NEWS KICKER

KEYLOC™ Tech DOC
(July 2020)

Overview

The KEYLOC is a 2-channel DSP-based, active line-output converter.

The KEYLOC has two input level ranges: the Low range can accept 125mV to 10V; the Hi range can accept 1V to 40V. It will output up to 10V which is adjustable by the output gain of the device. In the low-level range, there is a 60Ω load for use with newer smart radios (that shut outputs off if they detect there is no speaker on their outputs). If there is a need to load a source unit that has an output voltage greater than 10V, please use the KISLOAD products instead of the KEYLOC's built-in load resistors. The KEYLOC also features DC-offset to turn on, and it will output a remote turn-on (100mA) to start up other products.

The KEYLOC also can process the incoming audio from your factory source unit and apply the following to the signal:

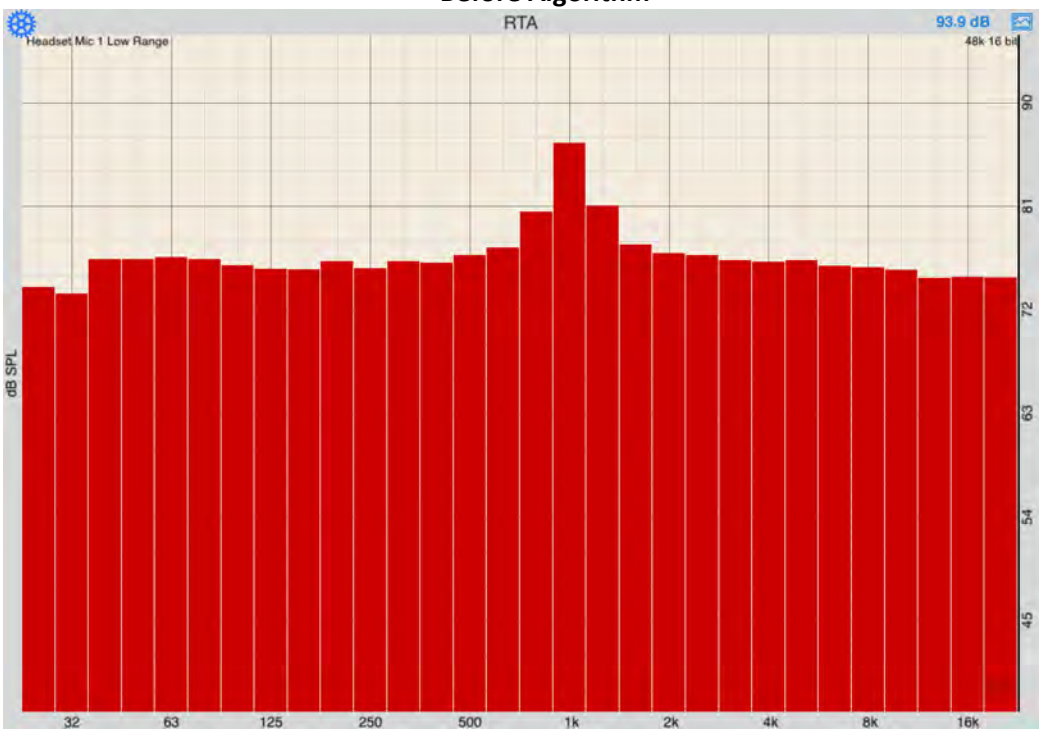
1. Smoothing of frequency response of TWO channels of your source unit via EQ correction. It can fix EQs with Qs ranging from 0.5-10 with up to +/- of 12dB of boost or cut.
2. Factory time delay defeat ranging from .06mS – 10mS. The algorithm is accurate down to .06mS which will move the first "null" of comb filters to at least 12kHz. This is a high enough frequency in the audible range to not affect imaging.
3. ALL-Pass filter defeat. The KEYLOC can correct up to three all-pass filters on one channel. The All-pass filters can have a Q ranging from 0.5-3.5 as long as they do not interact with the other All-Pass filter's phase.
4. Out of the box, before you run the KEYLOC through the setup process, it is in passive frequency detection mode. You can use this mode of the KEYLOC to give you a really good idea of what band of frequencies are available on the given wires that the KEYLOC is connected to:
    - Low: 20Hz – 200Hz
    - Mid: 200Hz – 2kHz
    - High: 2kHz – 20kHz

Below are some samples of KICKER R&D's testing of the KEYLOC that show before-and-after RTA curves, as well as some tech tips to help if you are having issues.

