



REVIEW: Parasound's Zamp V3

By Charles Hansen

Parasound

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www.parasound.com

MSRP: \$300 US

Dimensions: 9.5" W × 10" D × 2" H

Net Weight: 6.65 lbs, 3 kg.

Warranty: 10 years parts, 5 years labor

The Parasound Zamp V.3 Zone Amplifier is part of the extremely compact second- and third-generation Zcustom product line: Z because they are often used for multiple zones; custom because their diminutive size solves space problems in custom installations. The review unit is an earlier version of the Ztuner in the Parasound TDQ-150¹.

All Zcustom model front panel heights and mounting holes conform to the EIA standard for single space rack mounting. Zcustom panels are half rack width so that you can mount two Zcustom models in a single rack space when their front panels are attached. If you mount only one Zcustom model in a rack, it will require a Zblank SBS (side-by-side) panel to span the full 19" rack width. There is not much finger space under the unit when it is placed on a flat surface, but its light weight makes it easy to lift and carry.

The Zamp was furnished with a 16-gauge removable power cord, a 2.5mm-2.5mm trigger cable, and a 2.5mm-3.5mm trigger adapter cable. The 10-page Owner's Guide provides all the basics and specifications. The review unit was made in Taiwan.

INSIDE THE AMPLIFIER

The Parasound Zamp V.3 Zone Amplifier is a fully discrete stereo power amplifier rated at 45W per channel 8Ω in stereo mode (60W pc 4Ω), or it can be bridged to provide over 90W mono into 8Ω. **Photo 1** shows the front panel. The power button is on the left, followed by a 1/8" (3.5mm) stereo headphone jack. The display window in the center has four indicators. The red Protect indicator, which lights when the protection circuit activates, flashes for 2 seconds after the unit is first turned on. The L and R



PHOTO 1 (top): Front view. PHOTO 2 (bottom): Rear panel.

Channel indicators show green when the amplifier is operating normally, and will go out when the channel is faulted or an over-temperature exists. Finally, the Hi-Temp indicator turns red at or above the maximum safe operating temperature. The unit will shut down and remain off until it has cooled sufficiently.

The amplifier is composed of the usual three-sided steel sheet metal chassis and cover. Six screws hold the cover to the chassis, and it also engages a slot in the rear of the faceplate. This aluminum faceplate varies from 4–5mm thick, and the four rack mounting slots are an integral part of it. The top, bottom, and both sides have slots to enhance cooling. Four 1/4" thick plastic mounting feet have an elastomer ring on the bottom to help absorb vibration when you place the unit on a flat surface. You can configure the power transformer primary for 115V or 230V mains by means of a slide switch mounted flush to the bottom of the unit.

The rear panel (**Photo 2**) beginning on the left side has two pairs of gold-plated RCA input jacks that are looped together. Next comes a mini-control panel with three switches and three small pots. The switches are the Mono-Stereo switch (mono mode uses the right input jack); a Ground Lift switch;

and the Auto On switch. The latter has three positions: Audio Sense, in which the Zamp will power up automatically when an audio signal is present. This uses the control pot on the right side to adjust the sensitivity to an audio signal, the Main position that uses the front panel power switch, and the 12V position that responds to the 9-12V 15mA Trigger in-out jacks. The two pots on the left side are for L and R input level control, which the Zamp has in common with my Parasound HCA-1000A.

Two pairs of high-quality gold-plated five-way speaker binding posts are mounted on an angle to accommodate the compact chassis height. These pairs of binding posts are on US 0.75" centers so dual banana plugs can be used in stereo mode. However, the two red posts are spaced farther apart, so a dual banana plug cannot be used in bridged mono mode. The input jack and speaker terminal grounds are not connected together.

The IEC power receptacle has an integral 3A fuse, and its third ground pin is not connected to the chassis, thus the Ground Lift switch needs further explanation. This switch is normally left in the Gnd position. The manual explains that if you hear excessive back-ground hum, try setting the switch to

the Lift position, which disconnects the audio circuitry from chassis ground. The AC line side of the transformer remains connected to the chassis through a high value resistor.

Photo 3 shows the amplifier with the cover removed. You can see that the four input jacks, with their gold-plated ground shells, have nickel-plated center contacts.

A large Wei Kang toroidal transformer provides power for the Zamp. The protection relay board is located to the left of the toroid in the photo, and also carries the full-wave bridge rectifier on the underside.

The two small boards on the upper right behind the front panel are for the headphone jack and the power switch. Two 220 Ω power resistors deliver the amplifier output signals to the headphone jack. A small connector with wires running to the rear of the unit appears to deliver the audio signal to the audio sense circuit on the control switchboard at the lower right in the picture, near the input jacks. The hole in this PC board allows access to a bias adjust pot on the main board.

The finless aluminum heatsink sits vertically at the center of the amplifier. The main PC board is a single-sided FR4 board with solder mask. A number of wire jumpers are used to interconnect circuit tracks. Conventional-grade metal film resistors and polypropylene film caps are used in the audio path. Air-core inductors and RC zobel networks are used between the output transistors and the binding posts.

