

# Accuphase

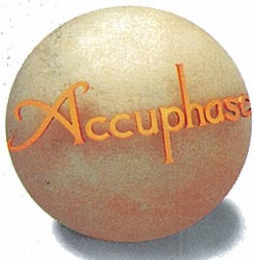
STEREO POWER AMPLIFIER

## P-700

- 12-parallel push-pull output stage delivers quality power: 350 watts x 2 into 8 ohms
- Current feedback circuit topology prevents phase shifts
- Bridged mode allows upgrading to true monophonic amplifier
- All signal paths gold-plated
- Balanced input circuitry
- Large speaker terminals







**A new reference for power amplifier excellence: the symbiosis of sheer dynamic impact with subtle musicality. Current feedback principle assures rock-stable operation. Multi-emitter power transistors in a 12-parallel push-pull configuration deliver 350 watts per stereo channel into 8 ohms, or a full 1,000 watts into 8 ohms during monophonic operation.**

The stereo power amplifier P-700 represents the entire spectrum of Accuphase audio technology. It has been designed to meet the strictest demands of discerning audiophiles who will accept nothing but the best. Top-quality parts and meticulous attention to every detail result in a product that is simply stunning in its musical accuracy.

For faithful reproduction of high-quality digital sources, an amplifier must be able to handle extremely delicate low-level signals and thunderous high-impact peaks with equal aplomb. It should not be affected by fluctuations in speaker load, and operation should remain stable at all times. The P-700 perfectly fulfills all of these requirements. Even difficult speakers that present not only a resistive but also a reactive load to the amplifier can be driven with ease and authority. In the output stage, a total of twelve multi-emitter type wide-range power transistors are arranged in a push-pull configuration, resulting in impressive output ratings. By using the P-700 as a monaural amplifier in bridged mode, even higher output can be achieved.

The amplifying circuitry of the P-700 features the current feedback principle which combines superb sonic qualities with extraordinary stability of operation and excellent frequency response characteristics. This circuit requires only minimal phase compensation in the high frequency range, and NFB can be kept desirably low. The audible result is drastically improved transient response.

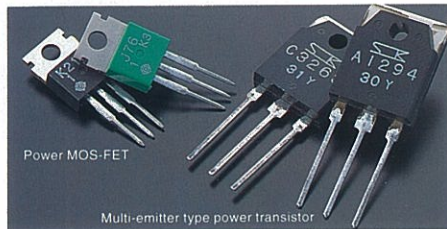
In the power supply section, which acts as the energy source for the amplifier, a high-efficiency "Super Ring" toroidal transformer is used, in combination with large filtering capacitors. This gives the P-700 ample performance margins to handle even the most severe demands. Balanced inputs make the amplifier impervious against externally induced noise during signal transmission. Gold plating of all major parts which carry the music signal, including circuit board copper traces and input and output connectors is another example of the P-700's dedication to musical purity.

The large heat sinks protruding on both sides of the amplifier and the panels of 15 mm thick extruded aluminum with champagne-gold alumite finish make

the P-700 a feast not only to the ear but to the eye as well. This new reference model exudes an atmosphere of sheer competence and beautiful sophistication which is fully borne out in the music as heard through this masterpiece. This is pure audio at its best.

**Modular power units in 12-parallel push-pull configuration deliver ample muscle: 350 watts/ch. into 2 ohms, 500 watts/ch. into 4 ohms, 350 watts/ch. into 8 ohms**

The output stage uses multi-emitter type power transistors with extraordinarily wide and flat frequency response. These devices also have excellent linearity of forward-current transfer ratio and outstanding switching characteristics. The transistors are arranged in a 12-parallel push-pull configuration (see Figure 1) and mounted on a massive heat sink made



from diecast aluminum. This assures effective heat dissipation and yields impressive output capability on the order of 350 watts per channel into two ohms, 500 watts per channel into four ohms and 350 watts into eight ohms. The amplifier can drive even difficult reactive low-impedance speaker loads with ease. The driver stage uses MOS-FET devices with negative temperature coefficient, which cancel out the positive temperature coefficient of the bipolar power transistors, to guarantee perfectly stable operation.

**Current feedback circuit topology prevents phase shifts**

When the gain of an amplifying circuit increases, frequency response, i.e. the bandwidth that can be handled by the amplifier, becomes more narrow. To counter this effect, a commonly employed

technique called negative feedback (NFB) routes some part of the output signal back to the input. If phase shift is disregarded, a circuit designed to have high open-loop-gain can apply a high amount of NFB, resulting in the wide frequency response of a closed-loop circuit, as shown in Figure 2.