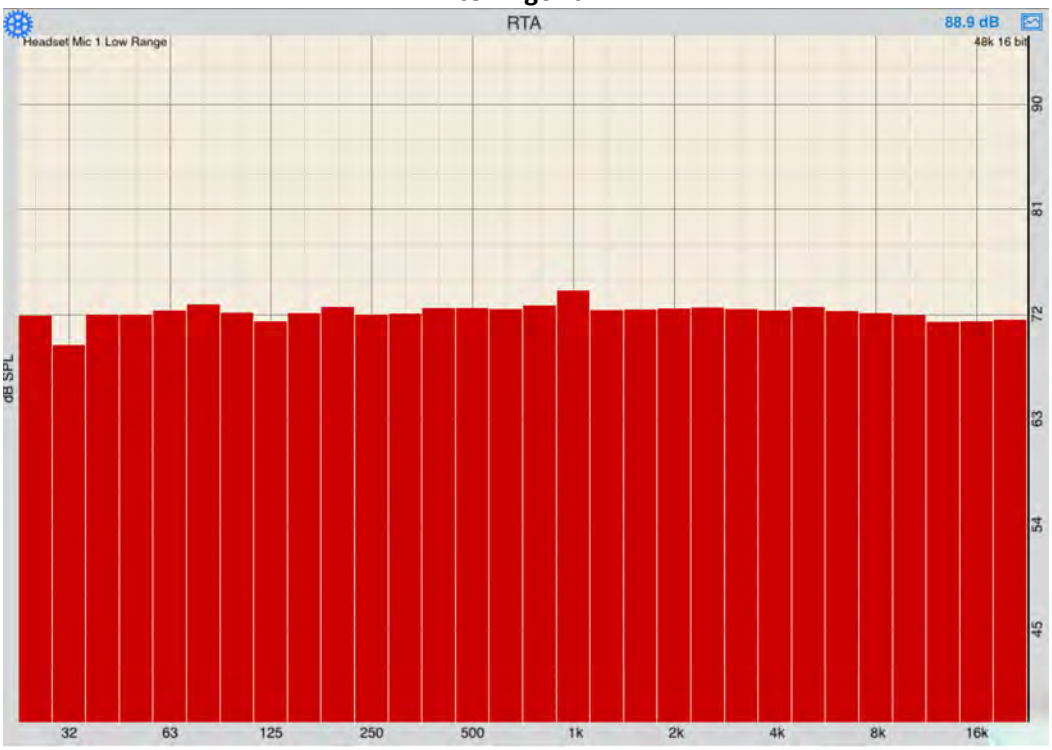
Testing

1. 1kHz EQ filter with 12dB of boost with a Q of 3.5.

Before Algorithm

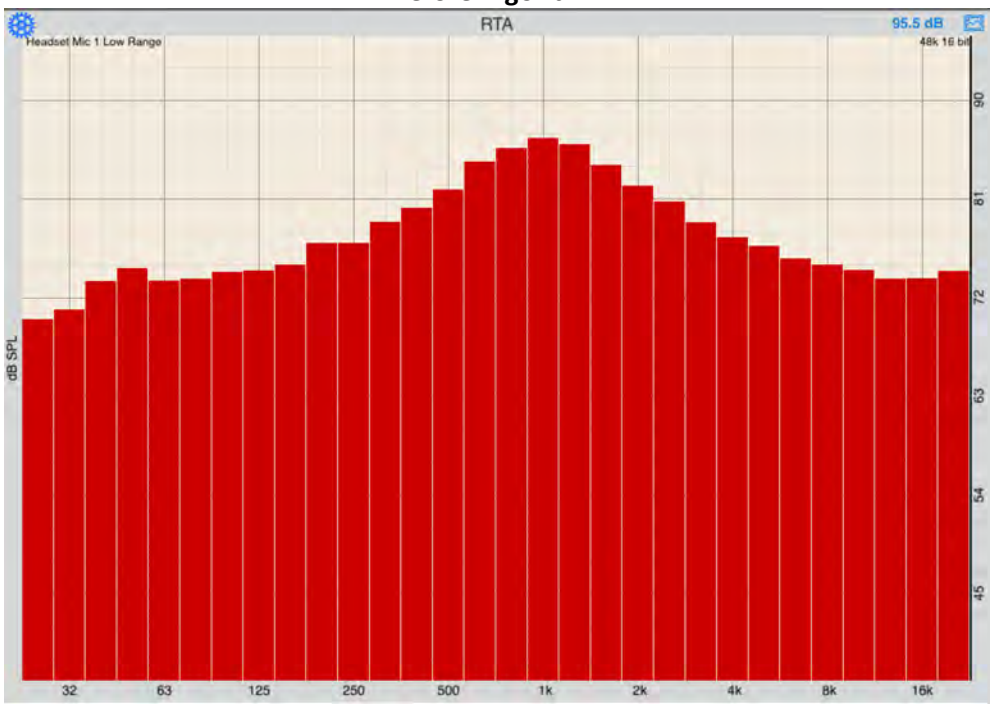


After Algorithm

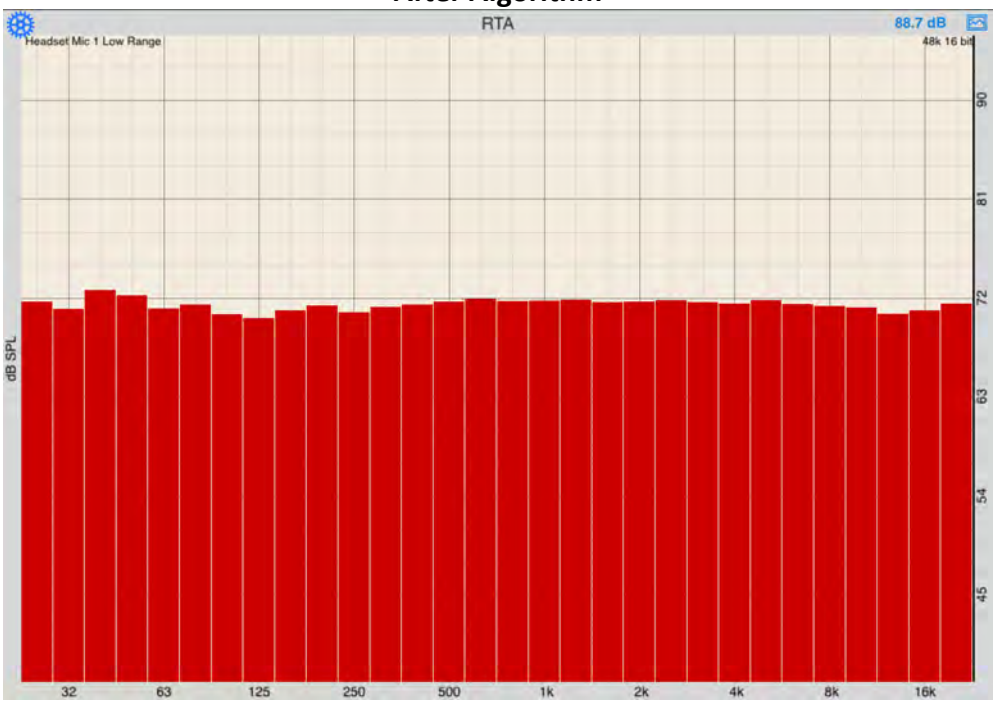


2. 1kHz EQ filter with 12dB of boost with a Q of 0.5.

