

# Accuphase

STEREO POWER AMPLIFIER

## P-7000

● Powerful 11-parallel push-pull output stage in each channel delivers linear power into loads as low as one ohm ● Input stage with MCS topology ● Current feedback circuit combines excellent sound quality with total operation stability ● Bridged connection mode allows upgrading to true monophonic amplifier ● Massive Super Ring toroidal transformer rated for 1.5 kVA ● Printed circuit boards made from Teflon material





**A stereo power amplifier with impressive punch: 1,000 watts into 1 ohm – MCS technology in input stage improves S/N ratio, distortion ratings and other characteristics. 11 pairs of wide-band high-power transistors in parallel push-pull configuration for each channel. Power supply with massive 1.5 kVA toroidal power transformer supports linear power down to impedances as low as one ohm. Teflon PCBs with low dielectric constant and minimum loss.**

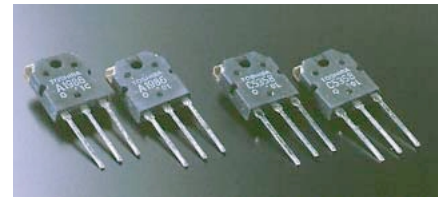
The P-7000 continues the distinguished design policy of the M-8000. It adds MCS technology in the input stage and many other refinements. Carefully selected top quality parts are used throughout. The design aim was to achieve very low output impedance (Note 1) and constant drive voltage (Note 2). The end result is a stereo power amplifier that provides effortless performance and impeccable sound quality. In the output stage, 11 pairs of high-power transistors with a rated collector dissipation of 150 watts are arranged in a parallel push-pull configuration for each channel. The devices are mounted to large heat sinks on both sides of the main chassis for efficient dissipation of thermal energy generated during operation. As a result, the amplifier is capable of delivering power in a linear progression towards lower load impedances: 1,000 watts into 1 ohm, 500 watts into 2 ohms, 250 watts into 4 ohms and 125 watts into 8 ohms. Speakers with very low impedances as well as speakers whose impedance fluctuates drastically can also be driven with ease. By using the P-7000 in bridged mode, it is possible to create a monophonic amplifier with even higher power. This performance is sustained

by a massive Super Ring toroidal transformer housed in a diecast enclosure with directly mounted heat sinks, and by large filtering capacitors. The transformer is rated for 1.5 kVA, and there are two capacitors of 56,000  $\mu\text{F}$  each. This assures more than ample reserves and allows the amplifier to meet even the most demanding and rapidly fluctuating power requirements.

The important input stage also has been given due attention. Another Accuphase innovation called MCS (Multiple Circuit Summing) helps to minimize noise. Current feedback topology combines total operation stability with excellent frequency response, while requiring only minimum amounts of negative feedback. The material used for printed circuit boards has a decisive influence not only on electrical characteristics but also on the sonic end result. The P-7000 uses Teflon boards with extremely low dielectric constant and low loss. The copper foil side of PCBs and all input and output terminals as well as all major signal carrying points are gold plated. Balanced inputs help to shut out external noise. The overall result of these measures is musical purity that leaves nothing to be desired.

**11-parallel push-pull power unit delivers guaranteed linear power output of 1,000 watts into 1 ohm, 500 watts into 2 ohms, 250 watts into 4 ohms and 125 watts into 8 ohms**

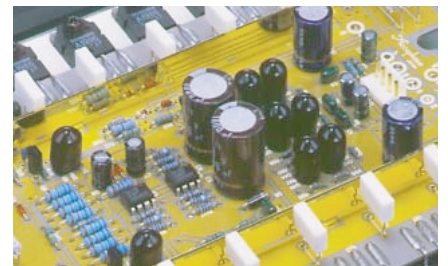
The output stage uses high-power transistors with a rated collector dissipation of 150 watts and collector current of 15 amperes. These devices boast excellent



frequency response, current amplification linearity, and switching characteristics. The transistors are arranged in an 11-parallel push-pull configuration (Figure 1) for ultra-low impedance and mounted on a massive heat sink made from diecast aluminum. This assures effective heat dissipation and allows the amplifier to effortlessly handle very low impedances. Power linearity is maintained down to loads as low as 1 ohm, which demonstrates the impressive capabilities of this amplifier.

