

ARC AUDIO KS300.4

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I will state up front that I have a soft spot in my heart for the products that come from Arc Audio. Each one has offered excellent performance and design and the feature set has always hit the nail right on the head. In the case of the Arc Audio Kar Series KS300.4 amplifier, I expect very good things and hope the amp can meet my expectations.

FEATURES

That word says it all – design. This amplifier is another fine creation from the mind of Robert Zeff and his crew. It makes use of a Class H power supply circuitry. I'll explain the details of that after we take a look at the nitty-gritty of what this amp is all about.

The KS300.4 is a four-channel amplifier rated to produce 90 Watts per channel into a 4Ω load, 175 Watts per channel into 2Ω and can be bridged to supply 350W into a pair of 4Ω loads. The amplifier is (as most are) based around an aluminum extrusion for the chassis. The chassis has fins integrated into the area underneath the circuit board. The switching devices clamp to the heat sink using spring-loaded steel clips. These clips secure the devices tightly and also happen to serve as additional heat-sinks. A computer-controlled 3-inch fan can be found at the very center of the amplifier. The fan draws cool air in through holes in the sides of the shroud, channels it over the switching devices, then expels it through the ends of the amp after it passes along the aforementioned fins.

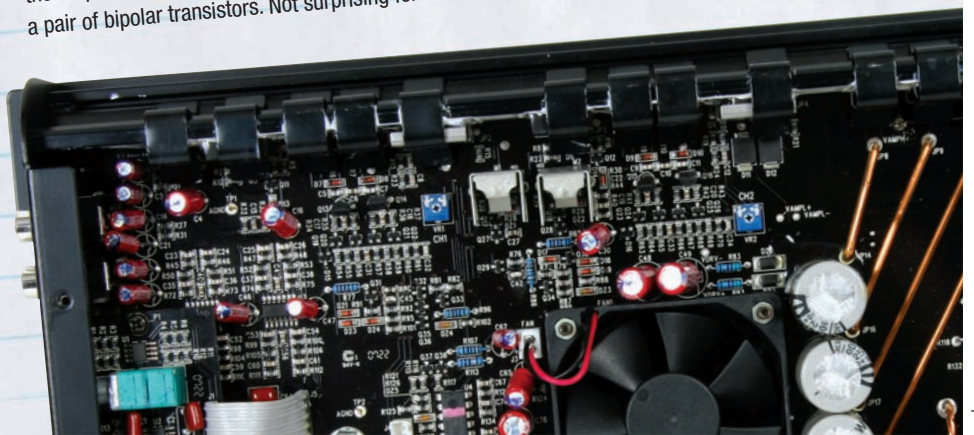
Let's jump ahead and have a look inside the amp. The circuit board is two-sided and features extensive surface-mount resistor, diode and transistor use. There are some ad-

ditional discrete components used where physical size requires them. Overall, the board layout is very neat and tidy and certainly every square inch of space has been maximized to minimize the footprint of the amplifier. A small daughter board lives at the control end of the amplifier and is attached to the main circuit board via a ribbon cable. This board is part of the preamp circuitry and allowed the designers to locate all the controls on one end of the amplifier.

In terms of major components, the KS300.4 uses four 75A MOSFETs for the power supply section accompanied by three 3,300μF, 25V, 105°C caps on the input side and four 3,300μF, 25V, 105°C caps on the output. The single power supply toroid is a multi-tap unit – more on that as we get into the discussion of the Class H circuitry. Buss bars are used to efficiently flow current from the power supply to the output stage of the amp. Each channel has a pair of bipolar transistors. Not surprising for a

Zeff design, the devices are ST Microelectronics TIP35C and TIP36C complementary silicon high power units, each rated for 25A continuous and 125W of thermal dissipation.

OK, enough about the inside, it's what's on the outside that counts, right? On the left side of the amp are the preamp inputs, as well as the amplifier's signal-processing adjustments. The RCA inputs are nickel-plated and colour-coded in white and red to define left and right channels. Each pair of channels has its own gain control that is adjustable from 200mV up to 4VRMS. An independent 12dB / Octave crossover is also available on each channel. The crossover can be set to low- or high-pass mode, or can be bypassed completely. Each crossover is adjustable from 55Hz to 550Hz. The front crossover has an X10 button that extends its range up to 5,500Hz. A bass boost control will dial in up to 15dB of bump (for whatever purpose you deem necessary). Each pair of



channels also has a mode switch, allowing your installer to choose from stereo, L+R mono or Left channel only mono. Finally, a source select switch allows you to choose 4-channel, 2-channel or 2-channel with bass boost operation. Weird as it is, I really like the font that Arc used for the KS300.4 silk screen on the side of the amp – I'll be requesting that for my personal use right away!