Before Algorithm

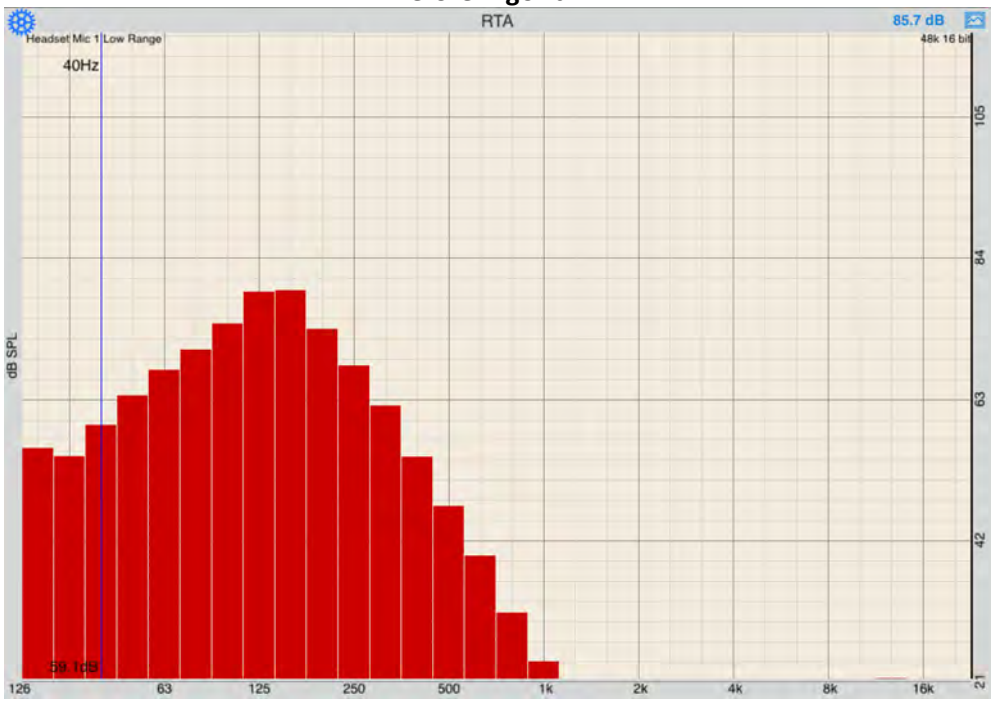


After Algorithm

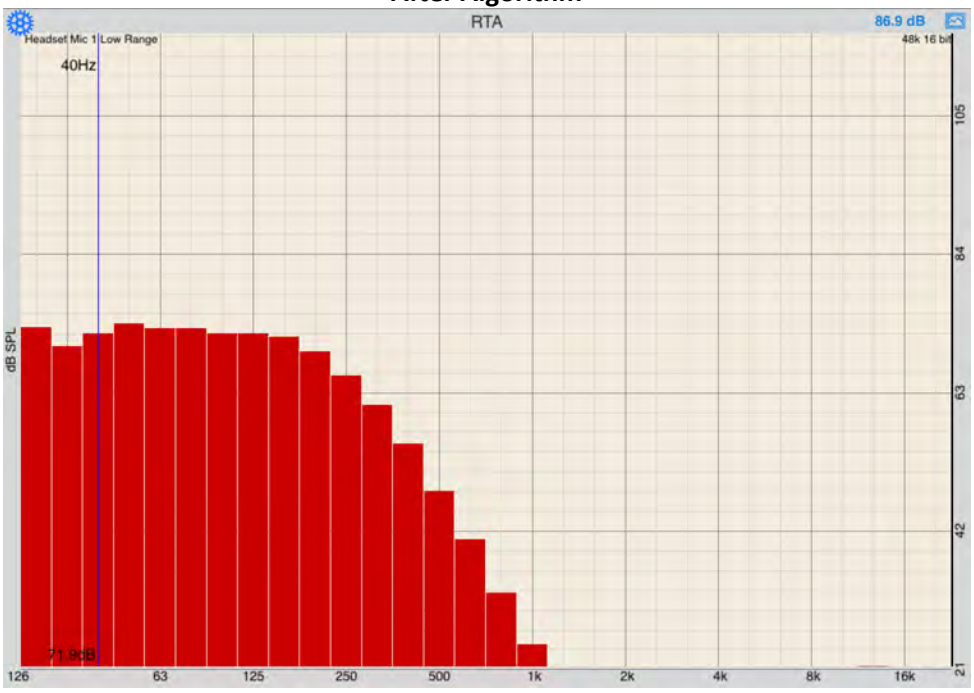


3. Bass restoration of factory high-pass 100Hz.

Before Algorithm



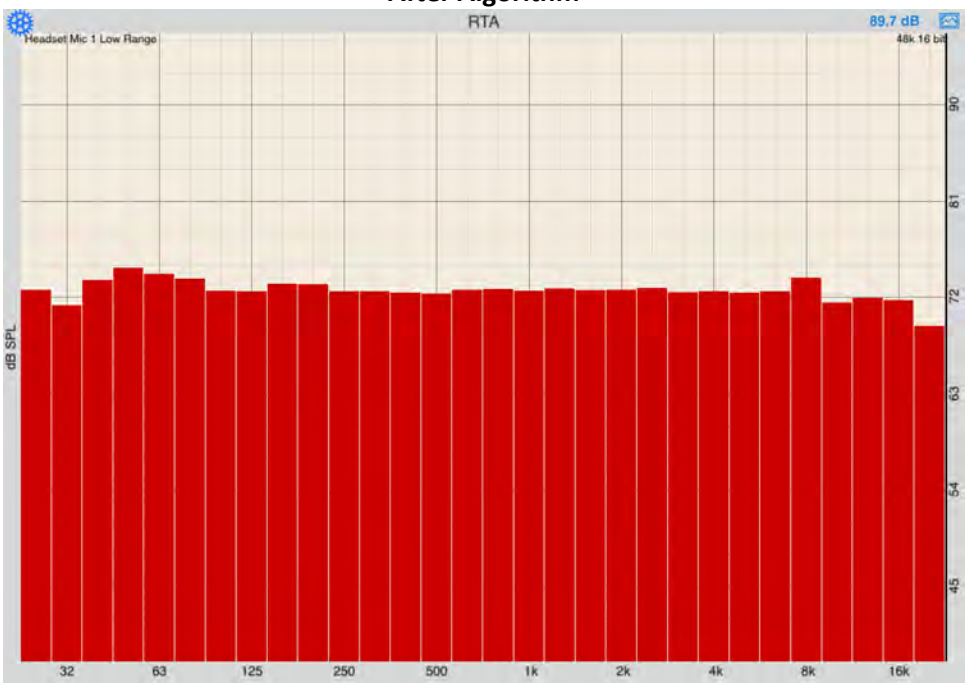
After Algorithm



4. 12dB of boost at 80Hz. 12dB of boost at 4kHz. All-pass filter at 8kHz.

