ISSUE
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Volume 1

BRYSTON
A Lifetime of Music

This Issue

Bryston Baby...

The preceding review appeared in the April 1997 Audio Video shopper magazine-page 72. The Bryston B-60 was one of six integrated amps reviewed.

Covering this year's WCES involved rushing around to as many as 10 different venues, so it was a matter of sheer luck that I happened to be in on what must be the human interest story of the Show. I went into the Bryston suite as part of my regular rounds, and was introduced to a young couple. They were WCES attendees who had brought their baby with them. Now, you say, that's nice, but what's the big deal? Well, get this: The baby's name is Bryston!

The couple wanted to give their baby boy an unusual name, and the husband, an avid audiophile, thought of naming him after the company whose products he has long admired.

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Bryston B-60 Integrated Amplifier

At first glance, the Bryston B-60's Spartan appearance might conceal this high-performance integrated amp's inner beauty. But packed into the minimalist 2-inch high chassis is a lean 60-watt-per-channel powerhouse that's surely the most accurate amp of the bunch. It's a no-compromise, dual-mono design, featuring fully discrete circuitry (no integrated circuits), a massive power supply, and super-quality parts through-out. This skinny black box from the Great White North is really uilt-Bryston's famed reliability is backed up with a 20-year (!) parts and labour warranty.

Now that's security! With just four inputs plus a tape monitor and an awesome-sounding headphone amp, the B-60 might strike some as a little too utilitarian.

But don't be fooled: The B-60 quietly goes about its business, giving you insights into familiar recordings revealing hidden back-ground singers, subtle bass fingerings, dynamic shifts and highs that are so clean you'll be able to count the rivets on a cymbal.

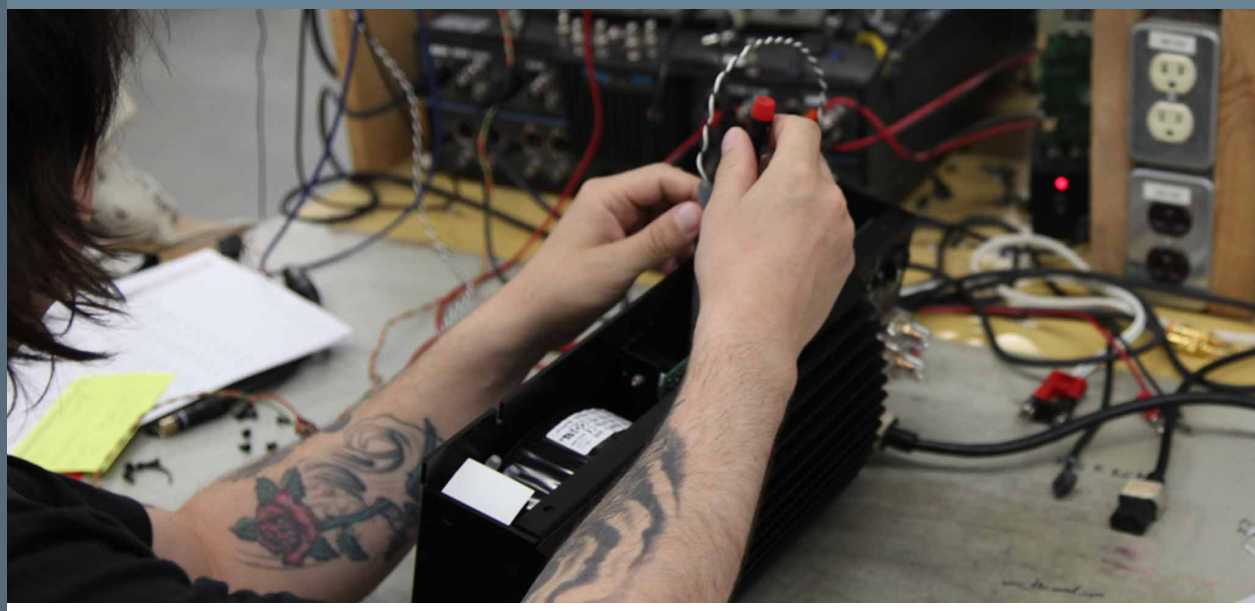
The B-60 excels at good, old-fashioned transparency; its remarkable clarity offers a virtual open window to the sound. 60 watts never sounded so robust, but if you later decide you need greater oomph, the preout/main-in jacks stand at the ready to accept more power. The optional remote ($300) deserves special mention-it's a sleek, solid chunk of black anodized aluminum, offering only volume and mute controls, cause that's all we really need.

It's All A Matter of Class, Eh?