The four status indicators are located on a vertical PC board just behind the display window.

TOPOLOGY

A schematic was not furnished with the unit. John Curl told me that he was not involved in the design of the ZCustom series of components. The lack of JFETs in the front end of the amplifier is one of the telling differences between the Zamp and my JC-designed HCA-1000A.

The heatsink mounted output devices for each channel are Sanyo 2SD1074 NPN and 2SB817 PNP bipolar power transistors. I find it a bit unusual to see 2SB/2SD devices (f_T 15MHz)

in the output stage, rather than the more usual 2SA/2SC devices (f_T 40-50MHz). However, like the Parasond HCA-1000A, the driver transistors are 2SA1358 and 2SC3421. Bipolar TO-92 transistors are used in the front end, with a heatsink mounted 2SD669A Vbe multiplier. The thermal protection sensor is located in the center of the heatsink. The main reservoir capacitors are 4700 μ F Jamicons, two per channel.

The main PC board also uses three dual op amps: a JRC4558 appears to be part of the audio sense circuit used for auto turn-on. There are also one JRC072 and one JRC2072. One is probably used for the DC servo functions, and the other the inverter for bridged mode operation. Two power transistors provide the regulated DC rails for the op amps. The small control switchboard has one 16-pin digital logic chip and a few discretes.

MEASUREMENTS

I operated the Zamp V.3 amplifier at 10W into 8 Ω at 1kHz to properly condition it for testing. About ten minutes into the run the amplifier tripped on high temperature protection. The chassis temperature just above the heatsink had increased to 46° C. The amplifier reset automatically in about three minutes. After another five minutes it tripped again.

At one-third power (15W into 8 Ω) the chassis above the heatsink reached a maximum temperature of 47° C in eight minutes, when the high temperature protection tripped yet again. I reduced the output power to 5W, and the amp ran fine for the remainder of the hour without further high temperature trips. Perhaps the compact Zamp requires the frame of an equipment rack for additional

conduction cooling.

The THD reading at the end of this 5W run-in period was 0.0054% in both the left and right channels. Accordingly, the distortion measurements for the left channel are presented here. There is a low thump when starting up and silence when shutting down the amplifier.

Output hum and noise measured 0.12mV (-87dB, input shorted) and was inaudible with my ear against the speaker. I also measured a worst-case -2.3mV of DC offset (left channel). The Gnd Lift switch position made no difference in any of the readings.

The Zamp V.3 preserves normal polarity. Input impedance measured about 20k, much lower than the 33k specified, and did not vary with the level control settings. The left input is shorted when in mono (bridged) mode. The gain at 2.83V RMS output into 4 Ω and 8 Ω loads was approximately 22dBv over the entire audio frequency range. The output impedance at 1kHz was 0.11 Ω , increasing to 0.31 Ω at 20kHz. In bridged mono mode the output impedances were 0.16 Ω and 0.38 Ω .

FREQUENCIES

The frequency response (**Fig. 1**) was within -1dB from DC to 37kHz, at an output of 2.83V RMS at 1kHz into 8 Ω . It was down -3dB at 72kHz. There is a bit of a lift at low frequencies, while the



PHOTO 3: Interior.

high frequencies start to fall off before 20kHz. The response with a complex load of 8Ω paralleled with a 2μF cap (a test of compatibility with electrostatic speakers) produced a frequency peak of +3.4dB at 43kHz (upper dashed line).

The amplifier was relatively insensitive to the impedance variations of my speak-

er load, an NHT SuperOne (dashed line between 4Ω and 8Ω). When I shut down the unit and switched to bridged mono mode, the gain was 10dBv higher than in stereo mode into 8Ω with the same level of input signal. In **Fig. 1** I normalized the bridged mode level at 1kHz to +2dB to keep it within the

graph.

At low frequencies the noise floor limited the cross-talk performance. The right to left

channel wideband crosstalk was slightly better than that of the left to right (**Table 1**). Adding an A-weighting filter altered the 10kHz performance by just -4dB.

TABLE 1: CROSSTALK.

Frequency	R to L	L to R
100Hz	-79dB	-79dB
1kHz	-75dB	-72dB
10kHz	-61dB	-56dB
20kHz	-60dB	-51dB

THD+N versus frequency is shown in **Fig. 2** for the loads indicated on the

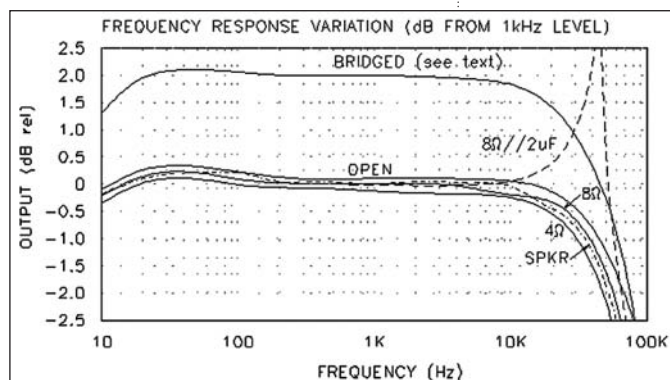


FIGURE 1: Frequency response.

