

Phase Linear



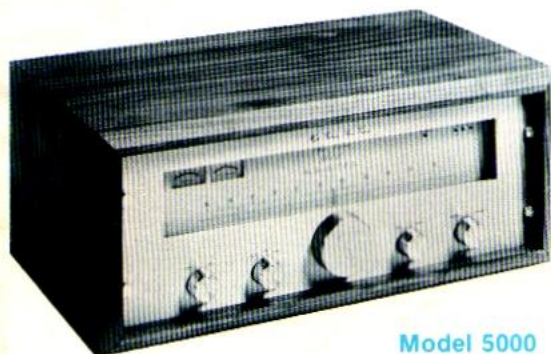
Phase Linear 2000 Preamplifier • Phase Linear 200 Power Amplifier • Phase Linear 5000 Tuner • Phase Linear 1000 Noise Reduction System • Phase Linear 4000 Preamplifier • Phase Linear 700B Power Amplifier • Phase Linear 400 Power Amplifier • Phase Linear Corporation, Lynnwood, Washington, U.S.A.



Model 4000

SPECIFICATIONS

Total Distortion: Less than .25%. Typically .02%. **Total Noise:** High Level: 95dB below full output. Phono: 72dB below full output. **Input Impedance:** Phono: No less than 47k from 20Hz to 20kHz. High level: 50k. **Gain:** Phono: 65dB. High level: 15dB. **Output Voltage:** Full output 8 volts R.M.S. Better than 2 volts into 4.7k or greater. **Frequency Response:** Phono: Within $\pm .5$ dB of RIAA from 20Hz to 10kHz. High level: Within $\pm .5$ dB from 20Hz to 20kHz. **Tone Controls:** Individual bass and treble controls with dual hinge points at 40Hz, 150Hz, 2kHz and 8kHz. Maximum boost/cut: 8dB. **Dynamic Range Expander:** Peak unlimit: +1.5dB. Linear expand: 3.0dB. Downward expand: 3.0dB. Total expansion: 7.5dB. **Active Equalizer:** 6dB/octave boost below 50Hz. **Four Channel Facilities:** Built in CBS SQ system with Phase Linear developed differential logic for enhance four channel separation. **Auto Correlator** (Noise Reduction System): High frequency: 2kHz to 20kHz. Low frequency: 200Hz to 20Hz. Weighted over all noise reduction -10dB from 20Hz to 20kHz. **Tape Monitor:** Two tape switches permitting any input source to be recorded on either of two tape machines, play back selection of either machine, or copy of tape machine 1 to 2 while listening to a third source. **Power Switching Capability:** Switched outlets are capable of switching up to 25 amperes. **Power Consumption:** Preamplifier: 40 watts. **Size:** 19"W x 7"H x 10"D. **Weight:** 18 pounds.



Model 5000

SPECIFICATIONS

Sensitivity: 2.0uV. **50dB quieting level:** 5uV mono, 25uV stereo. **Signal to noise:** 74dB mono, 72dB stereo (with expander). **Selectivity:** 75dB. **Capture Ratio:** 1.7dB. **Distortion:** 1kHz—less than 0.25% mono or stereo. **Separation:** 1kHz—greater than 40dB. **1kHz Suppression:** Greater than 40dB. **38kHz Suppression:** Greater than 40dB.

MODEL 4000 STEREO PREAMPLIFIER

The Phase Linear 4000 was designed to perform all the functions of an ordinary state-of-the-art stereo preamplifier but with the added advantage of eliminating noise and restoring dynamic range. The Autocorrelator Noise Reduction System and the Dynamic Range Recovery System must be heard to be appreciated. The revolutionary features will make your music sound more lifelike and remove that horrible background noise which has plagued audiophiles for years.

