

EDWARD J. FOSTER

Rotel RMB-1095

Five-Channel Amp



There are certain words and phrases that, despite common currency, I won't use, because they just don't make any sense. One example would be "very unique." If something is unique, it is singular, the only one of its kind. There can be no degrees to that, no more or less: It either is or it isn't. Another would be "faultless." Calling a product faultless implies that you are prepared to prove a complete absence of flaws—nonexistence. Can't be done. But much as I hate to use words like "faultless" to describe a hi-fi component, the Rotel RMB-1095 tempts me. It's a wonderful amp! On the test bench and in the listening room, it performed faultlessly, and in at least one respect it is unusual enough that some, less inhibited than I, might call it unique.

That particular aspect isn't earthshaking. It doesn't involve circuit design or anything esoteric. In fact, the RMB-1095's circuit topology seems pretty much plain vanilla. What I'm referring to is the pair of casters that support the amplifier's rump end, en-

abling you to maneuver it into place by lifting the front a tad and making like a wheelbarrow. Once you get it in position, it rests on three jumbo feet shod in firm but resilient pads. The wheels are a small point, to be sure, but considering the amp's weight, it's a thoughtful, typically Rotel gesture. Unique? No, not really. In fact, Rotel did the same thing a quarter century ago with the RB-5000, a 500-watt-per-channel stereo amplifier.

Rotel tends to stay with the tried and true electronically but implements its designs exceedingly well. Although I have no detailed information on the RMB-1095's circuitry, it seems clear from the test data that it employs the traditional Class-AB approach, probably with a fairly generous amount of bias to eliminate crossover distortion. Rotel simply does a better job executing traditional topologies than many others do, chooses components of superior quality, and doesn't scrimp to save a nickel. The same can be said for a handful of other companies—Bryston and Krell come immediately to mind—but their products sell for considerably more.

The Rotel RMB-1095 is bigger and heavier than many other 5 x 200-watt amps because it needs to be, not because it wants to be. Without noise-inducing switching power supplies or multirail topologies that are efficient but have questionable distortion characteristics, the RMB-1095 needs a pretty potent power source, and that's what it has. Pop the lid and you'll find its capacious chassis chock-full of components, not empty space. Two Rotel-made toroidal power transformers are stacked one atop the other in the center. Only the top one is visible; the other is hidden under the mounting platform for the upper. Heat sinks flank both sides of the chassis and sport multiple Toshiba power transistors for each channel.

The input circuit board runs across the top portion of the rear of the package. Mounted directly to it are gold-plated RCA jacks for unbalanced inputs and XLR connectors for balanced. A DB-25 socket enables single-plug hookup for all five channels to preamps and processors that support this type of connection. Using the DB-25 requires that you insert open plugs (supplied) into the RCA jacks, which en-

ROTEL

Rated Power: 200 watts per channel into 8 ohms, 20 to 20 kHz, with less than 0.03% THD.

Dimensions: 17 in. W x 9½ in. H x 15¾ in. D (44 cm x 24 cm x 39.8 cm).

Weight: 75 lbs. (34 kg).

Price: \$1,999.

Company Address: 54 Concord St., North Reading, Mass. 01864; 800/370-3741; www.rotel.com.

gage switches that toggle the input lines to the DB-25 and adjust the input impedance appropriately.

The input circuits use 5534A op-amps that, despite golden-ear protests to the contrary, do a fine job if you know how to handle them. Rotel says eight British-made, Dennis Moorcroft-designed capacitors serve as power-supply filters. Presumably they're tucked under the shield that supports the input board, because they're not readily visible. Component quality seems excellent, and the layout and construction are neat, which testifies to care in manufacture. Some call this "build quality," but a good-looking layout doesn't ensure quality any more than a sloppy one precludes it. The best that can be said is that care in manufacture never hurts! Frankly, I'm just as impressed by the rubber dampers affixed to the chassis under the sheet-metal cover as I am by neat wire routing. Covers that vibrate in sympathy with the power transformer are one of my pet peeves, and I can't see the wire routing when the cover is in place.

