

ARC AUDIO MPAK4 MOTORCYCLE AUDIO SYSTEM

Text by Gary Springgay // Photos by Manufacturer



Most of my friends know I'm an audio nut, and they've been exposed to my rather eclectic music collection. And most of them know I'm also seriously into motorcycles, and I have been for about 30 years. At any given time there are a half dozen or so bikes in my garage, and because one of my favorite kinds of riding is long distance touring, I have kept a touring bike of one kind or another in the stable for the last decade or so. The most recent touring mount in my garage is a Harley-Davidson Electra Glide Ultra. This is the first bike I've had with a full-on audio system, and I have to say, it's a very pleasant way to make the miles go by. But, as usual with a factory audio system there is a ton of room for improvement. This fact has not gone unnoticed by the aftermarket, and in this review we're going to take a closer look at one of the best value upgrades around, priced at just \$469.00 in the USA. The Arc Audio MPAK4 system is designed to fit all Harley-Davidson touring models with a factory equipped radio.



THE KIT

The Arc Audio MPAK4 kit is comprised of one of their KS 125.2 Mini Class G amplifiers, and pair of KS 6026 6.5-inch coaxial speaker systems, custom adapters to mount the large speakers in the OEM locations, and a custom wiring harness designed for the specific application. When you compare the cost of the entire MPAK4 system to some of the other aftermarket alternatives, the difference in value is obvious.

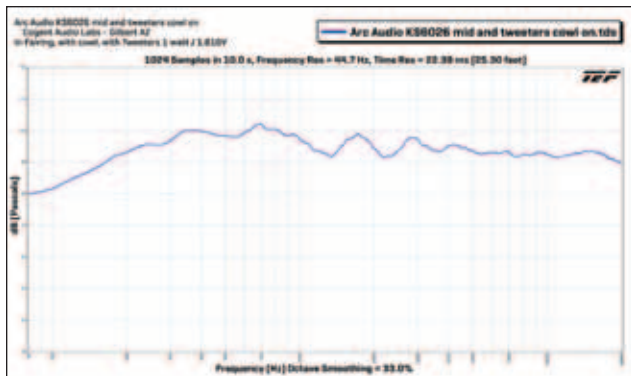
Also included in the kit are the adapter rings needed to fit the 6.5-inch speakers to the Harleys 5.25-inch openings, and an installation kit that includes a wiring harness to get the amp connected to the bikes battery. A complete set of installation and tuning instructions are also included, and even include photographs of an actual installation being done, which really makes them quite easy to follow.

THE AMP

The KS 125.2 Mini is quite a diminutive amplifier, but packs power levels that belie it's small stature. Regular readers will recall a previous test of the 4 channel version of this amplifier, the KS 125.4, which got high marks for sound quality and efficiency, and the 2 channel version will certainly share those attributes. With power ratings of 70 watts and 125 watts into 4 and 2 ohms respectively, the KS 125.2 can easily provide more than double the power of the Harley-Davidson (Harmon-Kardon) radio. Because the KS 125.2 uses higher efficiency Class G topology, the heatsink can be made smaller than you'd have with a typical Class AB design. Measuring only 8.25" x 4.85" x 1.7", the amplifier is small enough to be mounted within the confines of the bikes fairing. This approach simplifies the wiring as well as preserves vital luggage space. >>

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SPEAKER TECH SPECS	
Power Handling	50 watts RMS
Frequency Range	60-20kHz
Sensitivity	86dB/SPL @ 2.0V
Nominal Impedance	3.2 ohms
Minimum Mounting Depth	2.6"
Mounting Hole Dia	5.625"



The KS 125.2 is a full featured amp with high, low and all pass crossover settings, and an adjustable frequency range from 55 to 550Hz. The instruction manual suggests a 100Hz high pass crossover setting for the Harley application.

THE SPEAKERS

The KS 6026 coaxial speakers in the kit use materials which are resistant to the typical sun, temperatures, and moisture encountered in a motorcycle application. These speakers undergo a rigorous 550 hour test process with direct salt water spray, ultraviolet light testing, and temperature extreme

testing. The end result is a product that Arc Audio can confidently recommend for both marine, and motorcycle applications. The injection molded ABS adapter rings allow the large format speakers to mount in the factory locations with no modifications to the motorcycle, and even the tweeters remain covered by the OEM grille material. Weighing just under 30 ounces each, and using 80mm ferrite magnetic motors, the KS 6026's make the OEM speakers look puny! The moving assembly is driven by a copper coil wound on a 25mm Kapton former. Connected to the stamped steel basket by a cotton/Nomex spider and a butyl rubber surround, the injection molded polypropylene

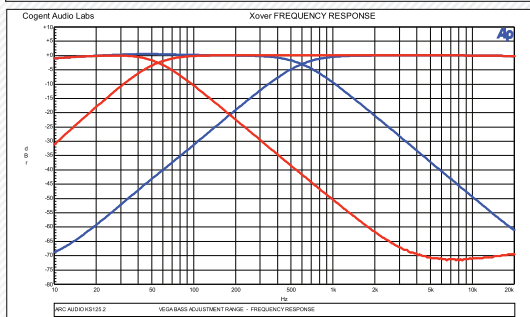
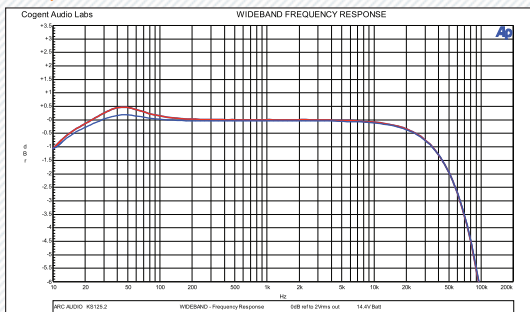
cone is finished in a good looking "brushed-look" gloss black. The 1" tweeter has a silk dome, and is powered by a neodymium motor, and uses Ferrofluid cooling for improved reliability.