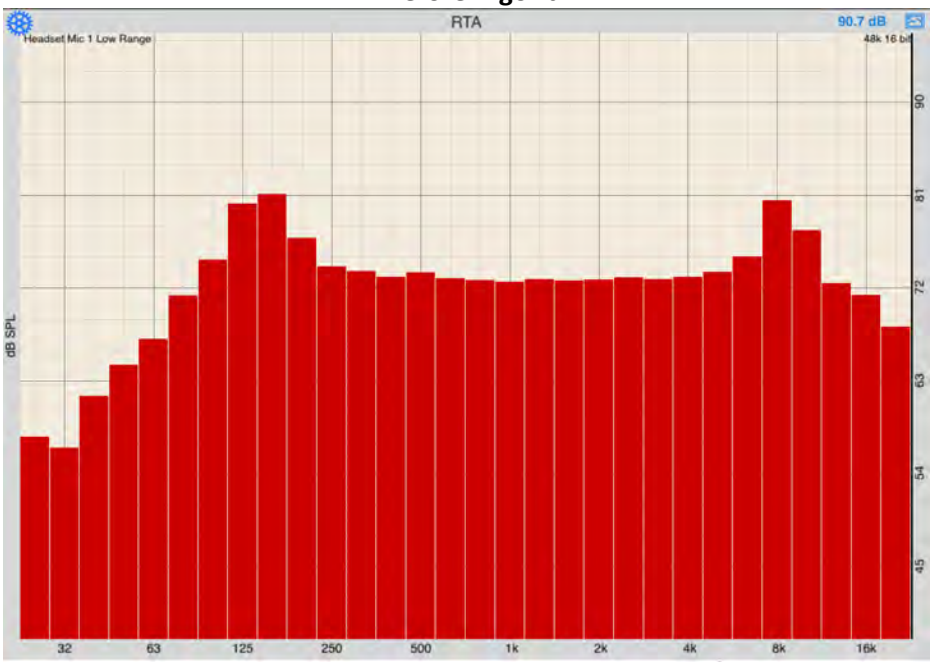
Before Algorithm

After Algorithm

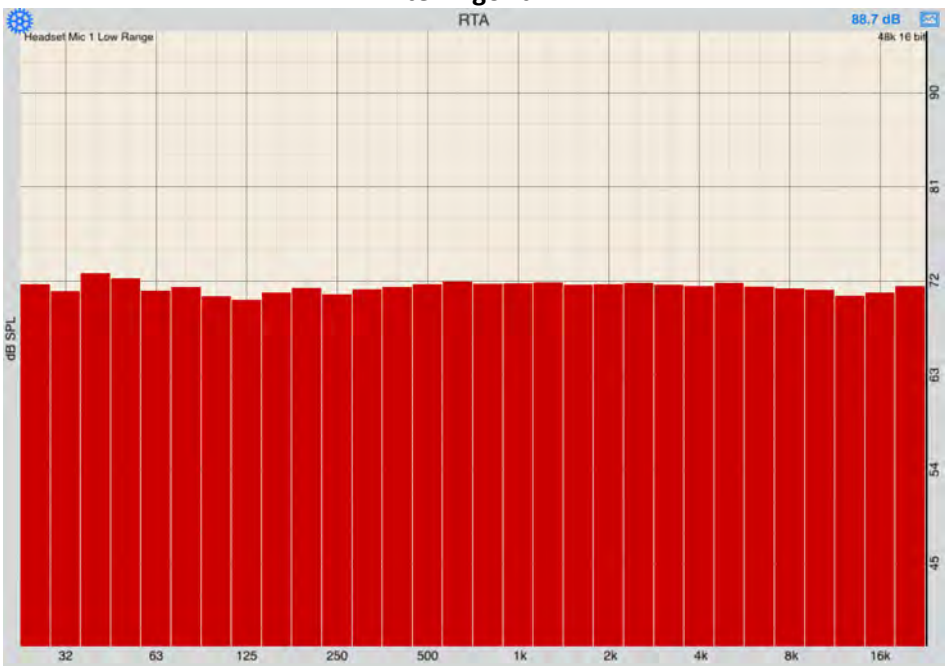


5. High-pass crossover set at 80Hz with a slope of 12dB/octave. 6dB of boost at 1kHz. 6dB of boost at 8kHz.

Before Algorithm

