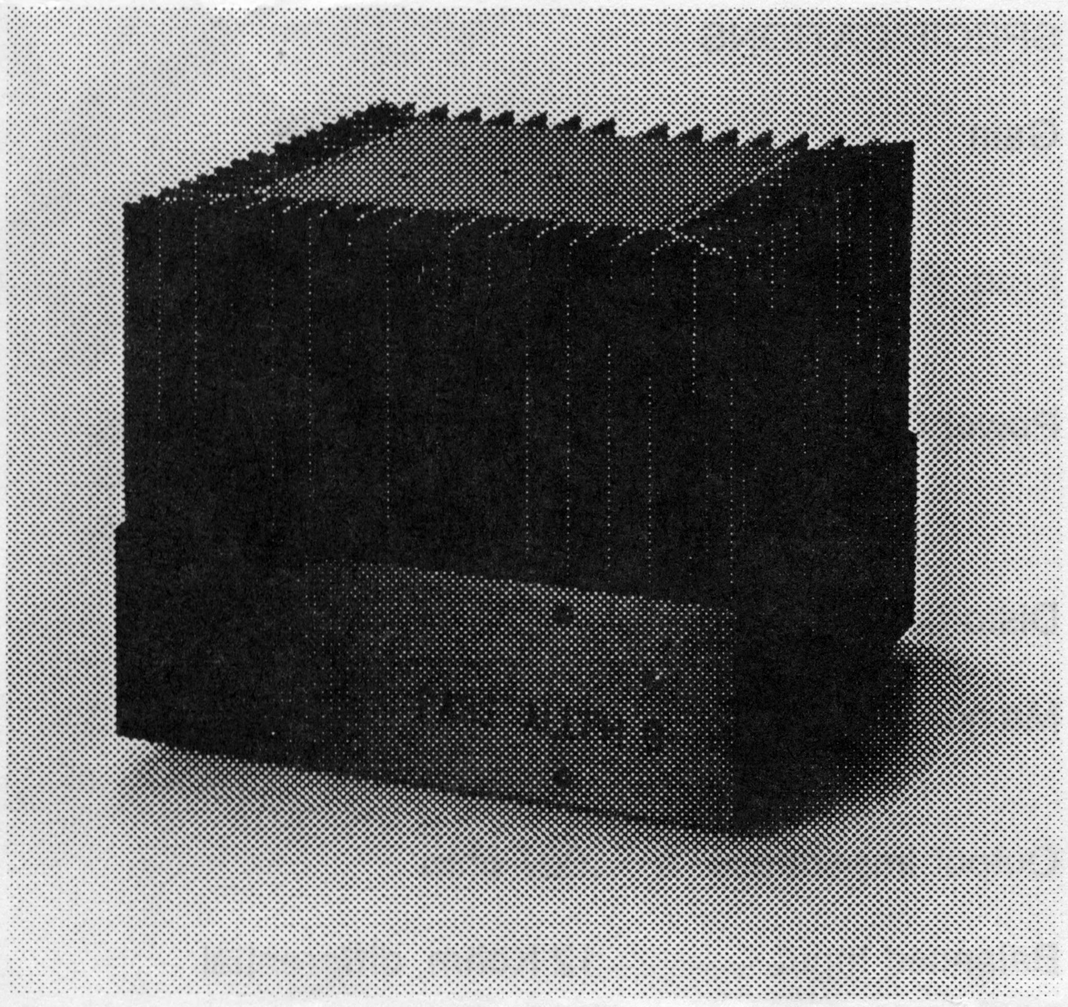


Pass Laboratories

Aleph 0s Stereo Power Amplifier

The Aleph 0s is a stereo version of the circuitry of Pass Lab's Aleph 0 single-ended Class A power amplifier. It uses the same hardware and basic chassis as the Aleph 0, but allocates the power supply and output stages between the two channels. The result is very similar musical performance at effectively half the price. The 0s shares the same skill and commitment to creating a musical amplifier with the most natural characteristic possible using the cleanest operating topology.

The Aleph series of audio power amplifiers are unique in employing single-ended Class A bias. Single-ended Class A has a more natural characteristic than push-pull circuits, as it reflects the asymmetric transfer curve of single gain devices instead of complementary push-pull circuitry.

Single-ended Class operation is often referred to as the "king of Class A" because it has the smoothest transfer curve and operates at the lowest efficiency of the family of Class A topologies. Properly designed, a single-ended amplifier exhibits second and even order harmonic structure, similar to the transfer characteristic of air, where the phase of the signal and harmonics reflects the subtle difference between acoustic compression and rarefaction.