"In the past, it has been fashionable to say that a good preamp is one which behaves like a 'piece of wire with gain'. That is, one that contributes or subtracts nothing from the original program source material. The fact is that the Phase Linear 4000 does alter signals—and alters them significantly, but the net effect of all this alteration is the reproduction of a quiet, clean, distortionless musical performance that makes you feel that there is absolutely nothing between you and the music. Obviously, much of the high cost of the 4000 arises from the autocorrelator and other special circuits, but the resulting product is a major technical achievement. Normally, our final lab rating takes into account both performance, and cost, and certainly, \$600.00 is no small price to pay for a preamplifier-control unit. But until Phase Linear (or someone else) can come up with an 'economy model', the Model 4000 must be awarded our very highest lab rating."

Feldman Lab Report
FM Guide

"Most of its differences and special functions reflect Phase Linear's belief that it is not enough that a preamplifier process and amplify the program material without introducing distortion and noise. In addition, it should also be able to compensate to a very large degree for the losses in dynamic power and signal-to-noise ratio inherent in the recording and reproduction process. This Phase Linear achieves by a combination of noise-reduction and dynamic-range-expansion circuits whose sophistication far surpasses anything previously available on the audio consumer level."

"Even without the assistance of its special noise-reducing systems, it would rank as one of the quietest units we have ever encountered."

"... the Phase Linear 4000 can reduce system noise, including turntable rumble and normal hum pickup, to below that of the ambient noise in a quiet listening room, and (with the components we used) some 12dB lower than would be possible with any other top-grade preamplifier."

"A good preamplifier should have no sound of its own, and many (including this one) meet that qualification easily. What we can say is that the Model 4000 makes any program played through it sound better than through any other preamplifier we have ever used, by virtue of its unique control features, and most particularly its autocorrelator and peak unlimiter. Altogether, it is a most impressive technical achievement, one bound to influence equipment to come."

Hirsch Houck Laboratories
Stereo Review

MODEL 5000 FM TUNER

The Phase Linear Model 5000 FM Tuner fully compliments our line of separate components both in appearance and philosophy.

Until now, separate component manufacturers have put most of their design emphasis into reaching the theoretical limits of FM receiving. Few consumers, however, can actually benefit from these technical achievements simply because the broadcast itself is too mediocre. A cure for that problem is what we have added to our tuner.

The Phase Linear 5000 combines excellent receiving capabilities along with a unique linear expansion circuit which compensates for the problems associated with FM broadcast. Consequently, the 5000 FM tuner delivers dynamic range and sonic quality audibly beyond that which has been available.

FEATURES: Large slide rule dial; variable muting 2uV to 100uV; fixed and variable outputs; 25uSec. and 75uSec. de-emphasis; 75 ohm cable connector; expander with selection for 4dB and 9dB, tailored to "decompress" typical FM compression techniques; L.E.D. multipath indicator which shows instantaneous multipath distortion; center tune and signal strength meters with back panel calibration adjustments; panel light dimmer switch.

All models have aluminum front panels with brushed light gold finish, baked enamel and black anodize. Optional walnut cabinets are available for all models.

Phase Linear CORPORATION

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Phase Linear starts where State-of-the-Art Leaves Off.

We build products with state-of-the-art specifications. But we don't stop there. Specifications are important to us, but equally vital is the achievement of obviously audible improvements in the reproduction of music with every separate component we make. This is the driving force behind Phase Linear, the single-minded philosophy that has produced so many innovative features, advanced circuitry and ultimately, products with greater dynamic range and bigger, more lifelike sound than can be found anywhere at any price. Our Research Department, headed by Robert Carver, is staffed by imaginative design engineers deeply concerned with the entire spectrum of musical reproduction.

We hope this brochure enables you to become more familiar with our products and our company. Phase Linear is a small company dedicated to designing and building quality top-of-the-line products. We invite you to review what the critics have said about our products, then do yourself a favor; talk to previous owners of Phase Linear equipment. Ask them how they enjoyed the equipment and what it did for their system. At that point you should go to one of our dealers and ask for a demonstration.

MODEL 700B SOLID STATE STEREO AMPLIFIER

The Phase Linear 700B is the most powerful stereo amplifier available in the world; putting out a minimum of 345 watts per channel. It was designed for the audiophile who is putting together the ultimate system and requires the power of the 700B in order to gain the best possible dynamic range.