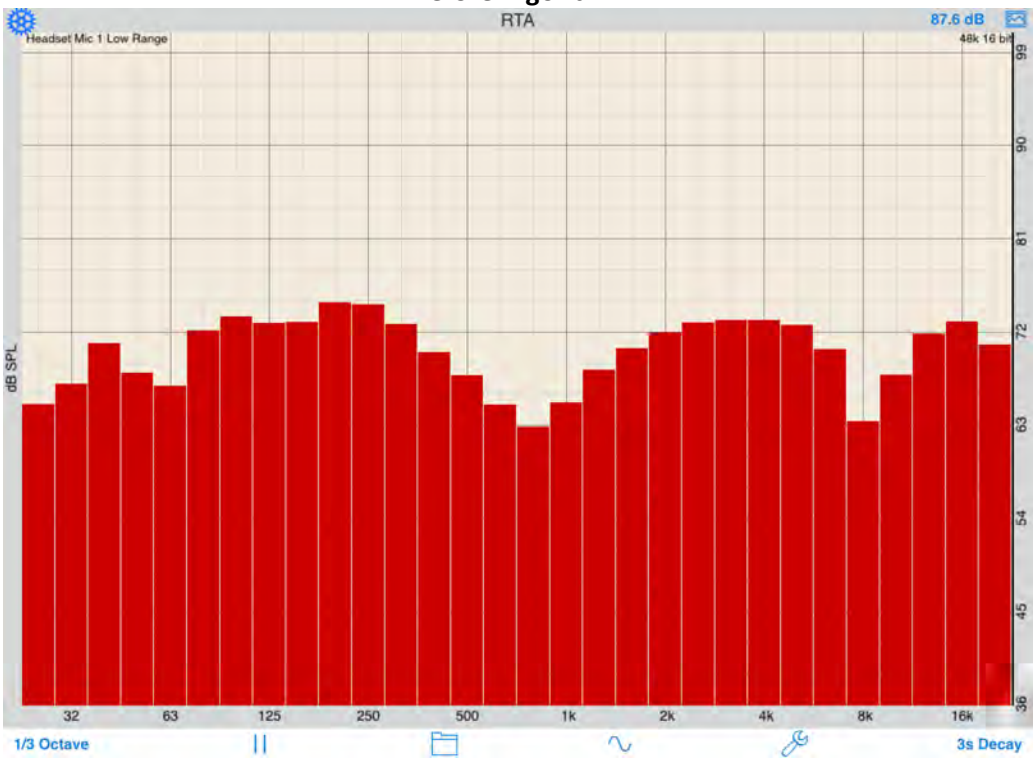


After Algorithm

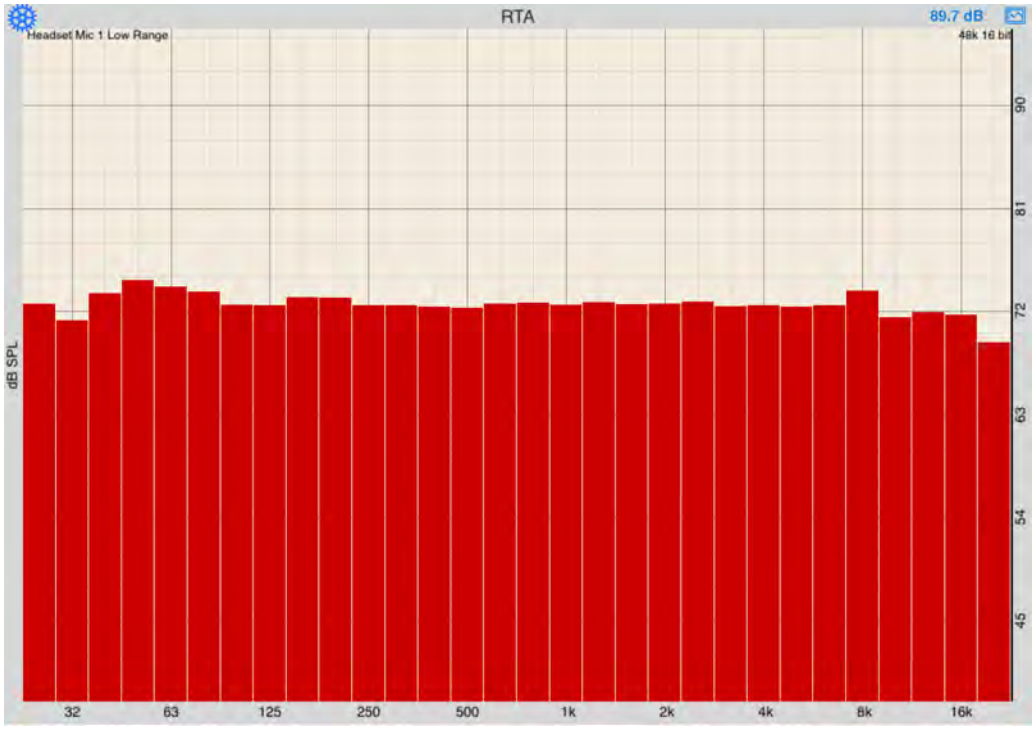


6. High-pass crossover set at 100Hz. 1kHz EQ filter with -12dB of cut with a Q of 0.5. 8kHz EQ filter with -12dB of cut with a Q of 3.5.