In addition to the two internal heat sinks, most of the front panel serves as a third, external heat dissipater. The center of the panel is smooth and bears the power pushbutton, power indicator, and five LEDs that illuminate when a protection circuit has triggered. Each channel's protection circuit minds its own business unless tragedy is imminent, in which case it doesn't muck around with current limiting, which can have disturbingly audible side effects; it simply disconnects the works and turns on the LED. It resets itself when the fault is cleared.

In use, the RMB-1095 never got more than moderately warm, so I guess its convection cooling is more than adequate. I'll happily accept the extra weight in the heat sinks in exchange for the freedom from fan noise. Power comes in through a removable, heavy-duty, three-wire IEC line cord, which brings up one feature that's missing on the RMB-1095: remote power switching. The only way to turn the amp on and off is with the front-panel button. If I owned the RMB-1095, I'd get a remote-controlled power strip of adequate capability, plug the amplifier into that, and leave the amp's own power switch on. Rotel says that the RMB-

1095 has a built-in surge attenuator to prevent circuit breakers from tripping at turn-on; I presume that the surge attenuator works whether or not you use the amp's power switch.

Including the front-panel heat sink and the bumpers that protect the rear-panel connectors, the RMB-1095 needs at least 16 inches of shelf depth and 17 inches of width. Figure on using a sturdy shelf (the amp weighs 75 pounds) with a vertical spacing of at least 13 to 14 inches to permit adequate airflow. Rotel suggests a minimum clearance of 4 inches all the way around.

Outputs are color-coded, multiway binding posts that accommodate spade lugs and single or dual banana plugs. The posts aren't drilled to accept bare wire or pins, but that's only a minor inconvenience; you're better



In the listening room and on the test bench, the RMB-1095 performed faultlessly.

off using lugs or plugs anyway. I've annoyed some companies by asking why they don't mount their amplifiers' output binding posts on $\frac{3}{4}$ -inch centers so they can accept dual (GR) banana plugs. I'm aware that $\frac{3}{4}$ -inch spacing is illegal in Europe, but I don't live there. Neither do most of my readers, and North America is not exactly the world's smallest market. If a company the size of Rotel can provide different products to meet the individual needs of the European and U.S. markets, why can't others?

Clearly, the Rotel RMB-1095 is built like the proverbial brick pagoda. Because it is, and because Rotel doesn't scrimp when it

comes to components and ratings, the RMB-1095 doesn't just meet spec and THX Ultra certification requirements, it blows them away! That's apparent from the test data, where the RMB-1095 cleared every hurdle by a huge margin—and from its effortless character in the listening room.

"Effortless" is the word of choice. No matter what music I handed it, no matter what movie soundtrack, the RMB-1095 refused to cry uncle. In stereo in my music listening room, it held its own against my reference Bryston 4B-ST so well that I could not tell them apart with any degree of surety, on any music, despite the Bryston's slightly higher power rating. True, I wasn't driving either amp to its limits, and it's also true that the powered woofer in the Mirage OM-8s I use for music listening reduces the strain on the main amp. But I also tried passive speakers and couldn't reliably tell the amps apart then, either.

That's high praise for the Rotel, because the Bryston is an excellent amplifier. Technically, I attribute this performance to the RMB-1095's remarkable bandwidth, distortion that is not only low but virtually independent of the power being drawn, the amp's ability to drive high currents into low-impedance loads without batting an eye, and its low and uniform output impedance. It is a most remarkable amplifier.

In my home theater, the RMB-1095 wiped out the amp I had been using. For the sake of decency, I'll not reveal the identity of the vanquished, since it was less powerful than the RMB-1095 and the contest was less than fair. Suffice it to say that I found no soundtrack that taxed the RMB-1095, even when I dropped the subwoofer out of the system and redirected bass into the main front speakers (Paradigm 9se MK 3s, which are, fortunately, big enough to take the gaff).