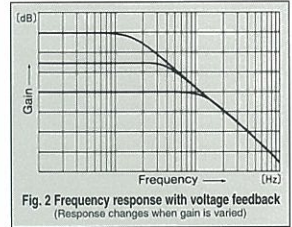


Fig. 2 Frequency response with voltage feedback (Response changes when gain is varied)

Conventional amplifiers employ voltage NFB, whereby the output voltage is used for the feedback loop. In the P-700 however, the signal current rather than the voltage is used for feedback. Figure 3 shows the operating principle of this circuit. At the sensing point of the feedback loop, the impedance is kept low and current detection is performed.

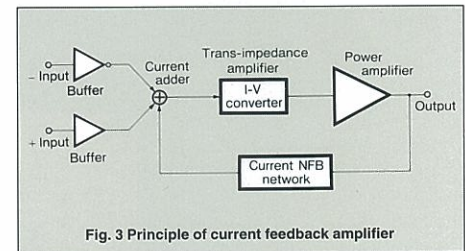


Fig. 3 Principle of current feedback amplifier

An impedance-converting amplifier then transforms the current into a voltage to be used as the feedback signal. Since the impedance at the current feedback point (current adder in Figure 3) is very low, there is almost no phase shift. Phase compensation can be kept to a minimum, resulting in excellent transient response and superb sonic transparency with natural energy distribution.

Figure 4 shows frequency response for different gain settings of the current feedback amplifier. The graphs demonstrate that response remains uniform over a wide range.

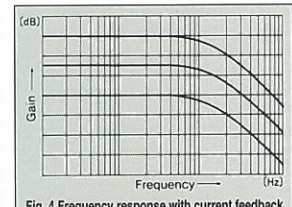


Fig. 4 Frequency response with current feedback (Response does not change when gain is varied)

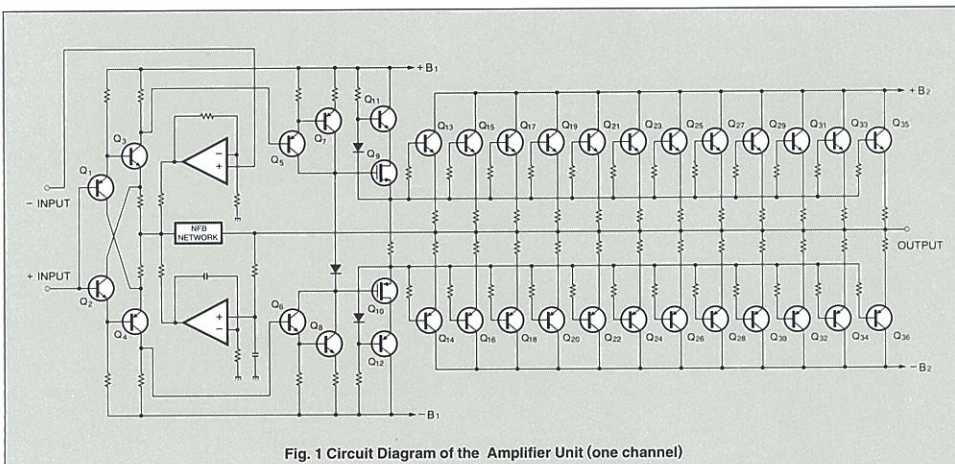


Fig. 1 Circuit Diagram of the Amplifier Unit (one channel)

**Bridged mode creates a true monophonic amplifier with 1,000 watts into 8 ohms**

Bridged mode means that the two channels of an amplifier are driven with the same signal voltage but with opposite phase, and their output is combined. The P-700 provides a switch arrangement for bridged operation, which turns the unit into a high-grade monaural amplifier capable of delivering an awesome 700 watts into 4 ohms and 1,000 watts into 8 ohms.

**LOAD IMPEDANCE switch allows problem-free driving of loads as low as 2 ohms**

When driving low-impedance loads to high levels, the LOAD IMPEDANCE switch can be set to "LOW".

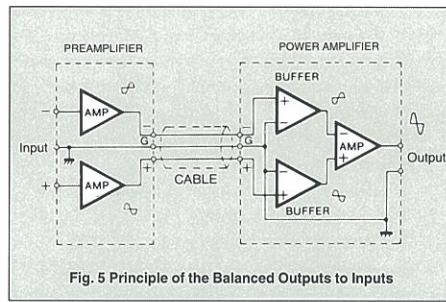


This reduces the voltage at the secondary winding of the transformer, thus limiting the output power (350 watts x 2 into 2 ohms). A sensor on the heat sink constantly monitors the temperature and automatically activates the "LOW" condition when a certain level is exceeded. When the temperature returns to normal levels, the "NORMAL" condition is restored. Since the gain of the amplifier does not change, there is no jump in volume when the mode is switched.