The 700B can give you better performance and greater reliability than any amplifier available at any price. On a dollar per watt basis it comes out below \$1.16 per watt which makes it the best buy on the market.

The unit may be used in either a home system or in industrial applications. There are many Phase Linear 700B's being used in symphony halls, touring P.A. systems and more exotic industrial uses.

The 700B features V.U. meters to monitor both channels and a meter attenuation switch allowing the user to adjust the sensitivity.

REVIEWER'S COMMENTS:

"... in terms of sheer power it is the most impressive we have tested."

High Fidelity Magazine

"The lowest distortion, in spite of its enormous power capability, was on the Phase Linear 700."

**Julian Hirsch
Stereo Review**

MODEL 400 SOLID STATE STEREO AMPLIFIER

The Model 400 has gained an international reputation as the world's most reliable and most accurate high powered amplifier. It puts out 201 watts per channel which enables it to drive all the better bookshelf speakers as well as the most exotic loudspeakers available. It also rates better than any amplifier in its power range on a dollar per watt basis (less than \$1.24 per watt). If you are contemplating the purchase of a high powered amplifier, you should audition the Phase Linear 400.

"Sound Advice," a sophisticated audiophile magazine (225 Kearny, Suite 200P San Francisco), came to the following conclusion after an extensive study of 19 high quality amplifiers:

"We were utterly flabbergasted when we discovered in our early A-B comparisons that the amplifier which sounded dramatically cleaner and more revealing turned out to be, when we removed our blindfold status, the Phase 400."

"We obtained a second Phase 400 (both were from private owners) and proceeded to throw everything we could at both of them, hoping perhaps to reconcile audiophile myth with reality, one way or the other. In over 100 blindfold A-B comparisons with five other amplifiers at a time, the two Phase 400's kept coming back to the surface. They either came in a clear first or, sometimes tied with the D-76 or Paoli, or once in a while were tied by the ESS or bested by the Paoli. No other amplifier ever even tied the Phase 400 for naturalness, clarity, and lack of distortion."

Sound Advice

"Harmonic distortion ... from 1 to 200 watts output the distortion was between 0.008 and 0.013 per cent. ... The I.M. distortion was under 0.08 per cent from all power levels from 7 milliwatts to 250 watts, and typically under 0.03 per cent. The frequency response was flat from d.c. (or 0Hz) to beyond 20,000Hz. ... In summary, the Phase Linear 400 is a superb amplifier, furnishing the essential qualities of the Model 700 at a much lower price (almost a bargain in today's market)."

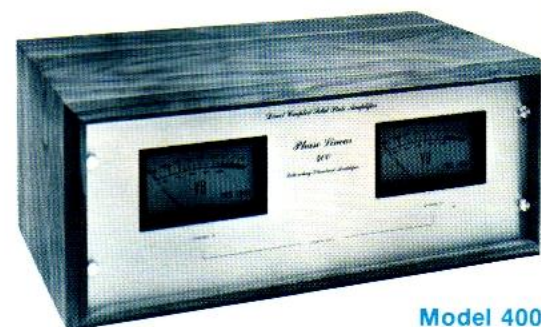
**Hirsch-Houck Laboratories
Stereo Review**



Model 700B

SPECIFICATIONS

POWER: 345 WATTS PER CHANNEL MINIMUM R.M.S. AT OHMS FROM 20HZ TO 20KHZ, WITH NO MORE THAN .25% TOTAL HARMONIC DISTORTION. **Sensitivity:** 1.75 volts for 345 watts into 8 ohms. **Input Impedance:** 100k nominal, reduces to 10k at full clockwise rotation of level control in normal or D.C. mode. **Hum & Noise:** A minimum of 100dB below 345 watts. **Damping Ratio:** A minimum of 1000:1 at 20Hz. **Rise Time:** Less than 1.6 microseconds. **Phase Shift:** Lagging 10 degrees at 20kHz. **Protection:** Electronic energy limiters together with supply fuses prevent excursions into unsafe operating regions. **Dimensions:** 19" wide x 7" high x 11" deep. **Weight:** 45 lb. **Optional Accessories:** Walnut cabinet and fan kit.