I would be most happy to install the Rotel RMB-1095 as the reference amp in my home theater. It's musical, it's powerful, and it got the most out of my speakers. From the test results, I dare say it will get the most out of your speakers, too, because it really doesn't seem to give a damn about what kind of load it's driving. It's that kind of amplifier—the best kind. I recommend it with enthusiasm.

A

TEST RESULTS

I have more than a passing acquaintance with power amps. I hate to admit how long ago it was that I designed my first one or how many have passed through my lab since. Power-amp design, like most things electronic, comes down to a delicate balance of conflicting requirements. You want low distortion? No problem! In theory, feedback can make distortion as low as you want, but you've got to trade something to counter distortion that way. Feedback brings its own bag of conflicts. What will you trade? Bandwidth? Stability? Output impedance characteristics? A little from Column A and some from Column B? Or are you willing to spend extra for transistors that produce less distortion and don't need so much feedback to Band-Aid the wound? A superior power amp is one

MEASURED DATA

Output at Clipping (1% THD at 1 kHz): 8-ohm loads, 285 watts (24.5 dBW)/channel; 4-ohm loads, 500 watts (27 dBW)/channel.

Dynamic Power: 8-ohm loads, 315 watts (25 dBW)/channel; 4-ohm loads, 575 watts (27.6 dBW)/channel; 2-ohm loads, 1,060 watts (30.3 dBW)/channel.

Damping Factor re 8-Ohm Loads: 415 at 50 Hz.

Output Impedance: 20 milliohms at 1 kHz, 25 milliohms at 5 kHz, 35 milliohms at 10 kHz, and 49 milliohms at 20 kHz.

Sensitivity for 0-dBW (1-Watt) Output: Unbalanced inputs, 120 mV; balanced inputs, 230 mV.

Noise (A-Weighted): Unbalanced inputs, -95 dBW; balanced inputs, -91.5 dBW.

Input Impedance: Unbalanced, 31.9 kilohms.

Channel Separation, 100 Hz to 10 kHz: Unbalanced inputs, greater than 73.2 dB; balanced inputs, greater than 64.7 dB.

Channel Balance: ± 0.03 dB.

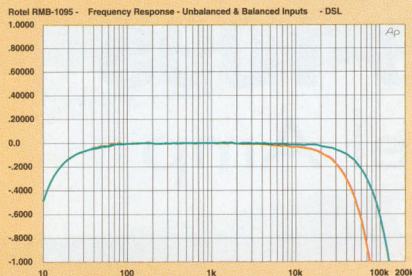


Fig. 1—Frequency response. Unbalanced input, aqua; balanced input, orange.

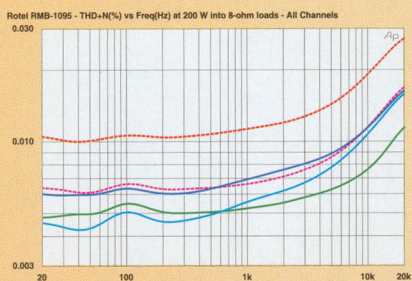


Fig. 2—THD + N vs. frequency at rated power, 8-ohm load. Left front, blue; right front, red; center, green; left surround, cyan; right surround, magenta.

in which those choices have been thoughtfully made, and in this respect, few compare to the Rotel RMB-1095. It's one mighty well designed amplifier!

Its frequency response is superb, especially in the treble—so good that Fig. 1 has an extremely sensitive vertical scale to emphasize how flat the response really is. The RMB-1095 is one of relatively few power amps whose high-frequency -3-dB point lies beyond 200 kHz—when using the unbalanced inputs, as I did for all basic tests. As usual, the bandwidth through the balanced inputs moves in a bit, but even then the -3-dB point is beyond 140 kHz, which is remarkably good. Bass response is the same using either input: down a negligible 0.13 dB at 20 Hz, with a -3-dB point below 10 Hz.

