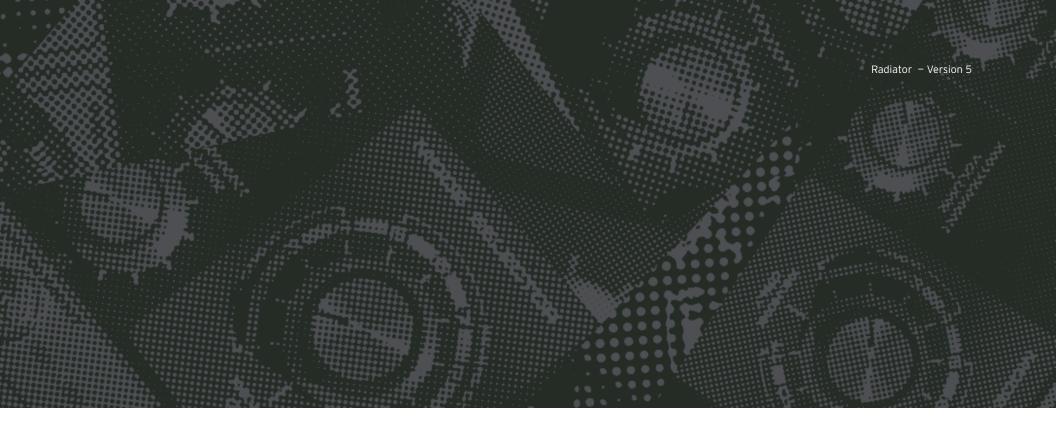
1-800-COOL-EFX

Please have the following information available to help assist our support team:

- The product version and serial number

- The version number of your audio system (e.g ProTools 11.2.1, Cubase 8.0.5, Logic 10.2.0, Cakewalk Sonar X3)

- Your interface/hardware (e.g. Mbox Pro, Apogee Quartet, RME Fireface, etc.)

- Your computer and operating system info (e.g. MacPro OS X 10.9.5, Windows 7 SP1, Windows 8.1, etc.)

- A detailed description of the problem

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