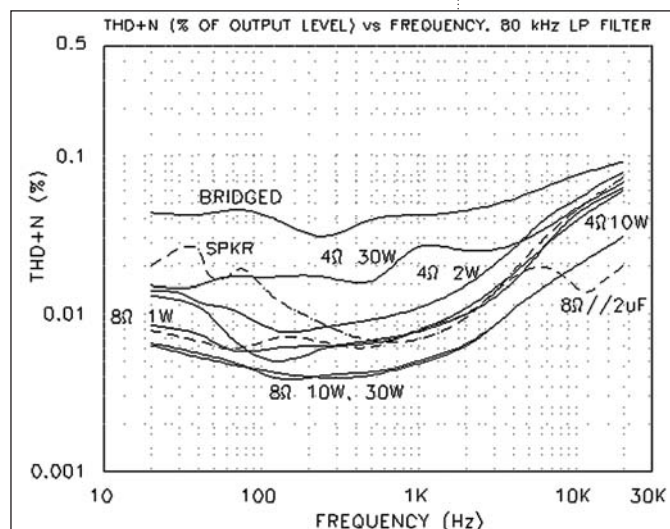


FIGURE 2: THD+N vs. frequency.

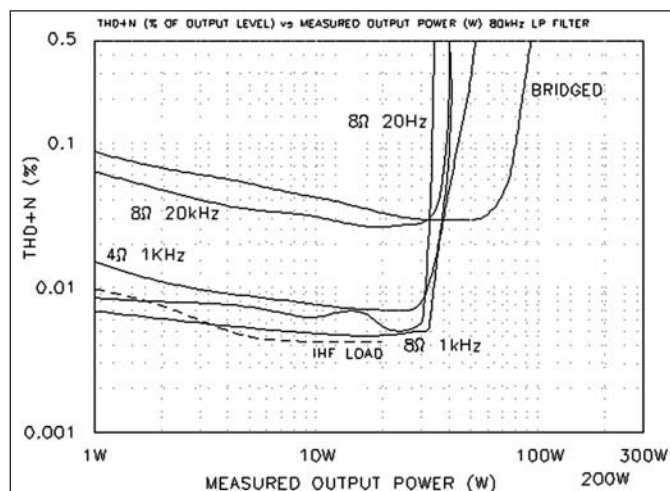


FIGURE 3: THD+N vs. output power.

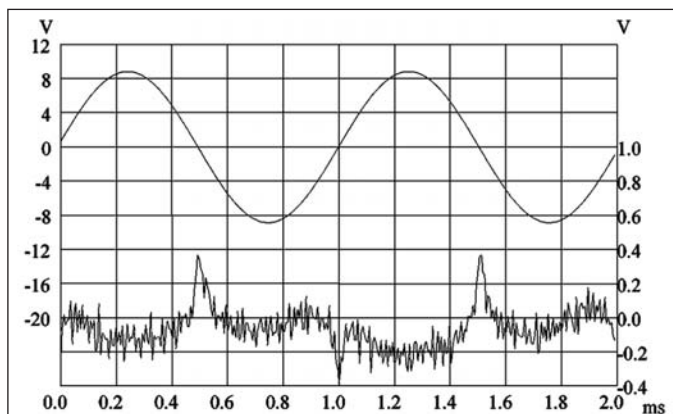


FIGURE 4: Distortion residual, 1kHz 5W 8Ω.

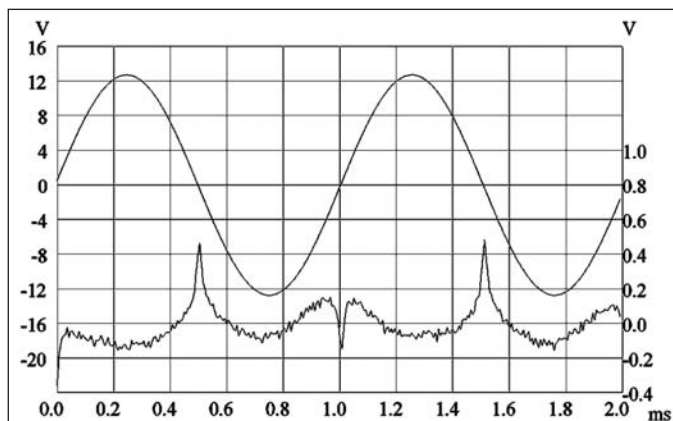


FIGURE 5: Distortion residual, bridged mode, 1kHz 10W 8Ω.