INSTALLATION AND LISTENING

Because this kit is designed for a specific application, and I just happen to have one of the Harley models it's made for, I decided to install the system into my own bike, and take it for an evaluation ride.

The actual installation went fairly smoothly since I'm quite familiar with how to remove the Ultra's fairing. The amplifier mounts right on top of the radio

FREQUENCY RESPONSE CURVE - SPEAKERS ON BIKE.



AMP TECH SPECS

The following power measurements were obtained using industry standard methods. (1kHz @ 1.0% THD+N - Battery voltages shown +/- 0.2V)

MEASURED PERFORMANCE SPECIFICATIONS

MANUFACTURERS RATED POWER	ACTUAL MEASURED POWER @ 1.0% THD+N @ 12.6V BATTERY	ACTUAL MEASURED POWER @ 1.0% THD+N @ 14.4V BATTERY
75 x 2 @ 4 Ω	60 x 2 @ 4 Ω	80 x 2 @ 4 Ω
125 x 2 @ 2 Ω	100 x 2 @ 2 Ω	132 x 2 @ 2 Ω
250 x 1 @ 4 Ω	200 x 1 @ 4 Ω	265 x 1 @ 4 Ω

Signal to Noise Ratio referenced to 2V output. [CEA-2006A] (1 watt @ 4 ohms)	-91.6dBA
Signal to Noise Ratio referenced to full output.	-110.6dBA
THD+N at rated 4 ohm power	0.05%
CEA-2006A rated 4 ohm Power (minimum power per channel developed over the entire intended audio bandwidth)	78 watts @ 20Hz
Maximum Efficiency at full 2 ohm power per ch.	64.7%
Idle Current	0.8A
Input Sensitivity	720mV- 6.8V
Maximum Current @ full power, lowest rated impedance	28.3A
Frequency Response [-3dB]	<10Hz - 64kHz
High Pass Crossover	55Hz - 575Hz -12dB/Oct
Low Pass Crossover	55Hz - 575Hz -12dB/Oct
Bass EQ boost	15.6dB @ 44Hz
Phase Adjustment [degrees of shift @ 100Hz]	N/A

using a large piece of Velcro. Wiring is straightforward, and in a couple of hours I had the whole system installed.

As usual, the first thing I check for after completing a new installation is noise, and happily, the system was noise free. Loading up a CD with a dozen or so favorite tracks, I fastened my helmet and went for a ride. The first thing I noticed was the additional power. The Ultra has a set of Vance and Hines pipes, and is quite a bit throatier sounding than a stock bike. Where I would normally have the radio volume at 30-40% just to overcome the exhaust, with the Arc Audio system I found I was running it at about half the level I did previously. The system sounded pretty good, and while it's difficult to assess ultimate sound quality when you are riding down the freeway at 70mph wearing a helmet, it was definitely a prodigious improvement over the stock gear. Midrange clarity was improved, and much of the high frequency information that used to be lost to road and wind noise were once audible again.

After a hour or so of riding, I came to the conclusion that I had been expecting a little more bottom end from the 6.5 speakers, so I pulled back into the garage and removed the fairing again to readjust the crossover a bit lower. Once reassembled and back on the road with a crossover frequency of around 70Hz, the system sounded warmer and had better

overall timbre. (Note: It should be noted that the opportunity to overdrive the speakers is always there, so if you use a lower crossover setting, you have to be a bit more careful with the volume control.)

On Harley Davidson motorcycles with the Harmon-Kardon radio, there is an automatic volume level function that is controlled by reading the signal from the bikes speed sensor. As you increase speed, the volume will increase to your preset limit, and then when you slow down, the volume comes back down automatically. But with this much power on tap, Arc Audio strongly recommends turning off the automatic volume control function in the Harley radio because it can overdrive and possibly even damage the system as the bikes speed increases.

Generally speaking, the MPAK4 system was head and shoulders better than the OEM system. I had plenty of power to hear the music well even at speeds that were well in excess of the 65mph local limits. From a sound quality perspective, the clarity and intelligibility were much improved compared to the OEM system, and the whole system was generally much more enjoyable.

And thanks to the fractional power efficiency of the Class G design, average current draw of the amplifier while riding was under 12 amps, even at my enthusiastic volume levels, so the system shouldn't tax the bikes charging system any more than a set of auxiliary lamps.

MEASURED SPECIFICATIONS

While the system was in the bike I used my portable TEF25 (Time-Energy-Frequency) system to measure the frequency response of the loudspeaker from the riders position. The resulting curve seemed to agree with my ears, with a relatively flat response, considering the speaker is being loaded into an adapter ring, and the speakers output is directed straight into the handlebar controls. (see graph)

The amplifier was removed and brought to the lab for a thorough test, and I'm happy to report it meets or exceeds all the published specifications.

CONCLUSION

If you are a music lover and you're fortunate enough to own one of the big touring bikes from Harley-Davidson, you owe it to yourself to check out this package from the folks at Arc Audio. Even if your bike runs aftermarket pipes like mine, you'll have plenty of audio power and vastly improved clarity at any speed. And just like the music it plays, when you compare the total cost of the MPAK4 system to many of the alternative system upgrades available, your choice will be clear as a bell. **PAS**



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