Before Algorithm

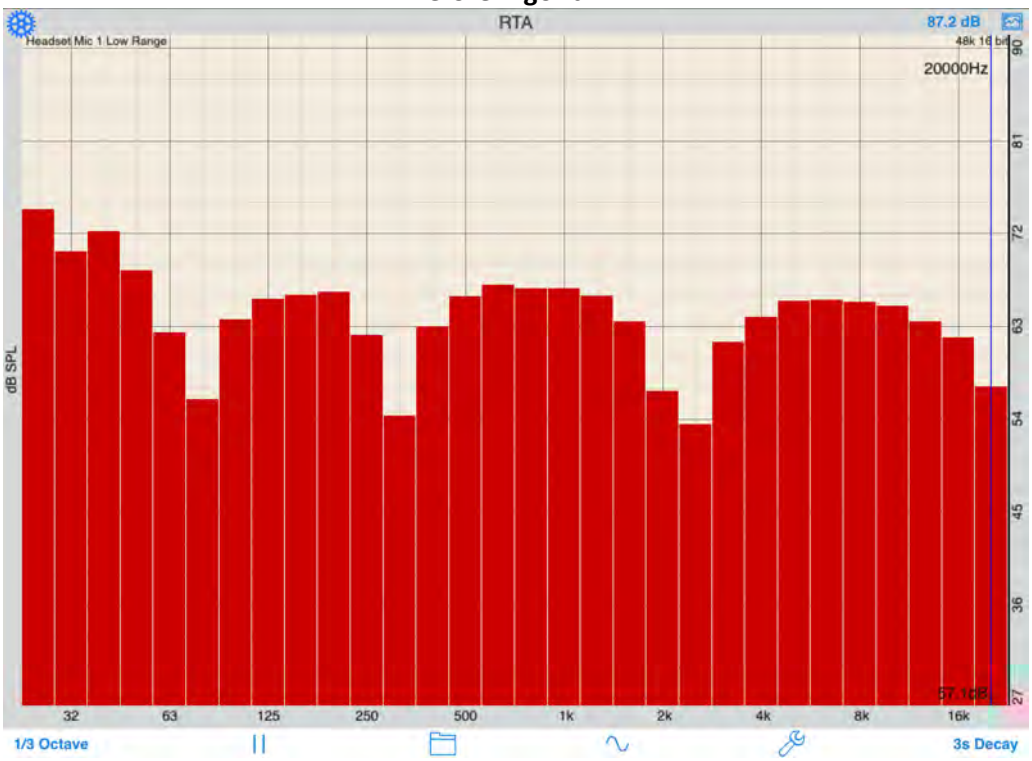


After Algorithm

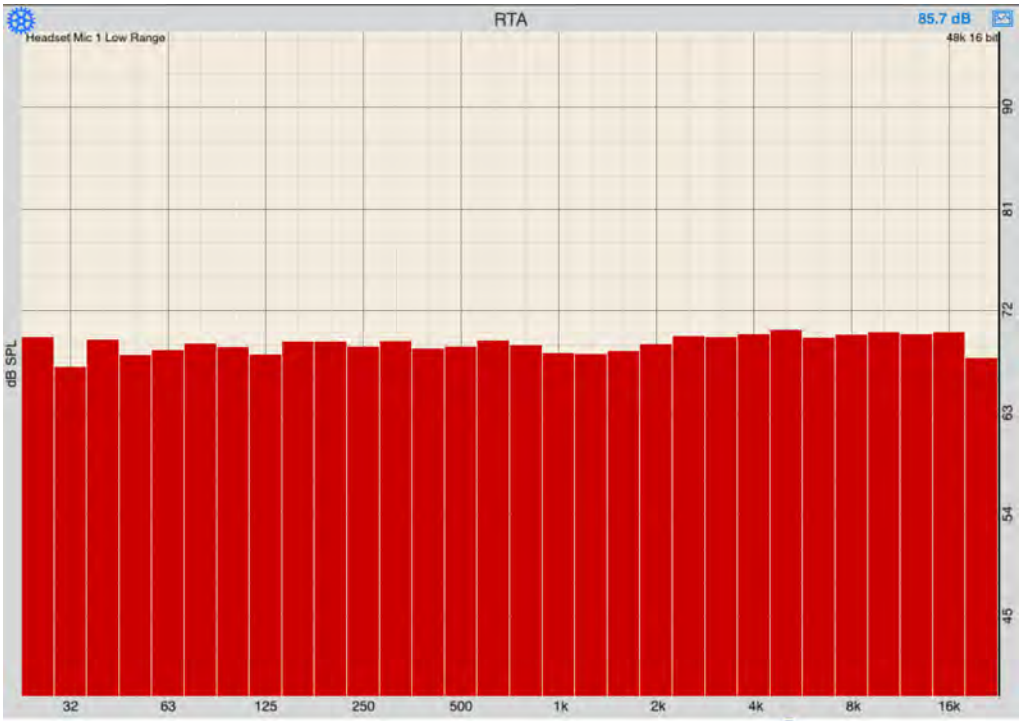


7. 3 all-pass filters set at 80Hz, 360Hz, and 2kHz Q of 1.7.