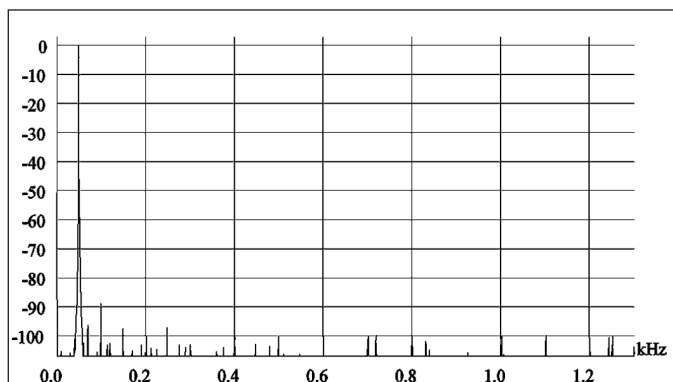


FIGURE 6: Spectrum of 50Hz sine wave, 5W 8Ω.

graph. During distortion testing, I engaged the test set 80kHz low-pass filter to limit the out-of-band noise. The dashed wiggle at low frequencies with the speaker load is due to the varying impedance with frequency. The dashed wiggle at the high frequency end is due to the complex load of 8Ω in parallel with 2μF. The bridged mono load for this test was 10W into 8Ω.

Figure 3 shows THD+N versus output power for the loads and frequencies shown in the graph. The IHF “speaker” load is shown as a dashed line. The amplifier, with both channels driven, reached its 1% clipping point at 43.4W with the 8Ω load (for -0.16dBW of headroom) and 55W with the 4Ω load (-0.38dBW). The negative half-cycles clipped just slightly before the positive half-cycles, with a scoop-out at the negative peak.

The headroom shortfall from the rated output at 8Ω was even greater at 20Hz (39.4W or -0.58dBW) and 20kHz (42.9W or -0.21dBW). The Zamp did reach rated output between 2% and 3% THD, however. With the unit connected to 8Ω in bridged mono mode, the 1% THD level at 1kHz was

98.9W, producing a power output headroom of +0.41dBW. At this power level the 120Hz power supply rectifier pulses slightly modulated the peaks of the 1kHz sine wave.

The distortion residual waveform for 5W into 8Ω at 1kHz is shown in **Fig. 4**. The upper waveform is the amplifier output signal, and the lower waveform is the monitor output (after the THD test set notch filter), not to scale. The residual signal shows mainly noise, but with spikes at each zero crossing. THD+N at this test point is a low 0.0049%. **Figure 5** shows the residual 1kHz waveform in bridged mono mode with a 10W load into 8Ω. Here the THD+N is 0.042%.

The spectrum of a 50Hz sine wave at 5W into 8Ω is shown in **Fig. 6**, from zero to 1.3kHz. The THD+N here measures 0.0052%. The 2nd, 3rd, 4th, and 5th harmonics lie at -86dB, -96dB, -100dB, and -95dB, respectively. The calculated THD for these harmonics is also 0.0052%. Low-level power supply artifacts are also present at 60Hz, 120Hz, and 180Hz. More curious is the distribution of mostly 100Hz-spaced spikes at -100dB across the spectrum. The spectrum of a 50Hz sine wave at

10W in bridged mono had a similar distribution of harmonics and spikes, but at higher levels (**Fig. 7**). The THD+N reading here is 0.043%.

I also recorded the spectrum of a 1kHz sine wave at 5W into 8Ω (**Fig. 8**). The THD+N measures 0.0054%, with the 2nd-5th harmonics at -95dB, -86dB, -95dB, and -91dB. This calculates to 0.0035% THD. As with the 50Hz spectrum, there is a pattern of spikes across the display at or near -100dB. I wonder whether these are

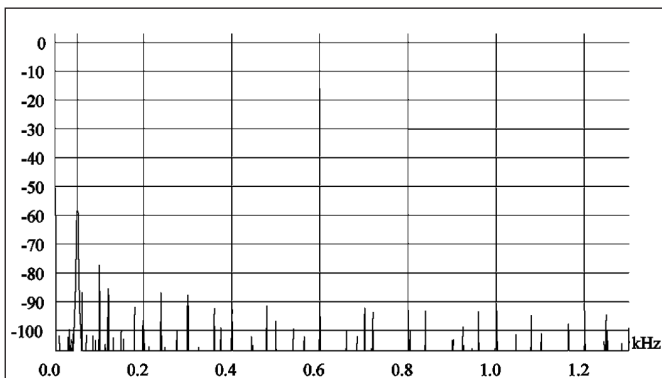


FIGURE 7: Spectrum of 50Hz sine wave, bridged mode, 10W 8Ω.

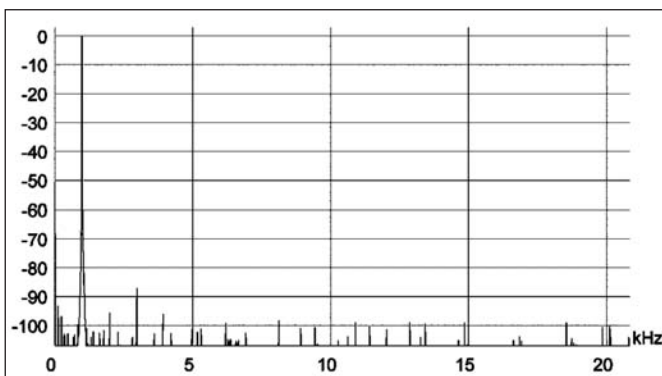


FIGURE 8: Spectrum of 1kHz sine wave, 5W 8Ω.