**Balanced connection reliably blocks induced noise**

As illustrated by Figure 5, balanced signal transmission means that the output stage of a component supplies two signal lines, having identical voltage but opposite phase. On the input side, these signals are fed to a positive and negative amplifier

circuit and then mixed. Since any noise interference that has arisen during transmission will be present

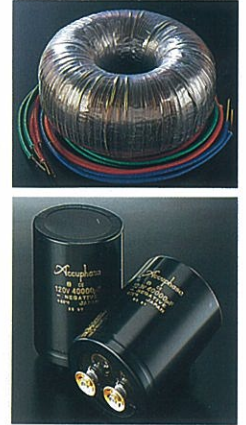


in both lines with identical phase, such noise is canceled out, leaving only the pure signal. The longer the cable connections between audio components,

the higher is the danger of external noise being introduced into the signal path, which invariably leads to sound quality degradation. The balanced connection principle reliably prevents this danger, by keeping the signal transfer completely free from any kind of interference. In the P-700, the balanced signal is connected directly to inverting (-) and non-inverting (+) input stages, resulting in ideal balanced operation.

**Robust power supply with "Super Ring" toroidal transformer and high filtering capacity**

In any amplifier, the power supply plays a vital role as the source of energy for the entire unit. The P-700 features a large toroidal power transformer with a rating of 1,500 VA. Some of the advantages of this "Super Ring" transformer are:



- ① Smaller ferrite core diameter and copper windings with high specific gravity mean low ferrite losses and low inrush current.
- ② The core with near-circular section allows near-circular coil windings with high packing density, resulting in low leakage flux and minimum vibrations.

Multi-emitter power transistors in 12-parallel push-pull configuration, mounted to massive diecast aluminum heat sink. MOS-FET driver stage. Current feedback amplifier.





These characteristics make this transformer type ideally suited for audio applications. In addition, two enormous aluminum electrolytic capacitors, each rated for 40,000  $\mu$ F/120 WV provide more than ample filtering capacity for the rectified current.

**All signal paths are gold-plated**

High-purity copper is commonly used in audio components for signal path lines. The P-700 goes one step further by providing gold-plating. This



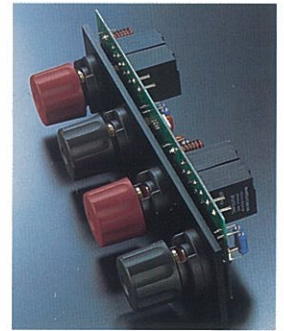
includes not only the copper traces on printed circuit boards but also ground bars carrying large ripple currents, bus bars providing current to the power transistors, input jacks, and speaker terminals. This thorough approach results in a distinct sonic improvement.

**Large direct-reading analog power meters**

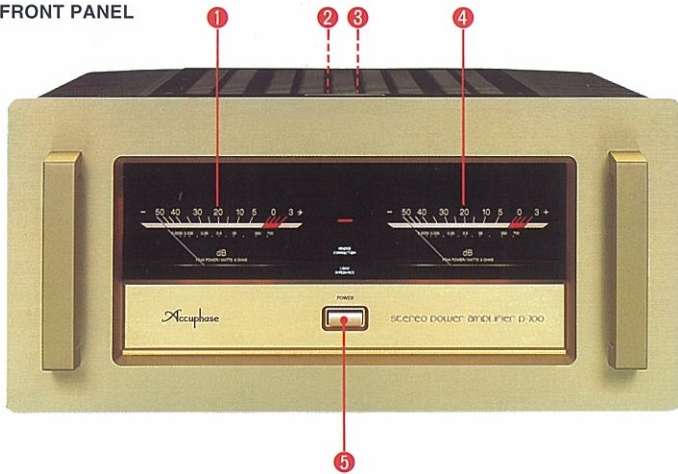
The large analog power meters have a peak hold function which lets the user easily monitor the output level of the rapidly fluctuating music signal. Thanks to logarithmic compression, the meters cover a wide dynamic range. Switches for meter on/off and illumination control are also provided.

**Extra large speaker terminals accommodate also banana plugs**

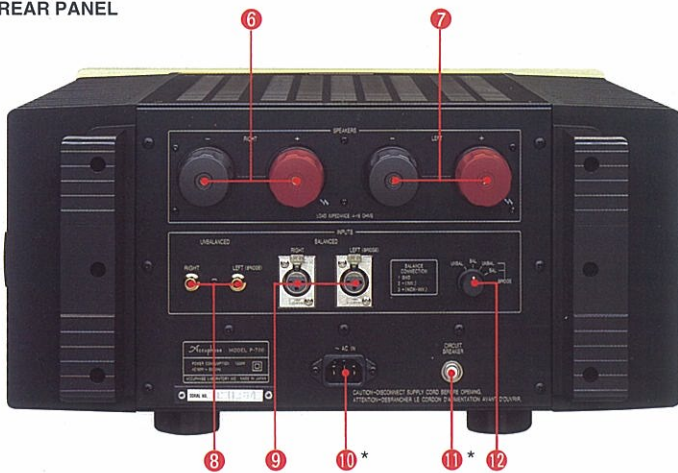
The oversized speaker terminals accept even very heavy-gauge speaker cable, and it is also possible to insert banana plugs. The terminals are made of extruded high-purity brass material and are gold-plated for utmost reliability and minimum contact resistance. Molded caps provide proper insulation.