On the opposite end of the amp are the power and speaker connections. A terminal block for power, ground and remote will accept 4awg cable without any problem. A two-tiered speaker connection block will take 10awg cable on each of the eight connections, should you be in 'that' mood. Three 30A ATC fuses are located between the terminal blocks.

A few observations before we get to the

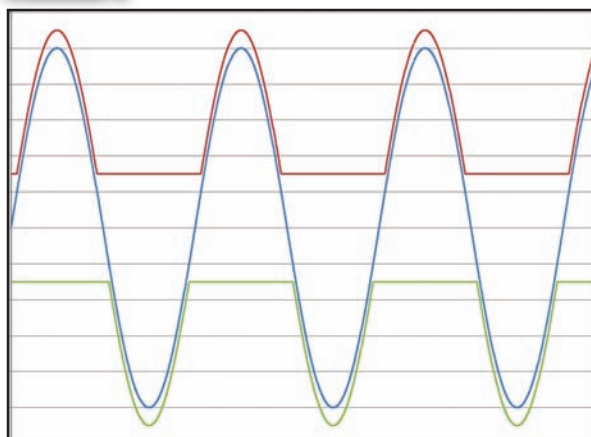
testing. The amplifier's mounting tabs extend outwards from the sides of the amp, meaning you can pack these units close together to maximize space in your installation. A single LED on the control end of the amp lets you know what the amp is doing and will also flash error codes should you do something wrong to your amplifier. This is possible thanks to the on-board microprocessor that controls the amp's functions.

So, what is this Class H power supply I have been mentioning all along? The arch-nemesis of any amplifier is heat – that goes without saying. A Class H amplifier has a power supply that tracks the output voltage above a preset level (some voltage is needed all the time, so it doesn't actually shut the power supply off when no music is playing). This means that at normal listening levels you are still turning the

output devices most of the way on relative to the modulated rail voltage. This dramatically increases amplifier efficiency.

So why not just a Class D amp? Aren't they extremely efficient? Yes they are, but there are significant sonic drawbacks as well. Class D amplifiers work by changing the way the audio signal is sent to the output devices. It converts the audio signal into a pulse-width-modulated waveform that turns the output devices all the way on and off at high speeds. Large filter networks are required to smooth out this 'chopped up' audio signal back into its original form. Class H amplifiers use a completely pure Class AB audio signal path that doesn't 'mess with' the audio signal. Class H is not a compromise in terms of sound quality – it simply reduces current draw. I have attached a rudimentary graph of how the power supply voltage in a Class H design operates – see Figure 1.

FIGURE 1



RED:
Positive Rail Voltage

BLUE:
Audio Waveform

GREEN:
Negative Rail Voltage

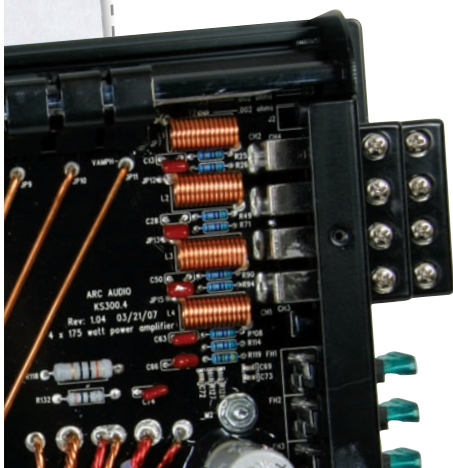
TESTING

I set the KS300.4 up on my bench and connected it to my pair of brand spankin' new Kinetik KIPS12-80 power supplies and my bank of load resistors. Figure 2 shows the power measurements. You can see that even at well below the CEA-2006 power measurement voltage of 14.4V, the KS300.4 exceeds its rated power. Efficiency at full power exceeds some Class D amplifiers and 1/3 power efficiency is almost twice what a conventional Class AB amp would be drawing. ➤

// The KS300.4 is a black box that does exactly what an amplifier should do – amplify the signal and allow it to sound absolutely great."