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related to the crossover distortion I observed in the residual distortion. The spectrum of 1kHz into the speaker load (Fig. 9) produced a rather large spike at about 1.5kHz, which I cannot explain. The measured THD+N is 0.0046%.

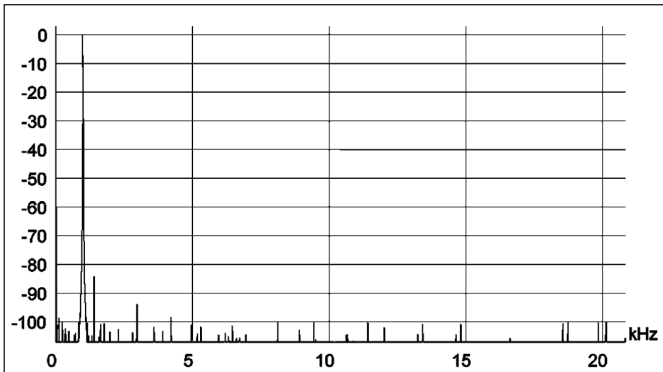


FIGURE 9: Spectrum of 1kHz sine wave, 5W speaker load.

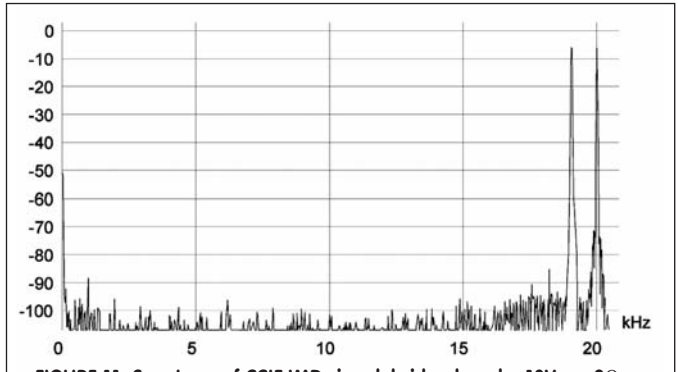


FIGURE 11: Spectrum of CCIF IMD signal, bridged mode, 12Vp-p 8Ω.

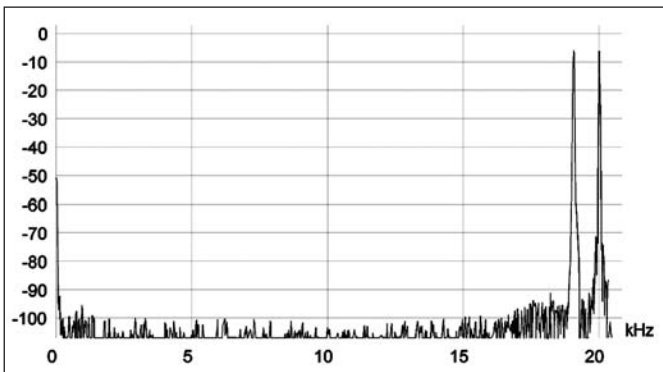


FIGURE 10: Spectrum of CCIF IMD signal, 12Vp-p 8Ω.

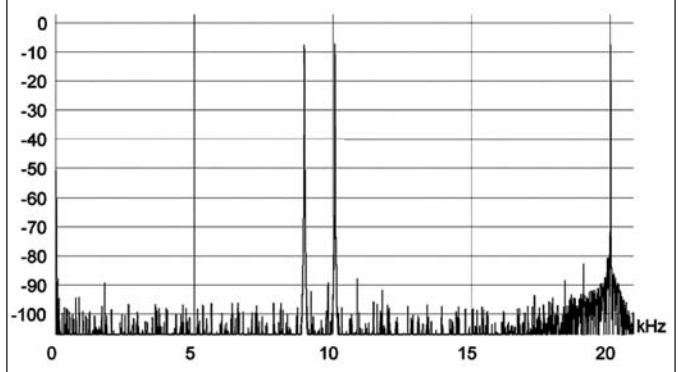


FIGURE 12: Spectrum of multitone IMD signal, 12Vp-p 8Ω.