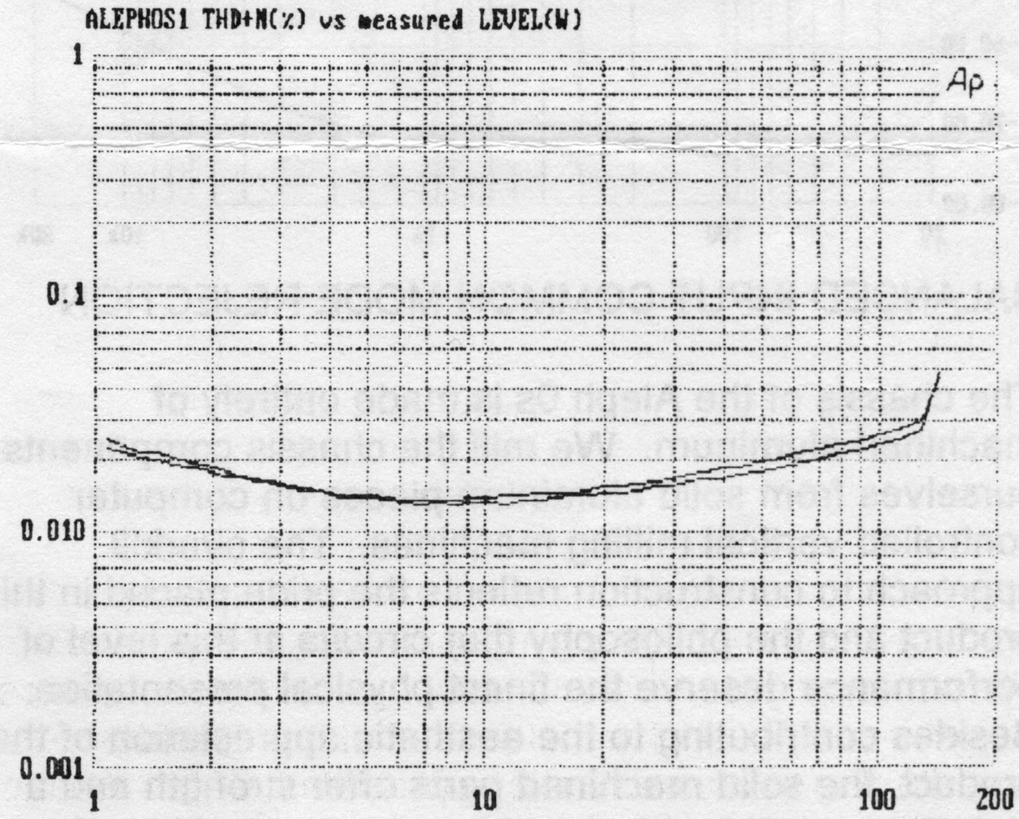
This amplifier operates single-ended Class A for output currents to plus 25 amperes and moves to "pull" Class A operation at negative currents beyond the bias point. Each channel of the Aleph 0s operates single-ended Class A to minus 1 amp, "pull" Class A to minus 3 amps, and "pull" Class A/B operation to minus 25 amps.

The Aleph 0s has absolutely minimal parts in series with the signal path. A balanced input signal is presented to differential power Mosfets driving a single cascoded common source device that provide the full voltage gain which is followed by the Mosfet output stage. The total number of gain stages in the amplifier is three, counting the output followers, as contrasted with other high end solid states products having from four to seven gain stages. This minimalist topology is supported outside of the signal path by doubly regulated constant current sources. The signal does not pass through coupling capacitors anywhere in the circuit.

The amplifier is nominally rated at 40 watts per channel RMS into 8 ohms, and will deliver a maximum transient of 25 amps of output current. It is stable into any reactance angle, and delivers low distortion to below 2 ohms. Each Aleph 0s is supplied with its own individual distortion curve into 2 ohms from 1 to 160 watts.

The amplifier is powered by a toroidal transformer rated at eight times the amplifier's output rating which charges 125,000 uF to 150 Joules. This unregulated supply feeds the output transistors only with a full power ripple of about 1/4 volt. The front ends of the amplifier are passively decoupled from the main supply for still lower noise and distortion,

The Aleph 0s uses International Rectifier Hexfet power Mosfets exclusively for all gain stages. These Mosfets were chosen because they have the most ideal transfer curve for an asymmetric Class A design. Operated properly in a single-ended circuit, the nonlinearity in their transconductance is such that the gain increases slightly on the positive swing and decreases slightly on the negative. This is a close parallel to the acoustic nonlinearity of air, and presents the least subjective degradation possible in an electronic amplifier. Mosfets also allow extremely high current outputs with low circuit complexity, delivering high performance in a minimalist topology.