Distortion is exceedingly low. Into 8-ohm loads, Rotel rates the RMB-1095 at 200 watts per channel with less than 0.03% total harmonic distortion plus noise (THD + N) from 20 Hz to 20 kHz. In my tests, only the right front channel approached

that level of imperfection (if 0.03% distortion can be considered imperfection), while the other four proved notably better and quite similar to each other. I hasten to point out, however, that every channel betters Rotel's specification (and THX Ultra certification requirements) for distortion.

You can see the whole story in Fig. 2, which plots THD + N versus frequency for each channel at rated output into 8-ohm loads. The surround and left front channels top out at pretty much the same point at 20 kHz—approximately 0.015% distortion (half the rated amount)—while distortion in the center channel barely exceeds 0.01% at 20 kHz. On the whole, distortion is less than 0.01% at rated power over the most important frequency range, and that's great performance!

Figure 3A shows THD + N versus frequency for the left and right front channels at three power levels into 8 ohms: 10, 100,

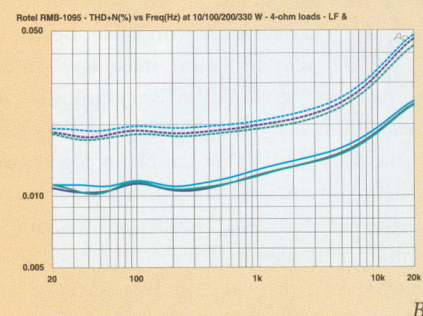
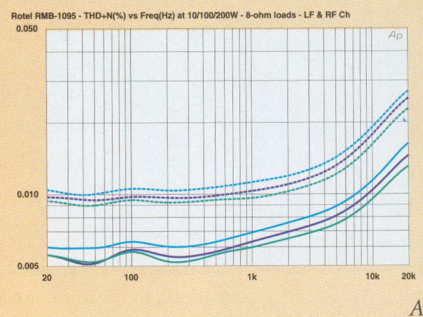
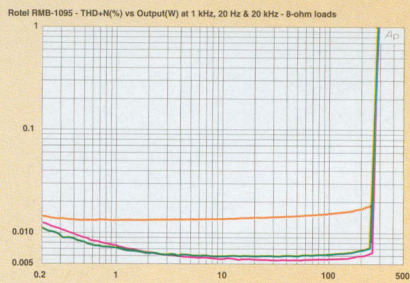
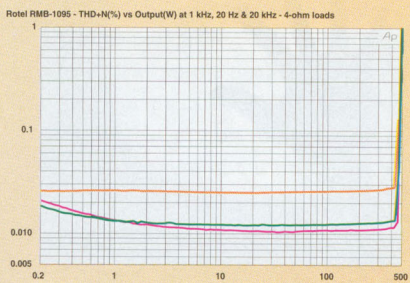


Fig. 3—THD + N vs. frequency at 10 watts (aqua), 100 watts (purple), and rated power (cyan) into 8 ohms (A) and 4 ohms (B). Rated power is taken as 200 watts into 8 ohms and 330 watts into 4 ohms. Solid curves are for left front channel, dashed for right front.

TEST RESULTS



A



B

Fig. 4—THD + N vs. output at 20 Hz (green), 1 kHz (magenta), and 20 kHz (orange) into 8-ohm loads (A) and 4-ohm loads (B).

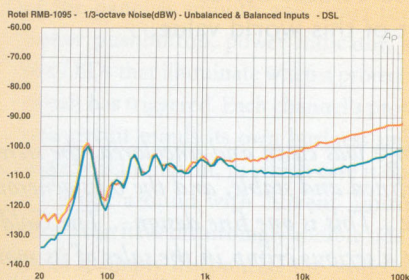


Fig. 5—Noise analysis. Unbalanced input, aqua; balanced input, orange.

and 200 watts. The left can be considered representative of the other channels, while the right is the worst case. What's impressive about these curves is how parallel they are to each other and how negligibly distortion rises from 10 watts to rated power. It's as if the RMB-1095 doesn't care how much power you ask it to deliver. It just hangs loose.

