



Simple RTA set-up for testing signal on powered outputs and how to use it.

Parts needed:

- 1) Test leads – insulation piercing are preferred
- 2) iPhone - Android line level to mic level adaptor with attenuator
 - a. www.kvconnection.com (part number: KM-IPHONE-MIC-A22) \$28.50
- 3) KISLOC – high quality speaker to line level adaptor
- 4) 3.5mm to RCA cable male connections on both ends
- 5) RTA app – any will work but we recommend Octave RTA (\$4.99)
- 6) iPhone, Android, or laptop to run RTA application
- 7) Dual male, 3.5mm cable

Steps to construct a simple RTA:

- 1) Connect your test leads to the KISLOC.
 - a. Cut off the ends that would normally plug into a test meter and strip the insulation off the end of the wire leaving about 1/2" of the bare wire exposed.
 - b. Strip about 1/2" of the insulation on the wires of the KISLOC
 - c. Twist the white and grey solid wires of the KISLOC together and connect them to the red test lead.
 - d. Twist the white with black and the grey with black wires of the KISLOC together and connect them to the black test lead.
- 2) Connect the RCA to 3.5 mm adaptor to the KISLOC.
- 3) Plug the line level to mic level adaptor to the 3.5mm RCA adaptor.
- 4) The test cable is now ready to use.

TESTING:

Start with the level adjustments on the KISLOC in the minimum or fully counter clockwise setting. You can adjust later if necessary. Make sure you have the volume of the source unit turned down and make sure tone is set flat and all crossovers (if equipped) are turned off. The listening position should be in center and turn off loudness before beginning test.

To test speaker leads for bandwidth and factory equalization you will need to have a good source of pink noise. A CD with several minutes of pink noise is preferred but there are other options. If



the vehicle you are testing has a CD player, you will not need to test the source device as outlined below.

Testing pink noise source:

If you are planning on using a hand held device such as a tablet or phone for the source, you will want to make sure the headphone jack has a full range output. Not all handheld devices have full range outputs on the headphone jacks. You can use the RTA to verify frequency response. You will only need a dual male 3.5mm cable and the mic to line adaptor. The KISLOC, RCA to 3.5 mm cable, and the test leads are not necessary for this test. Just plug the 3.5mm dual male cable into the headphone jack of the source to test and the other end to the line to mic level adaptor. Plug the adaptor into the device that has the RTA application. Make sure that if you have any equalizer settings on or changed any of the tone settings on that device that they are turned off so you will have a good flat signal. The Kicker U app has a signal generator that has a pink noise function. You can use that as your source for pink noise on your handheld device. Use the RTA app and start playing pink noise with the volume reduced on the phone or tablet's output. Watch the level of the RTA app and adjust volume accordingly to see bandwidth. You may need to adjust the level on the KISLOC if you do not get enough signal for accurate measurements. If the graph shows a flat response, it is acceptable to use as a pink noise source for testing frequency response. Use the dual male 3.5mm cable to plug into the factory audio systems auxiliary. Now you can test signal using the factory audio systems auxiliary input with pink noise.

If you do not get a smooth and flat response you will need to check tone settings on output device. If the high or low frequencies roll off significantly and you have all settings flat, you will need to find a different source to play pink noise that has a flat response to get accurate readings.

Testing speaker leads for frequency response:

Using a CD with recorded pink noise is best but if your vehicle does not have a CD player or 3.5mm auxiliary input, you can also use pink noise from a flash drive if there is a USB input. Just make sure to get as high of resolution as possible when downloading pink noise from the internet. MP3s are compressed so try to use a high resolution source. Bluetooth has limited bandwidth and can be used with the Kicker U app but as a last resort.

Now that you have a suitable source of pink noise and the testing gear, you can test the speaker signal going to each speaker. This will tell you if the signal is full range, crossed over, has bass roll off at high volumes, or has a factory programmed equalizer.

1. Locate the speaker wires to be tested either at speaker or output of amplifier.
2. Turn on vehicles head unit and select source for pink noise play back.
3. Make sure all tone controls are set to a flat or neutral position and listening position, balance, and fader, are also centered.
4. Connect testing gear you made to device running RTA application
5. Probe the speaker wires or connector you wish to test with test leads. Polarity is not important. Just make sure you have the two wire that go to a specific speaker.



6. Start with volume in the minimum position and slowly increase until desired level is seen in the RTA application. You may have to adjust the output of the device playing pink noise.
7. You may have to adjust the levels on the KISLOC to get the signal level at the proper levels needed for testing.
8. If you have a good flat response at any volume level you can use this speaker lead as a full range input to an aftermarket amplifier.
9. If the signal is crossed over, determine if it will play the necessary bandwidth to get the signal you need. If signal is low passed at 200 Hz from the factory audio system, it is still acceptable to run an aftermarket subwoofer amplifier from it but not a full range, or high pass signal from an aftermarket amplifier.
10. If you cannot find a full range output from any of the speaker leads tested, you will need to use a summing device such as the Kicker SUM8 to combine all of the factory outputs for a full range signal. You can test the signal coming out of the SUM8 to verify frequency response. Plug in the RCA to 3.5mm cable into the output channel you wish to test from the SUM. Connect the 3.5 mm end to Line to mic adaptor. Start to turn up the volume of the head unit with pink noise until you have appropriate signal level for testing. This will also help you to set levels of SUM8 for a flatter response if levels of the stock audio systems outputs are different amplitudes.
11. You can also test for automatic bass roll off from the factory audio system. Turn up volume on factory audio system and watch RTA with it connected to the speaker wires. You may need to adjust the levels on the KISLOC if the output is too high. If bass rolls off at higher volume levels you have an automatic bass reduction built into the factory system. If you do not wish your aftermarket system to roll bass off at high volume levels, just note at what point on the volume control bass starts to roll off and set amplifier gain's at that point to get maximum output without bass rolling off.
12. If the bass and treble do not roll off but you still don't have a flat response, you have a factory equalizer function. The OEM will often use DSP equalizer settings to compensate for less expensive speakers, poor placement or vehicle acoustics. You may need to retune the system by using an RTA and a microphone after the aftermarket system is installed. The other option is to de-equalize the factory signal with a processor before sending signal to amplifier.

To tune a system, refer to the **“Procedure for properly tuning a system with a real time analyzer (RTA)”**