The preceding article appeared as part of a show report by Robert Deutsch in the May 1997 issue of Stereophile.

If you have followed power amplifier technology for any length of time, you will have noticed mention of "class", as Class A, Class AB, etc., and perhaps wondered exactly what this nomenclature pertained to. These terms do not refer to quality, but to the operating parameter of the output section. Most power amplifier output stages operate in a push-pull configuration, where the power is delivered from two power supplies on either side of ground, or zero volts. (There are some which do not, but they are relatively non-linear, and

Bryston (the company) was so delighted that Bryston (the baby) is getting one of the new B-60 integrated amps as a present. Two-month-old Bryston (it is a great name, isn't it?) was looking around, alert and bright-eyed, obviously impressed with the sound of the PMC speakers that "Uncle Bryston" is distributing.



need not be considered here).

Operating in push-pull, the output transistors share the load, and are theoretically required to do work only as the signal swings away from ground, in either the positive or negative direction. If the transistors are completely switched off at zero output, and only start conducting when signal is present, this is defined as Class B operation. This is an efficient way of operating the output, and the amplifier runs cool at no signal, but there is one disadvantage; The output devices always have some lag time in their operation, and thus there appears a small but potentially annoying dead zone, called "crossover distortion", at the zero point. Although this crossover nonlinearity does not necessarily add large amounts to the distortion numbers, (0.05% is probably typical), it is easy to is that hear.

Fortunately, crossover distortion can be reduced to negligible proportions by the simple expedient of running the output transistors "biased" slightly "on" at idle, so they start conducting before the output swings through the zero point. When an amplifier runs this biased output mechanism, it is referred to as "Class AB". Moderate amounts of bias are all that is needed, and as it produces only a bit of heat, this type of amp is still reasonably efficient. Crossover distortion has a number of ways to pop up its ugly little head, however, even if there is a fair amount of bias present, so the engineering of this type of amplifier must be very exacting and precise to give the lowest distortion at all frequencies. If done properly, however, there is no more accurate or lower-distortion type of amplifier available; 0.01% is typical, and 0.001% is attainable.

Some engineers prefer not to have to deal with the possibility of crossover distortion in their designs, and they choose another bias system, called "Class A", where the output transistors are biased on so much that they continuously conduct more than the full load current, even at idle. Thus, they never turn "on" or "off', theoretically obviating crossover distortion.

Unfortunately, this operating system has some obvious, (and some not-so-obvious), disadvantages. Running that much current generates a tremendous amount of heat, so the amplifier is not just inefficient, it is large and expensive, due to the huge heat-dissipating mechanisms required. This consequently warms up the whole room as a side-effect. (Nice in the winter, but remember electric heat is the most expensive kind there is).

A not-so-obvious disadvantage with class A designs is that this high idling current has consequences to the distortion levels far beyond the theoretical elimination of crossover artefacts, (which even in itself is debatable). Transistors have numerous types of distortion mechanisms, among which are deviations from linearity under conditions of simultaneous high voltage and high current. These are, of course, the exact parameters necessary to class A operation, and a typical Class A amplifier runs distortion levels at least 10 times, and often over 100 times, as high as a Class AB amplifier of similar power, or around 0.1%. A careful inspection pf the distortion spectrum also reveals that all the 'harmonics are increased, including those represented by the crossover distortion at which the class A operation was aimed in the first place!

Going in the other direction, Class D offers high effi-

ciency through a very different approach to output operation. Class D, often erroneously thought of as "digital amplification", is actually an analog system which varies the width of the top-versus-bottom duty-cycle of a square wave carrier frequency. The amplifier still traverses from negative to positive voltages and back again, but does so continuously, at a high frequency of perhaps 500 kHz. The time it spends at one extreme or the other is proportional to the locus, or exact voltage-time relationship, of the desired signal at that moment.

Since the output devices spend almost all their time at either full-on or full-off, (areas of absolute minimal dissipation), efficiency is very high, from 80 to 90%. Thus, these amplifiers produce very little heat, and do not have to be as heavy or as large as typical class AB amplifiers, (to say nothing of the class A monsters)! There are naturally disadvantages as well. Class D, by definition, uses very large RF signals, and must be shielded and well-filtered to prevent interference and speaker-damaging outputs. This in turn harms overall linearity, as well as adding to the cost, thus this is not an inexpensive technology. The overall distortion is usually on a par with Class A amplification; good but not great, at around 0.1% or so. If efficiency is your requirement, though, this is the way to go.

Next time, we will look into some other classes of amplification, such as class H, or variable power supply, as well as some interesting "combination" classes, to see if some of them might have merit.

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