Before Algorithm

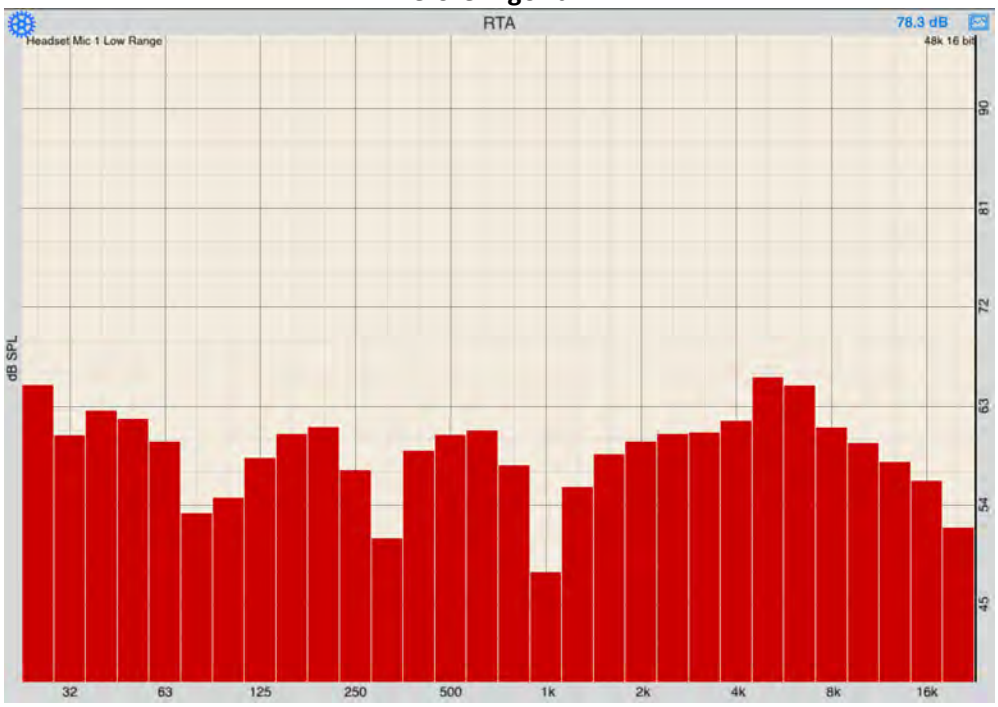


After Algorithm

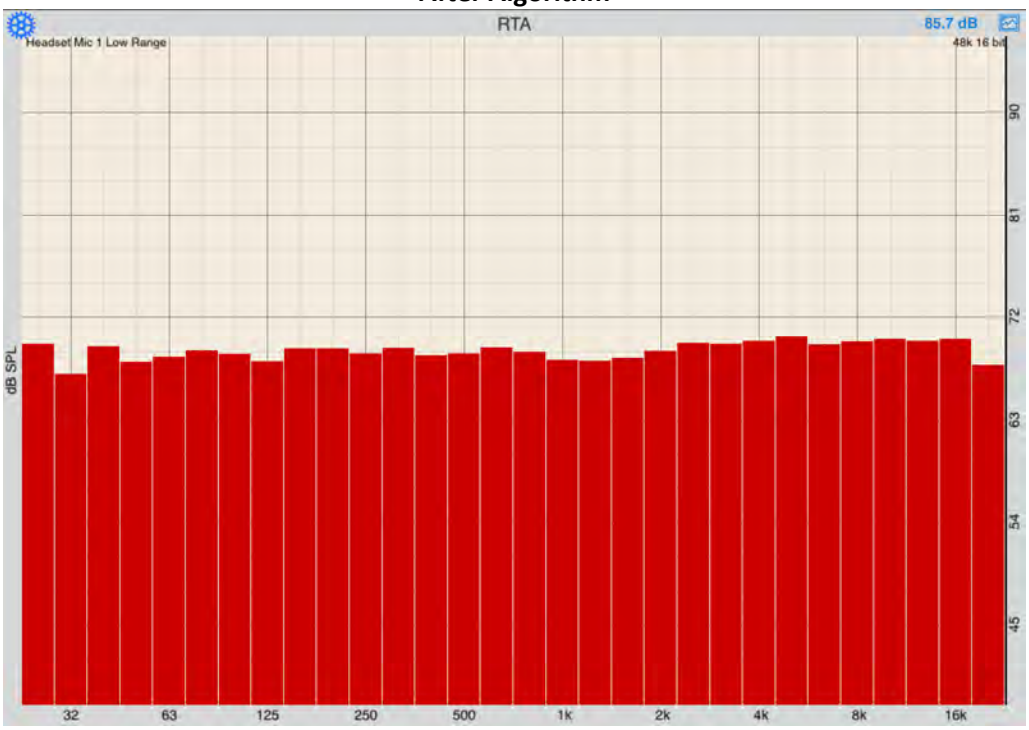


8. 3 all-pass filters with a Q of 2.4 with an EQ boost at 6kHz and an EQ cut at 18kHz.

