

ARC AUDIO KS 125.4

Text and Measurements by Garry Springgay // Photos by Mark Pereira and Manufacturer

MINI AMPLIFIERS, WITH MAX PERFORMANCE



Dedicated readers will recall a product review we did some time back on a rather unusual amplifier, the very large and heavy Arc Audio 4000SE. What made this big subwoofer amp unusual was the choice of topology. Rather than a common Class AB or Class D design, the 4000SE used the Class GH configuration, to improve overall efficiency, but without the usual sound quality issues associated with Class D. And if you recall, it worked very well.

FEATURES

Continuing with the physical examination of the Mini four channel amp, I noted that the power and ground connections will accept 4 gauge cables, and the speaker connections can handle up to 8 gauge wire. The cables are held in place with nickel plated, Phillips head set screws. On the top of the amplifier is where you'll find all the settings and adjustments. One of the first things I noticed were a pair of small slide switches. One was marked "Input Level", and it had a Hi and Low setting. The other switch was labeled "Auto Sense" and simply On or Off. Here's where reading the manual comes in handy... as it turns out, the Arc Audio amplifier can be turned on by a conventional +12V signal from a headunit, or it can be turned on by sensing when

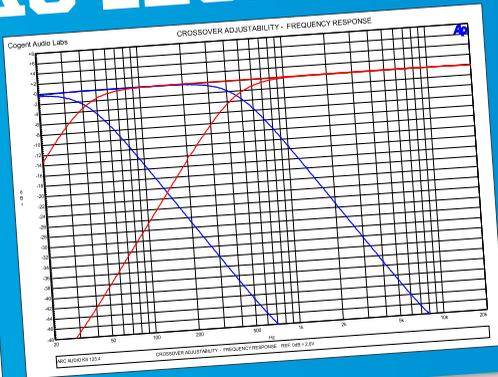
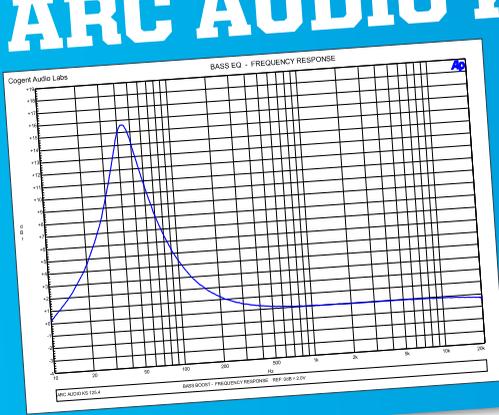
Well, it seems that the product folks at Arc Audio have decided to continue the exploration of the efficiency benefits of Class G, and obviously realized that with improved efficiency comes the possibility of reduced heatsink size. So now instead of a monster of an amp, (and once again tapping the engineering wizardry of Robert Zeff) they've used the technology to create a series of "Mini" amplifiers. These Mini amps come in single, two and four channel designs, and the stereo models are full range and bridgeable. This time we're going to have a close look at the Arc Audio KS 125.4, "Mini" amplifier, which has a manufacturer's suggested list price of \$519.00 in the USA, making it competitive with many of the popular more conventionally larger size amplifiers.

The amplifier is indeed small, considering the prodigious power ratings it boasts. Rated by Arc Audio at 75 watts x 4 channels into 4 ohms, and 125 watts x 4 into 2 ohms, it measures about half as big as a conventional competitive amp, at 11.625 x 5.125 x 1.75 inches. The Arc Audio Mini series is conventional in appearance, finished in a combination of semi-gloss powdercoat on the extruded aluminum heatsink, and using a black anodized, brushed aluminum top cover, with an oval, silver colored Arc Audio badge.

the amplified outputs of a factory headunit turn on. The amp does not sense signal, but instead works on a different type of signal commonly found on the amplified outputs of a head unit. Then in a stroke of brilliance, when the amplifier is used in auto turn-on mode, the turn on terminal of the amp becomes a source of +12V output, to turn on additional amplifiers conventionally. This clever feature also will prevent excessive turn on noise, because the consecutive amps will be delayed in turning on until the main amp is done. Sweet!