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By Bill Waslo

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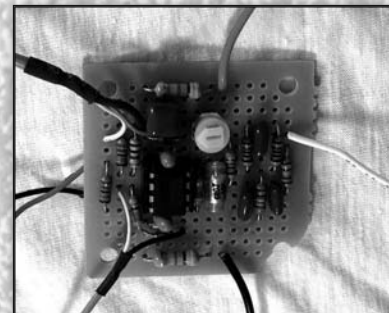
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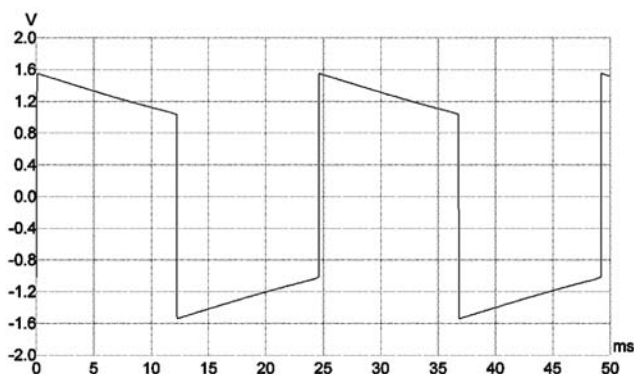


FIGURE 13: Squarewave 50Hz, 2.5Vp-p 8Ω.

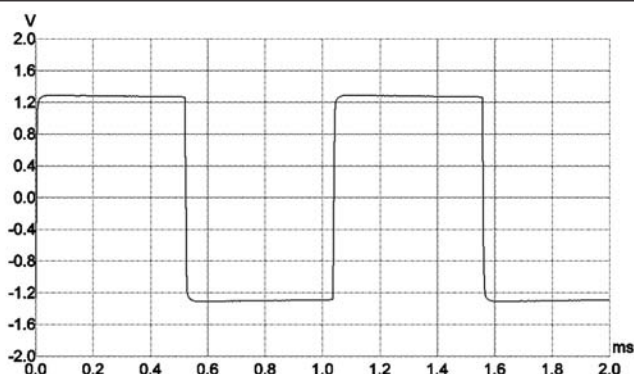


FIGURE 14: Squarewave 1kHz, 2.5Vp-p 8Ω.

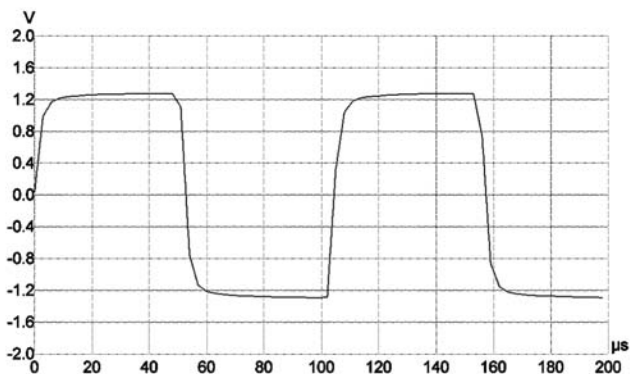


FIGURE 15: Squarewave 10kHz, 2.5Vp-p 8Ω.

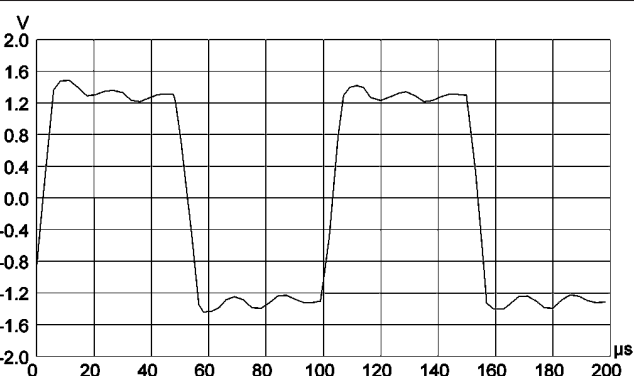


FIGURE 16: Squarewave 10kHz, 2.5Vp-p 8Ω/2μF.

Figure 10 shows the amplifier output spectrum reproducing a combined 19kHz + 20kHz CCIF intermodulation distortion (IMD) signal at 12Vpp into 8Ω. The 1kHz IMD product is -95dB (0.0018%), and the 18kHz product is -91dB. As with the sine wave spectrums, there are groups of spikes at or below -100dB. In bridged mode (Fig. 11) the CCIF spectrum is similar, but with higher levels of IM products.

I repeated the IMD test with a multi-tone signal (9kHz + 10.05kHz + 20kHz, Fig. 12), which gives a better indication of the amplifier's nonlinear response, because it is a closer approximation to music than a sine wave. The MIM spectrum is equally busy.

The 2.5Vp-p squarewaves of 40Hz and 1kHz into 8Ω (Figs. 13 and 14) were almost perfect. The leading edge of the 10kHz squarewave in Fig. 15 is noticeably rounded, indicative of the early HF response rolloff. When I connected 2μF in parallel with the 8Ω load in Fig. 16, there was noticeable ringing, which collaborates

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TABLE 2: MEASURED PERFORMANCE.