Before Algorithm

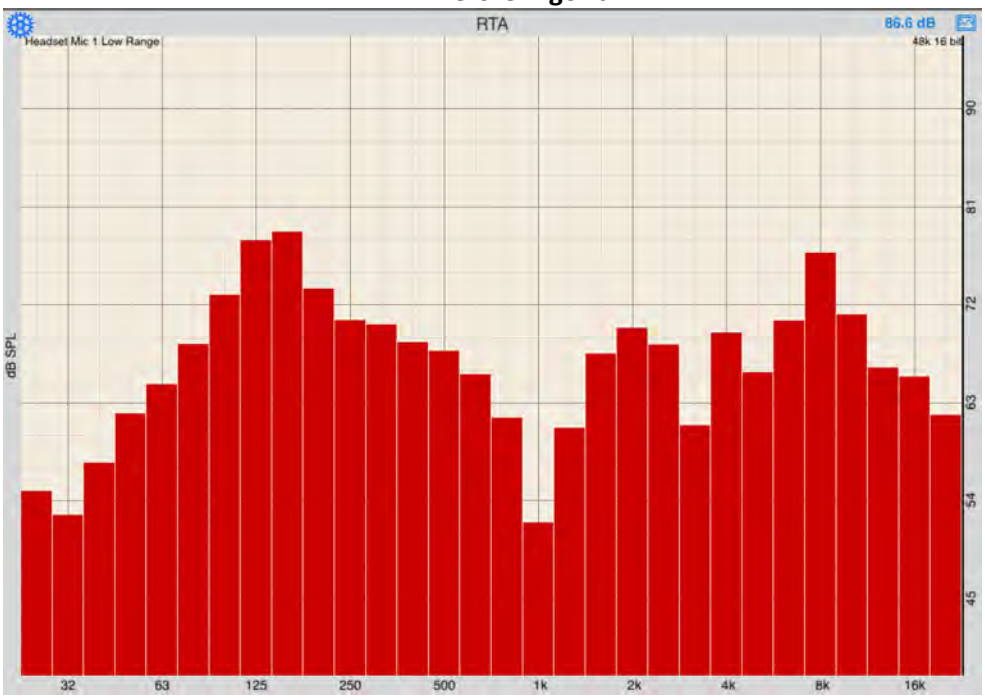


After Algorithm

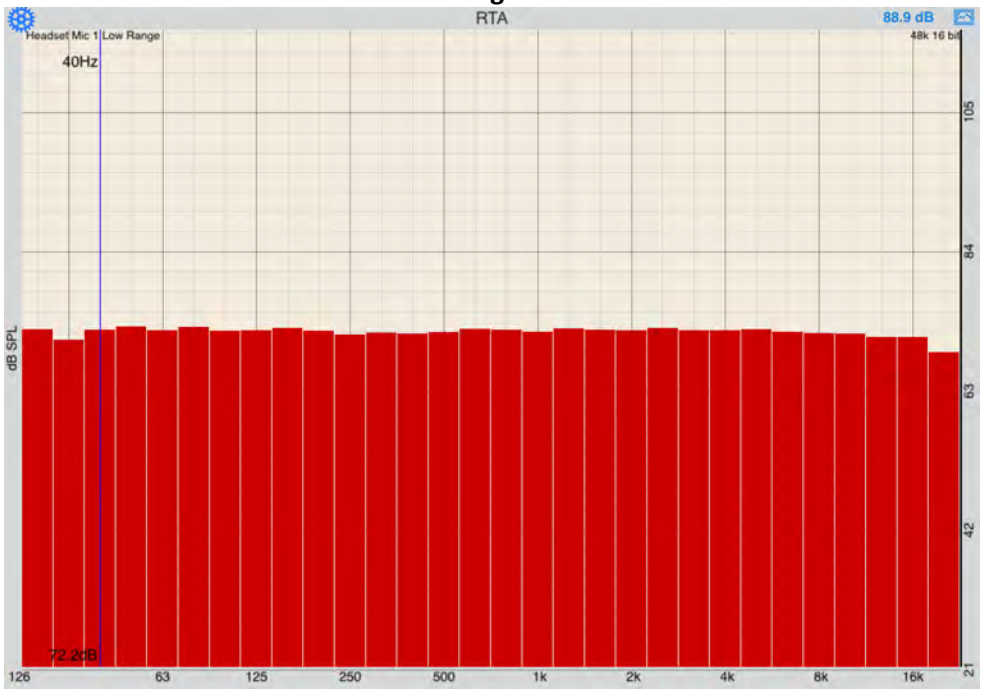


9. Time Delay with an EQ boost at 125Hz and 8kHz and high-pass crossover at 100Hz.

Before Algorithm



After Algorithm



Tech Tips:

1. If you have an issue go back and review the full manual it has all the info you will need to run the KEY process.
2. If you have issues getting a smoothed EQ response on an RTA or it just doesn't sound smoother, **PLEASE MAKE SURE THE SOURCE UNIT IS NOT CLIPPING. WE HAVE SEEN UNITS THAT WILL CLIP BEFORE ½ VOLUME. IF YOU HAVE AN O-SCOPE, USE IT WITH OUR GAIN MATCH TRACK TO WATCH THE SWEEP FOR CLIPPING. THEN TURN DOWN THE SOURCE UNIT UNTIL CLIPPING GOES AWAY. Then** go back and check the input GAIN match of the KEYLOC. If there are tall peaking filters, it can take two or three sweeps of the gain match track to be sure you have gain matched (wait 10 – 15 seconds to make sure the gain match LEDs are not flashing). If you're still seeing an issue where the frequency response is not being smoothed, it is suggested to turn the input gain down ~¼ of a turn and run the KEYLOC setup process.
3. If step two does not fix your issue, it is very likely that you are clipping the outputs of your audio source. Use the gain sweep track and an O-scope to verify that the signal coming into the KEYLOC is not clipping. If it is, turn down the volume on the source unit.
4. In most systems people will not be using a fully active DSP after the KEYLOC. In these cases, you would likely want to turn off the All-pass/Time-delay defeat for the best imaging. To do these please refer to the manual for the menu options.
5. To keep the noise floor low (hiss), we have designed the KEYLOC to add no more than 18dB of gain to any one frequency. In most applications this should get you back to completely smooth response +/-1.5db in the frequency bandwidth you are feeding into the KEYLOC.
6. During the KEY process, if you accidently push the KEY button before playing the noise floor track, the KEYLOC will have an error and the LEDs will all flash. You must then press the KEY button to exit the KEY process. You will need to re-enter the KEY process to start again.
7. You can find the necessary test tones for the KEYLOC setup process here: https://www.kicker.com/test-tones

   https://www.kicker.com/keyloc-smart-line-out-converter