FIGURE 2 - POWER

Load	Supply	Supply Current	Power	Efficiency	1/3 Efficiency
4Ωx4	13.53 V	40 A	109.5 Wpc	81%	55%
2Ωx4	13.4 V	69 A	176.3 Wpc	76%	57%
4Ωx2	13.33 V	82 A	361.0 Wpc	66%	50%



ARC AUDIO KS300.4

Frequency response was pretty good, as shown in Figure 3. On the bottom end, the amp played down to 18Hz at -1dB and 8.95Hz at -3dB. The top end was good for 30.8kHz at -1dB and 57.5kHz at -3dB. I have added a new graph to this report, and will be using it in subsequent reviews – it's a phase response graph. Figure 4 shows the relative phase of the output signal relative to the input – this is the dashed line, while the solid line is frequency response. Less phase shift through the audio band represents better performance. As this is the first time I have published this, you don't have anything to compare it to, but we'll consider this as very good performance and compare as we see more over the rest of the year.

With the measuring complete, it was time for a listen. I set the KS300.4 up in my reference system. The source is a DRZ9255 and the speakers are LSi9s. The disc was of course the Focal Demonstration Disc 1. Spanish Harlem

was up first, and it was a nice change from the 'entry' amp I had just reviewed. Everything was clearer, crisper and more detailed. The piano sounded real again – ah, there's nothing like the sound of a good amplifier to relax you. What really stood out was Dock of the Bay by Lincoln Mayorga. Each instrument has a very accurately defined position on the soundstage with a clear sense of space around it. There was even some sense of depth to the performance – an amazing feat.

I had hoped to be able to A / B compare the KS300.4 against my Arc 2150SE amplifier, but alas, the 2150SE has found its way to the trunk of my car to replace another four-channel amp that wasn't firing on all cylinders. Nevertheless, the KS300.4 stands as a great-sounding amp and I have no complaints. Maybe I'll get a 2300SE for the car and bring the 2150SE back into the lab... Now where is Fred's email address?

“This amplifier is another fine creation from the mind of Robert Zeff and his crew.”

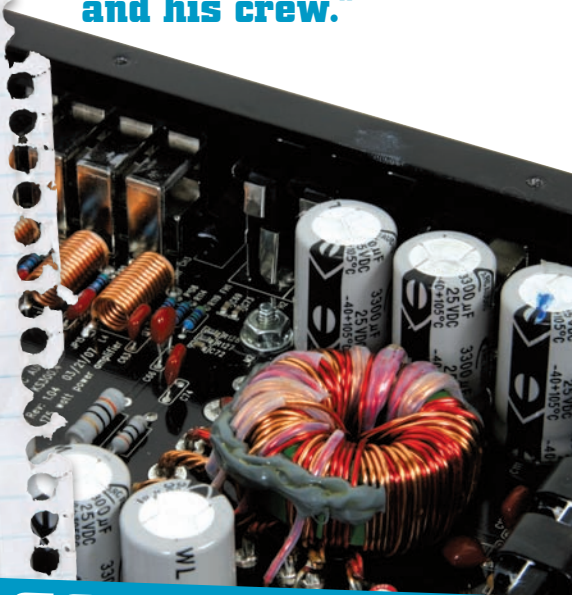


FIGURE 3

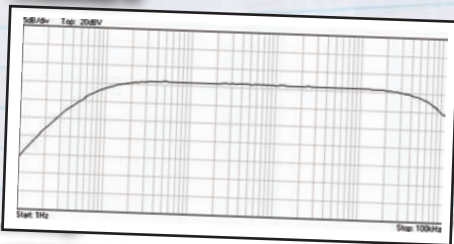
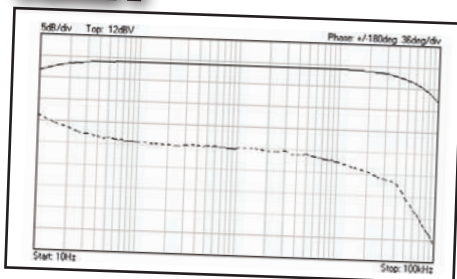


FIGURE 4



CONCLUSION

There are only a handful of audio companies who are truly working to advance their amplifier designs in terms of offering more bang for the buck in terms of sound quality, performance and, even more importantly, efficiency. With vehicle electrical systems becoming more and more inadequate and our desire to listen to our music at ever-increasing sonic levels, it's nice that Arc Audio has an offering that works as well as it does.

There are some criteria you must meet before rushing out to your Arc Audio dealer and having one of these installed. You must understand that it takes

good quality equipment to accurately recreate music as though it were a live performance. You must be passionate about your music, letting it invoke an emotional response from you. And finally, you must not be someone who falls victim to keen marketing ploys and tactics like bright LEDs, nickel-dipped chassis' or other elaborate distractions that do nothing to help make the amp sound better. The KS300.4 is a black box that does exactly what an amplifier should do – amplify the signal and allow it to sound absolutely great. **PAS**



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