Parameter	Manufacturer's Rating	Measured Results
Continuous Power Output:	45W RMS × 2, 20Hz - 20kHz, 8Ω, both channels driven	39.4W 20Hz, 43.4W 1kHz, 42.9W 20kHz
	60W RMS × 2, 20Hz - 20kHz, 4Ω, both channels driven	55W 1kHz
	90W RMS × 1, 20Hz - 20kHz, 8Ω (minimum impedance)	98.9W 1kHz
		all at 1% THD
Frequency Response:	5Hz to 100kHz, +0/-3dB	5Hz to 72kHz, -3dB
Total Harmonic Distortion:	<0.07%, 8Ω full output	0.07% at 43W 8Ω
	<0.10%, 4Ω full output	0.10% at 49W 4Ω
	<0.02% average levels	0.011% maximum at 2W
IMD - CCIF (19 + 20kHz):	<0.05%	0.010% CCIF
MIM (9 + 10.05 + 20kHz):	No spec	0.012% MIM
Dynamic headroom:	1.5dB	-0.58dBW 20Hz 8Ω
Inter-channel crosstalk:	80dB at 1kHz	-79dB A-wtg
	60dB at 20kHz	-60dB (R-L)
Input Impedance:	33kΩ	20kΩ
Input sensitivity:	600mV	7W 8Ω at 600mV
	1.5V for full output	45W 8Ω 2.7% THD
Gain:	N/S	22dBv
Signal to Noise Ratio:	116dB, input shorted, IHF A weighted	Not tested
Power Requirements:	220W at full output, 1W Standby	Not tested
Output Impedance:	N/S	0.11Ω 1kHz
		0.31Ω 20kHz

with the frequency peaking in **Fig. 1**.

A comparison of the measured results and the manufacturer's ratings is shown in **Table 2**. *aX Reference*

1. "FM Tuners: NAD and Parasound," *audioXpress* 6/02, p. 60.

Manufacturer's Response:

1: In the discussion about the temperature protection tripping with higher-level test signals, this seems at odds with the subjective review's frequent comments about the amp running cool. Perhaps there should be a comment in the objective section about the temperatures when playing real program materials instead of test signals. I'm sure

readers will understand this, but someone viewing a reprint might not be all that sophisticated about audio and electronics.—*Gordon Sell, PR for Parasound.*

2: It's true the amp will get warm with high power sine wave testing, owing to the heat dissipation limitations of such a small chassis (and the fact that is fully occupied with parts). But it won't overheat with music under 99% of the applications in which it's used.

By the way, with a Zbreeze stacked on it running silently (actually about 27dB), on its lowest speed the Zamp v.3 will output its full rated 4Ω power 24/7 without a wimper.—*Richard Schram, Parasound.*

Parasound Zamp V.3 Amplifier

LISTENING CRITIQUE

Reviewed by Duncan, Nancy, and Colin MacArthur

We first played the Parasound Zamp on Colin's computer-based sound system. A few days later when we tried to get the Zamp back, we realized we'd goofed. Returning it wasn't on Colin's agenda.

"Do you have to take it back?" he asked.

"Yes," said Nancy. "Unless you want to write the whole review."

A heavy sigh from the 16-year-old slouched at the breakfast table. "If you insist," he said.

We each reacted differently to the Zamp's plain appearance and tiny size. Colin thought it was small, sleek, and elegant. I thought it was inconspicuous. Nancy insisted that it looked like a component a car thief had pried out of a

dashboard.

In any event, the Zamp is small—very small. It's one thing to read the dimensions on paper and another to unpack this amplifier and hold it in your hands (or hand). Given its size and cool operation, you can tuck it away and not worry about it. Once you've hidden the Zamp, its looks (whether you like them or not) become irrelevant.

USER EXPERIENCE

Parasound packs plenty of features into the half-rack-width Zamp. The front panel, with power switch, indicator lights, and headphone jack, is clean and uncluttered. The same can't be said of the rear panel, which squeezes in six jacks (four RCA for inputs and outputs and a pair of mini-jacks for remote turn-on), three small switches (mono, ground lift, and signal sensing), three variable controls (R and L input level and signal sensing sensitivity), two pairs of "5-way" speaker connections, a fuse holder, and an IEC AC connector (phew). An AC voltage selector switch on the bottom of the Zamp

rounds out the feature set.

While we can see the utility of most of these features for video applications, we used only a few for audio testing. All the features we tested (inputs, outputs, volume controls) worked flawlessly with two minor exceptions. The Zamp ran cool to the touch, didn't exhibit any mechanical noise, and didn't require any particular care or feeding.

To fit all those jacks and controls onto the rear panel, Parasound mounted the output binding posts diagonally very close to the AC input connector. Thus, of the "5-ways," banana plugs work very well, bare wires will work if you're careful (if you have large fingers, try using a ½" nut driver), and large spade lugs won't fit. If you plan to change speakers often and will be working in a tight space, we recommend the bananas.

Our only other caution concerns the volume controls, which work perfectly for matching gains between channels and with other amplifiers (as the manufacturer intended). However, their location and small size would cause difficulties if the Zamp were driven

directly from a source with no volume control of its own.