Figure 3B is similar except that the data was taken using 4-ohm loads and the "rated-power" curve was taken at 330 watts. I put in the quotes because Rotel doesn't

give an FTC power rating for 4-ohm loads, just a DIN spec of 330 watts at 1 kHz with less than 0.03% THD. I don't know why the company is so conservative; the RM-1095 certainly has no difficulty driving 4-ohm loads anywhere in the audio band and could easily claim a rating of 330 watts, 20 Hz to 20 kHz, with less than 0.05% THD (the poorest reading in the poorest channel). Perhaps the amp will not pass FTC preconditioning with 4-ohm loads, although it ran cool on my bench considering its power rating. (Since I've found that preconditioning can obscure more problems than it uncovers, I don't precondition before measuring.) In any event, although distortion is slightly greater when the RMB-1095 is driving 4 ohms than 8, it remains essentially unaffected by output level, which is amazing performance.

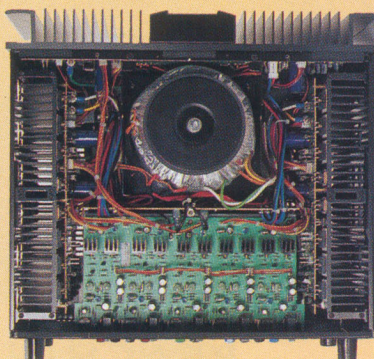
Figure 4 shows THD + N versus output into 8- and 4-ohm loads at three test frequencies: 20 Hz, 1 kHz, and 20 kHz. The results are remarkable in several respects. For one thing, the curves reveal that the RMB-1095 can deliver essentially the same maximum output power independent of frequency, which is rare. All the curves in Fig. 4A head up at 250 watts and cross the 1% line at 285 watts. All 4-ohm curves (Fig. 4B) head skyward around 440 watts, and two of the three cross 1% at 500 watts. The amp's protection circuit kicked in at 460 watts at 20 kHz, so that curve ends there. Since I can't say I know of a tweeter that can take 460 continuous watts at 20 kHz, I'd say that's a non-issue.

The relative flatness of these curves, together with their very low lie, indicate that the noise is exceedingly low. A-weighted noise of -95 dBW is great for any amp and in this case reflects an A-weighted S/N figure of 118 dB relative to rated output, several decibels better than Lucasfilm requires

for THX Ultra certification. (Through the balanced inputs, noise is about 3.5 dB greater, which is to be expected.) Noise-spectrum analyses taken using the unbalanced and balanced inputs are shown in Fig. 5. There's a suggestion of magnetically induced hum at 60 Hz and its odd harmonics (180 Hz and 300 Hz) but almost no power-supply ripple at 120 Hz. No hum component is excessive (-100 dBW, worst case, at 60 Hz), all are far lower in level than the maximum allowed for Lucas-

film THX certification, and they are totally inaudible.

The Rotel RMB-1095 can deliver awesome amounts of dynamic power into just about any load. When I terminated the front channels in 2 ohms and cranked up the IHF tone burst, the



amp pumped out more than a kilowatt a side, repetitively, with no sign of fatigue! Into 4-ohm loads, it put out 575 watts a side on the burst, and with 8-ohm loads it cranked out 315 watts. That's a dynamic headroom of +2 dB relative to rated power, eight times better than required for THX Ultra certification.

Damping factor exceeded 400 at 50 Hz, and output impedance remained very low across the audio band. Even at 20 kHz, it was less than 50 milliohms, worst case, one-fourth of what's permitted for THX Ultra certification! (It is difficult to measure output impedance when it's that low, and the reading often depends on the test method. I actually got figures well under 50 milliohms at 20 kHz when I did the test a different way.)

Sensitivity is virtually spot on the THX targets for both the unbalanced and balanced inputs, and input impedance is three times greater than Lucasfilm requires. This amp not only meets THX Ultra certification requirements, it leaves them in the dust!—E.J.F.