Model 400

SPECIFICATIONS

POWER: 201 WATTS PER CHANNEL, MINIMUM R.M.S. AT OHMS FROM 20HZ TO 20KHZ, WITH NO MORE THAN .25% TOTAL HARMONIC DISTORTION. **Hum and Noise:** At least 100dB below rated power. **Damping Ratio:** 1000:1 at 20Hz. **Rise Time:** Less than 1.7 microseconds. **Phase Shift:** Lagging 12 degrees at 20kHz. **Sensitivity:** 1.7 volts for rated power output. **Input Impedance:** Kilohms. **Protection:** Electronic energy limiters together with supply fuses prevent excursions into unsafe operating regions. **Dimensions:** 19 inches wide, 7 inches high and 10 inches deep. **Weight:** 35 pounds.



Model 200

SPECIFICATIONS

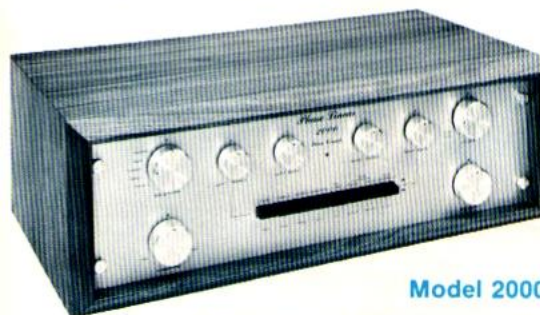
POWER: 105 WATTS PER CHANNEL, MINIMUM R.M.S. AT 8 OHMS FROM 20HZ TO 20KHZ WITH NO MORE THAN .25% TOTAL HARMONIC DISTORTION. **Hum and Noise:** At least 95dB below rated power. **Damping Ratio:** 100:1. **Rise Time:** Less than 1.7 microseconds. **Phase Shift:** Lagging 12 degrees at 20kHz. **Sensitivity:** 1.5 Volts for rated power output. **Input Impedance:** 18 Kilohms. **Protection:** Current limiting amplifier protection. Output relay electronically operated for speaker protection. **Dimensions:** 19 inches wide, 5 1/2 inches high and 8 3/4 inches deep. **Weight:** 16 pounds.



Model 1000

SPECIFICATIONS

Total Distortion: Less than .25%. **Input Impedance:** 70k ohm. **Input Level:** 3 volts R.M.S. maximum. **Output Voltage:** Full output 8 volts R.M.S. Better than 3 volts R.M.S. into 2000 ohms. **Frequency Response:** Within ± 1 dB from 20Hz to 20kHz. **Peak Unlimiter:** Nominal peak unlimit rate attack threshold, front panel variable) 5dB/microsecond for +6dB peak unlimit operation. **Nominal Amplitude Attack Threshold:** 2 volts peak at input to peak unlimiter. **Semiconductor Complement:** 28 transistors, 8 integrated circuits, 91 diodes. **Downward Expander:** Downward expansion commences at -35dB. Ultimate limit is -41dB. Unlimiter window is 35dB wide, upper and lower thresholds are simultaneously variable by front panel unlimit threshold control. **Autocorrelator (Noise Reduction Systems):** High frequency noise reduction commences at 2kHz and is 3dB, reaching 10dB from 4kHz to 20kHz. Low frequency noise reduction begins at 200Hz, ultimately reaching 20dB @ 20Hz. Passive subsonic filter rejection of -35dB @ 5Hz. **Weighted overall noise reduction is -10dB from 20Hz to 20kHz.** **Tape Monitor:** The Model 1000 provides a tape monitor circuit to replace the one it utilized. **Power Consumption:** 35 watts. **Size:** 9 1/2" wide x 5" high x 11-4/5" deep. **Weight:** 6 pounds.