The Arc Audio KS 125.4 is a fairly basic amplifier in terms of audio control features, but it certainly includes all the "required" ingredients. There are separate gain pots for each of the four channels, so getting the left to right "balance" set perfectly is simple. -12dB Butterworth crossovers are employed for both high and low pass, and can be adjusted from about 40Hz to 500Hz. The rear channels include a bass EQ function that is centered at 45Hz, (which is about perfect for most systems) and can provide up to 15dB of boost. Thankfully, the "Q" factor of this boost control is nice and narrow, making it far more useful and effective than some of those designed more to put a marketing bullet on the box than to actually use in real life. Make no mistake, the folks behind this amp, "get it". >>

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BLUE
Regular Bass EQ
RED
Bass Focus for sealed enclosures

I removed the six machine screws that hold the top cover on, and had a look inside. What I found was a well laid out amplifier, with a symmetrical layout, and extensive use of very low tolerance surface mount style parts. The power supply uses four pairs of 50N06 MOSFETs with each one capable of continuously switching 35 amps of current. The outputs are two pairs per channel of TO-218 large case TIP35/36 high power transistors, with a total output capability far exceeding the Arc Audio KS125.4's design. The power supply gets its energy from 13,600µF's of capacitance, and after stepping up the "jolts", the secondary side of things has 8800µF's of storage capacity. Two 30A ATC style fuses are mounted on the panel beside the power connectors. The amp is complex inside, with a high part density which speaks well to the ability of the factory building it, as well as the designer who did the layout. Vertically mounted daughter boards are used to conserve space, and to provide the top mounted control functionality. These little vertical boards were solid in their placement, and in fact the entire amp seems solidly built, with good attention to detail.

LISTENING

Lately my ears have been spoiled by the exceptionally superlative performance of a couple of very high-end home amplifiers I've been listening to, (by high-end, I mean amps that cost as much as a decent new car) and so I was quite conscious to avoid being overly critical of the next mere "car amp" I auditioned. As it turned out, I needn't have been so concerned. Now while I'm certainly not going to tell you that the Arc Audio KS 125.4 sounds just like a Krell or Pass Labs amplifier, but when you consider what it is, and how much it costs, it's certainly a welcome addition to the system in any car!

The Arc Audio KS 125.4 sounded very good throughout my listening trials. I configured it so the rear channels were bridged into my 4 ohm reference woofer, and the front channels drove my reference bookshelf speakers. With the front crossover filter set to all-pass, and the sub adjusted to about 80Hz, the amplifier was very musical, and virtually transparent. Bass was tight and very defined, with good power and authority considering

the 250 watt rating. The full range front channels sounded as if the amplifier wasn't there... which is about the nicest thing you can say about an amplifier. I didn't notice any of the "compressed" type of sound I have noted on some recent full range Class D designs, and I think the Class AB and Class G designs may still have a slight sonic edge there. Stereo imaging was excellent, as was the decided lack of background noise. Other than a very slight amount of noise from the top mounted cooling fan, this thing is dead quiet. When the amp was pushed very hard, with the woofer occasionally driven well into clipping, I did notice the front channels also began to distort as the available current in the power supply was depleted. This however is common to most multi-channel amplifiers, and is certainly nothing specifically deleterious to the Arc Audio design.

One of my concerns when I saw the size of the heatsink and read the power ratings was whether or not the amp would pass muster from a thermal perspective. After listening to it for several hours at relatively high levels, I measured the surface temperature of the heatsink. The hottest spot I found was about 71°C, which is good and warm, but not hot enough to make the amplifier thermally protest. Now, I should remind you that the amp was inside my cool listening room, and not in a hot car trunk, so how it's going to do in the Arizona summer remains to be seen, but I found no cause for thermal concern in my testing. And I have tested amplifiers that would thermal under the same conditions, so I'd have to say it's very competitive from a thermal perspective.