DETAILED LISTENING RESULTS

We auditioned the Zamp using Genesis 400 and Speaker City EFE (reviewed in *aX* 3/06) speaker systems. Following our standard 50-hour break-in period with the EFE speakers, we did most of our serious listening with the Genesis speakers. We compared the Zamp directly with our reference tube integrated amplifier, the Manley Stingray, as well as with an older solid-state Audio Source AMP-1. The Zamp's sound was surprisingly close to that of the Manley. The Zamp was better than the aging AMP-1 in all respects and probably will replace it driving the EFEs in Colin's room.

We auditioned the Zamp using a number of tracks from the *Hi-Fi News and Record Review Disk III* (track 2: Parry's "Jerusalem"; track 4: Vivaldi's trumpet concerto; tracks 5 and 6: excerpts from Prokofiev's "Peter and the Wolf"; track 7: Purcell's "Welcome, Welcome Glorious Morn"; track 10: a Corkhill percussion piece; and track 14: Rio Napo RSS demo), as well as a wide variety of other CDs listed in the appendix. (The CD list was long because we enjoyed every CD we listened to with the Zamp.)

The smoothness and naturalness of the Zamp's midrange was exceptional: clean, sweet, realistic, and musical. These characteristics were especially evident on vocal music of all genres—folk (The Highwaymen, Bob Dylan), country (Charlie Daniels, The Cowboy Junkies), bluegrass (Old and in the Way), blues (Doc and Merle Watson), rock (Jethro Tull), and Romantic (Dvorak). The Zamp also performed admirably with piano (Beethoven) and instrumental music (Prokofiev, Vivaldi, Purcell, Strauss, Tchaikovsky, Old and in the Way, and The Modern Jazz Quartet).

With certain other amplifiers we've auditioned, the horns on the Vivaldi concerto have occasionally made us cringe. With the Zamp, listening to the Vivaldi trumpets was a pleasure.

Another strong feature of the Zamp was its imaging ability. The individual instruments in the Prokofiev and Rio Napo pieces were well defined and spaced precisely across the stage. The

choir in the Parry piece was distributed evenly across the entire back of the stage. The vocals on the Highwaymen and Charlie Daniels recordings were stable, firmly located, and distinct from the instruments (and each other). Note: the Zamp didn't extend the image beyond the speakers on the Rio Napo piece, although between the two speakers it produced an image with good width, depth, and height, as demonstrated by the choir on "Jerusalem" and by the drum kit of the two BROTHER tracks.

Transients, dynamics, and "drive" were the Zamp's third strong suit. The transients on the Corkhill, Rio Napo, and Charlie Daniels pieces sounded crisp and alive. The dynamic range of the massed instruments on the Prokofiev and drums and didgeridoo on the BROTHER selections was impressive. On the faster pieces the rhythm produced by the Zamp could best be described as *toe-tapping*. Two minor caveats: we tend to listen at below-rock-concert levels, and both sets of speakers we used are reasonably efficient [89dB (2.83V, 1M)]. If you listen at louder levels or own a less efficient speaker system, your results may vary.

After hearing about the Zamp's three major strengths, you're probably waiting for the other shoe to drop. Except there wasn't another shoe—perhaps a lightweight slipper or two. The Zamp's low-frequency response was very strong on Prokofiev's drums and tympanis—maybe a bit too strong, as we heard a slight wooliness on instruments such as the bassoon in "Peter and the Wolf." The drums on both BROTHER cuts sounded realistic enough to make us fear for our woofers.

Although our listening room, with its multiple hard surfaces, is unforgiving of any hint of high-end harshness, all recordings sounded clean and natural. Only in comparison with a much more expensive amplifier did the Zamp's highs exhibit a little solid-state graininess. Again, this characteristic was particularly evident at high levels. In addition, the cymbals on the Prokofiev and MJQ pieces lacked that last bit of shimmer.

The ambience recovery of the Zamp was another area in which we disagreed. I thought the hall sound in both the



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Parry and Henry V pieces was exceptional and the sense of air around the instruments and vocals on the Highwaymen recordings was very natural. Nancy thought the ambience recovery was good but said she'd heard better, particularly on the Parry piece.

FINAL THOUGHTS

NM: We seldom write rave reviews. At times manufacturers have accused us of being, er, too picky. Unkind. Less than enthusiastic.

After listening to the Zamp for a few hours, I wanted to jump up and down and shriek "Three hundred bucks? Are you kidding?" If you're in the market for an inexpensive amplifier, run—do not walk—to check out the Parasound Zamp. It's a fabulous value for the money.

CM: None of my friends think of a quality stereo system as a high priority: a \$90 boombox is considered "high-end." In my mind, the Zamp represents the gold standard for a teenager's amplifier. It sounds great and has a form factor acceptable for almost any space. For

me it has become a must have. And the price tag makes it feasible financially. The Zamp's great sound and price make it a steal not only for a teenager but also for anyone in the market for a reasonably priced amplifier.

DM: This part is easy—buy this amplifier.

Of course, I have some caveats. The Zamp is an incredible bargain at \$300, but it isn't perfect. We won't be getting rid of our reference amplifier anytime soon. However, if you're thinking of purchasing a sub-\$1000 amplifier, you should listen to the Zamp. ■

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