Model 2000

SPECIFICATIONS

Total Harmonic Distortion: Basically so low it is unmeasurable. Guaranteed less than .1% at rated output with 1HF measurement. **Frequency Response:** Phono $\pm .5$ dB of RIAA Standard. **Input Sensitivity:** High level input: 40K. Low level input: 47K, 290pf. **Hum and Noise:** 20Hz to 20,000Hz inputs shorted. High level: 88dB below 2V. Low level: 74dB below a 10mV input. **Ambience Signal:** (L-R)=L & (R-L)=R. **Volume Control Tracking:** Less than 1dB tracking error. **Gain:** Low level (Phono) to preamplifier output: 56dB at 1kHz. Phono to tape output: 41dB at 1kHz. High level to preamplifier output: 15dB at 1kHz. **Maximum Output Levels:** Rated at 2V; maximum 10 volts will source a 5k ohm load. **Bass:** Turnover frequency 50Hz: ± 11 dB at 20Hz. Turnover frequency 150Hz: ± 13 dB at 20Hz. **Treble:** Turnover frequency 5kHz: ± 10 dB at 20,000Hz. Turnover frequency 2kHz: ± 14 dB at 20,000Hz. **Dimensions:** 5 1/2" H x 19" x 6" D. **Shipping Weight:** 15 lb.

MODEL 200 STEREO AMPLIFIER

The Phase 200 is the best amplifier you can purchase for medium power handling applications. At 105 watts per channel, the 200 complements all high quality bookshelf speakers in the efficient to medium efficiency range. The 200 has enough power to eliminate clipping with most efficient speaker systems as well as many inefficient systems.

The Phase 200 has a Velocity Feedback switch which allows for a Reduction in current feedback. This results in a lowering of the damping ratio and this has been a recommendation made by various speaker manufacturers. In numerous speaker systems this reduction in feedback will provide a warmer, more mellow sound.

MODEL 1000 AUTOCORRELATOR NOISE REDUCTION AND DYNAMIC RANGE RECOVERY SYSTEM

The Model 1000 is an outboard signal processor which eliminates noise and expands dynamic range. No other product on the market, except our Model 4000, incorporates the two systems available in the 1000. One system, the Autocorrelator, removes noise from records, tapes and FM broadcast merely by playing the signal through the 1000 on playback. You do not need to have a pre-processed signal as is the case with most noise reduction systems. The other system incorporated in the 1000 is the Dynamic Range Recovery System which compensates for the various techniques used by recording studios such as gain riding and compression. These techniques limit the dynamic range you can achieve and the Dynamic Range Recovery System can recover much of what is lost.

"The Autocorrelator is just plain amazing in what it can do for signal-to-noise ratio with any recorded medium . . . noise becomes virtually inaudible."

Audio Magazine

"The Phase Linear Model 1000 is not inexpensive (it is far from a simple device as may be judged from its semiconductor complement of twenty-eight transistors, eight I.C.'s and ninety-one diodes). However, for any already top-quality music system, we doubt a \$350 expenditure in any other system component could match the audible improvement made possible by the Phase Linear 1000."

Hirsch-Houck Laboratories
Stereo Review

MODEL 2000 STEREO PREAMPLIFIER

The Model 2000 offers excellent specifications, outstanding sonic performance and a unique "Ambience Circuit" designed to retrieve out-of-phase signals while using the 2000 in a stereo mode. Prior to this time one had to add another amplifier and an additional set of speakers to utilize such a system, but this is not true of the ambience system in the 2000. When listening to a record played through the 2000 with the ambience circuit on, you will hear instruments that would not be audible on our preamps. The music is on the record out of phase and the 2000 corrects that problem.

"In measurements made at CBS, the Model 2000 proved itself a strong performer. In neither channel did output clipping occur at less than 12.2 volts, whether driven singly or together. At an output level of 2 volts (more than enough for full output from most power amps), harmonic distortion was less than 0.02% in all cases—well below Phase Linear's 0.1% spec. And if we ignore as inaudible all harmonics above 20kHz, harmonic distortion is no more than 0.0066%."

"The Model 2000 is as super in the listening as it is smooth in the handling. Once one has become used to the controls, they are convenient to operate and satisfying to touch. The extra flexibility in the tone controls (the separate knobs for each channel, as well as the variable turnover points) delivers worthwhile options."

High Fidelity