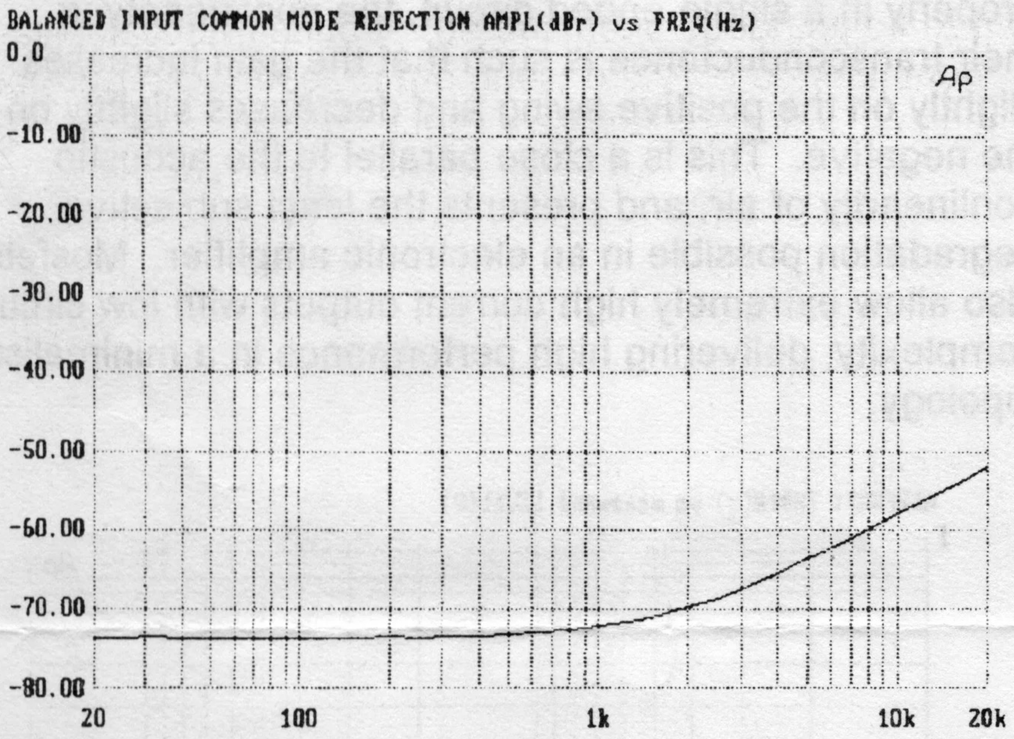


DISTORTION AND NOISE
2 OHM, 1 KHz, 1 TO 160 WATTS

The input and subsequent gain devices are rated at peaks of 2 amps, and are followed by output devices with peak capacities of 100 amps per channel. The Aleph 0s has been designed for maximum reliability without the use of limiting. The amplifier employs 1500 watts of power Mosfet output devices and massive heat sinking rated at 1/10 degree per watt. At 40 watts per channel output, the amplifier consumes 300 watts, so that each output device is operated at 20% of its rated power, one half of its 150 degree temperature rating, and one third of its voltage rating. Protection is provided by an AC line supply fuse and by a thermal switch.

In accord with the requirements for the lowest possible operating noise in any environment, the amplifier is equipped with balanced inputs featuring a typical common mode input noise rejection -70 dB. Balanced operation is accomplished through a passive network tied directly into the input stage of the amplifier, not with additional active input circuitry as in other products. This assures that the noise benefits of balanced operation are not accompanied by the degradation of more semiconductors in the gain path.

The input system will also exhibit full common mode noise rejection with passive balanced sources, where the negative input is connected to ground at the source through the appropriate source impedance. This makes the amplifier easy to adapt non-balanced sources to balanced operation.



BALANCED INPUT COMMON MODE REJECTION

The chassis of the Aleph 0s is made entirely of machined aluminum. We mill the chassis components ourselves from solid aluminum pieces on computer controlled vertical milling machines. The overkill approach to construction reflects the pride placed in this product and the philosophy that circuits at this level of performance deserve the finest physical presentation. Besides contributing to the aesthetic appreciation of the product, the solid machined parts offer strength and a high degree of electrical and mechanical isolation for the circuitry.

SPECIFICATIONS

Gain	26 dB balanced 26 dB unbalanced	
Freq. Response	-0 dB @ DC -3 dB at 100 KHz	
Power Output	40 watts 80 watts 160 watts	@ 8 ohms @ 4 ohms @ 2 ohms
Distortion	< 1 % THD	
Maximum Output	25 amps 30 volts	(peak) (peak)
Output Impedance	.007 ohm	
Balanced Input	12 Kohm, differential	
Input CMRR	> -50 dB	
Output Noise	10 nanowatt, A weighted	
Crosstalk	> -80 dB @ 1 KHz	
DC offset	100 mv after warm-up	
Power Consumption	300 watts	
Temperature	50 degrees C.	
Warm up time	1 hour minimum	
Dimensions	12 " W x 12 " D x 10.5" H	
Shipping Weight	71 lb.	

The Aleph 0s is warranted by Pass Laboratories to meet performance specifications for 3 years from date of manufacture. During that time, Pass Laboratories will provide free labor and parts at the manufacturing site. The warranty does not include damage due to misuse or abuse or modified products and also does not include consequential damage.

PASS

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