TECHNICAL DATA

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

MANUFACTURERS RATED POWER

75 x 4 @ 4 Ω
125 x 4 @ 2 Ω
250 x 2 @ 4 Ω

ACTUAL MEASURED POWER @ 1.0% THD+N @ 12.6V BATTERY

61 x 4 @ 4 Ω
101 x 4 @ 2 Ω
205 x 2 @ 4 Ω

ACTUAL MEASURED POWER @ 1.0% THD+N @ 14.4V BATTERY

82 x 4 @ 4 Ω
136 x 4 @ 2 Ω
274 x 2 @ 4 Ω

Signal to Noise Ratio referenced to 2V output. (CEA-2006A) (1 watt @ 4 ohms)	-87.3dBA
Signal to Noise Ratio referenced to full output.	-106.4dBA
THD+N at rated 4 ohm power	0.04%
CEA-2006A rated 4 ohm Power (minimum power per channel developed over the entire audio bandwidth)	75 watts @ 20Hz
Maximum Efficiency at full 2 ohm power per ch.	65.6%
Idle Current	1.4A
Input Sensitivity	360mV- 4.3V
Maximum Current @ full power, lowest rated impedance	57.6A
Frequency Response (-3dB)	<10HZ - 77KHZ
High Pass Crossover	42HZ - 475HZ -12DB/OCT
Low Pass Crossover	42HZ - 475HZ -12DB/OCT
Bass EQ boost	15.6DB @ 44HZ
Phase Adjustment (degrees of shift @ 100HZ)	N/A

PERFORMANCE / BENCH MEASUREMENTS

After I'd finished the listening part of the evaluation, I brought the amp into the electronics lab for a thorough examination. I've looked inside and measured thousands of amplifiers over the years, and sometimes I sort of develop my own performance expectations based on what I've just seen and heard. Before ever firing up the Audio Precision analyzer, I expected the Mini Arc Audio amp to surpass it's published specs based simply on how it sounded and what I'd noted inside. The Arc Audio KS 125.4 did just that. It made

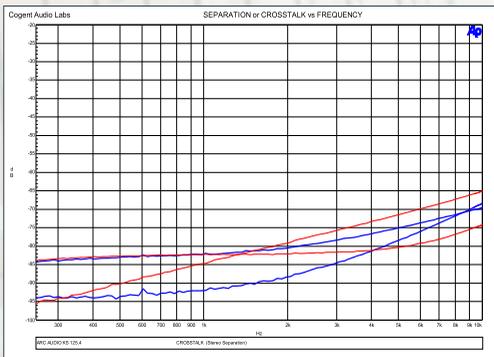
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more than advertised power at 4 and 2 ohms, and also at 4 ohms bridged. S/N was better than published as well, and the frequency response within human hearing was within 0.3dB from perfectly flat. When I noted how densely populated the PCB was, I wondered if the amp would have problems with crosstalk. Crosstalk, or stereo separation is the products ability to keep the signal on one channel from “leaking” or “crossing” into the other. I needn’t have worried, the Arc Audio KS 125.4 measured as good or better than almost any other car amp I’ve tested. Another kudo to the layout and design team! There was really very little to find fault with, maybe the overall power efficiency wasn’t quite as great as I expected, and I thought it could have had a bit more available gain... but really, that was about it for raspberries.



CONCLUSION

With their relatively modest power, these Mini amps are probably not going to be the first choice for a hard core SPL customer, but the Arc Audio Mini Series represent a high-tech and different approach to compact, good sounding amplifiers for the vast majority of enthusiasts everywhere. Everything I’ve seen here would indicate they’ll be reliable, easy to live with due to their small size, and you’ll look long and hard to find something that sounds significantly better. So in the end, if they sound good, fit in small places, and don’t break, what else could you ask for? **PAS**



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