**FRONT PANEL**

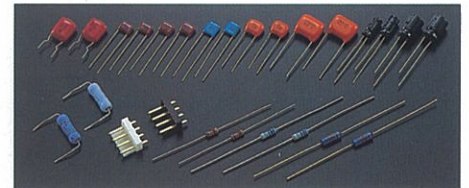


**REAR PANEL**



- 1 Left channel output meter (dB div., wattage direct reading)
- 2 Meter operation and light switch ON OFF
- 3 Load Impedance Switch NORMAL LOW
- 4 Right channel output meter
- 5 Power switch
- 6 Right channel output terminals speaker systems
- 7 Left channel output terminals speaker systems
- 8 Unbalanced input jack
- 9 (Balanced) input connectors. (1)Ground, (2) Inverted (-), (3) Non-inverted(+)
- 10 AC connector (for supplied power cord) \*
- 11 Circuit Breaker \*
- 12 Input/bridge selector UNBAL. BAL. BRIDGE UNBAL. BRIDGE BAL.

**Remarks**  
\* The shape of the plug of the supplied power cord, and the circuit breaker current rating depend on the voltage rating and destination country.



High-quality parts selected for outstanding sonic properties

**GUARANTEED SPECIFICATIONS**

Guaranteed specifications are measured according to EIA standard RS-490.

**Performance Guaranty**

All Accuphase product specifications are guaranteed as stated.

- **Continuous Average Output Power (20-20,000 Hz)**
  - Stereo mode(both channels driven)
    - 350 watts per channel into 2-ohm load \*
    - 500 watts per channel into 4-ohm load
    - 350 watts per channel into 8-ohm load
  - Monophonic mode(bridging connection)
    - 700 watts into 4-ohm load \*
    - 1,000 watts into 8-ohm load
    - (\* When LOAD IMP switch is set to "LOW")
- **Total Harmonic Distortion**
  - Stereo mode(both channels driven)
    - 0.05%, with 2-ohm load
    - 0.02%, with 4 to 16 ohms load
  - Monophonic mode(bridging connection)
    - 0.02%, with 4 to 16 ohms load
- **Intermodulation Distortion**
  - 0.003%
- **Frequency Response**
  - 20 to 20,000 Hz, +0 dB, -0.2 dB (Continuous average output power)
  - 0.5 to 160,000 Hz, +0 dB, -3.0 dB (for 1 watt output, level control at maximum)
- **Gain**
  - 28.0 dB (in stereo and monophonic mode)
- **Output Load Impedance**
  - 2 to 16 ohms stereo mode
  - 4 to 16 ohms in monophonic mode (bridging connection)
- **Damping Factor**
  - 400 in stereo mode
  - 200 in monophonic mode (bridging connection)
- **Input Sensitivity (with 8-ohm load)**
  - Stereo mode
    - 2.11V(Continuous average output power)
    - 0.12V (for 1 watt output)
  - Monophonic mode(bridging connection)
    - 3.56V(Continuous average output power)
    - 0.12V(for 1 watt output)
- **Input Impedance**
  - Balanced : 40 k ohms
  - Unbalanced : 20 k ohms
- **Signal-to-Noise Ratio (A-weighted)**
  - 123 dB (input short circuit, Continuous average output power)
- **Power Level Meter**
  - Logarithmic compression type
  - 50 dB to +3 dB and direct watt reading
- **Power Requirements**
  - 100V, 120V, 220V, 230V, 240V (Voltage as indicated on rear panel) AC, 50/60 Hz
- **Power Consumption**
  - 210 watts at zero signal input
  - 1,200 watts in accordance with IEC-65
- **Maximum Outline Dimensions**
  - 475mm (18-11/16 inches) width,
  - 238mm (9-3/8 inches) height,
  - 540mm (21-1/4 inches) depth
- **Weight**
  - 42kg (92.6lbs.)net
  - 47kg (103.6lbs.)in shipping carton

※ Specifications and design subject to change without notice for improvements.



PRINTED IN JAPAN K9510Y 851-0135-00 (AD1)