**MCS topology in input stage drastically improves S/N ratio, distortion, and other characteristics**

The input stage features Accuphase's original MCS (Multiple Circuit Summing-up) design. Three separate



unit amplifiers for the input signal are connected in parallel, which minimizes noise and distortion and greatly improves other performance parameters as well. This manifests itself in further improved sound quality.

**Current feedback circuit topology prevents phase shifts in high frequency range**

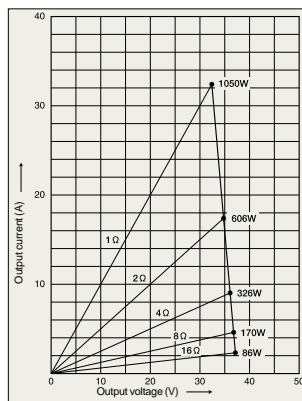
The P-7000 employs the original Accuphase current feedback principle. At the sensing point of the feedback loop, the impedance is kept low and current detection is performed. An impedance-converting amplifier then turns the current into a voltage to be used as the feedback signal. Since the impedance 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

**Note 1: Low amplifier output impedance**

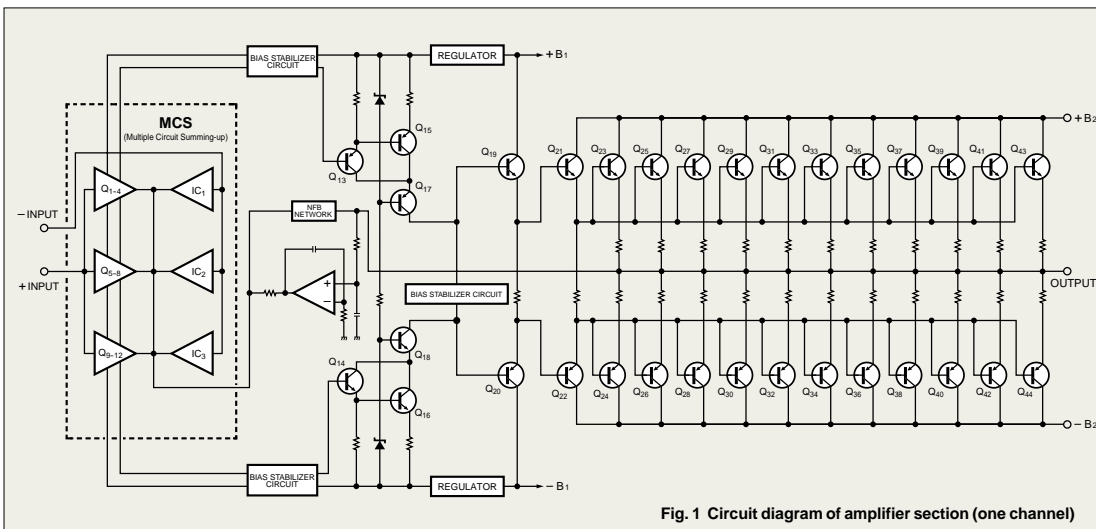
When forming the load of a power amplifier, a loudspeaker generates a counterelectromotive force that can flow back into the amplifier via the NF loop. This phenomenon is influenced by fluctuations in speaker impedance, and interferes with the drive performance of the amplifier. The output impedance of a power amplifier should therefore be made as low as possible by using output devices with high current capability. This absorbs the counterelectromotive force generated by the voice coil and prevents the occurrence of intermodulation distortion.

**Note 2: Constant drive voltage principle**

Even when the impedance of a load fluctuates drastically, the ideal power amplifier should deliver a constant voltage signal to the load. Figure 2 is a graph plotting the output voltage versus current characteristics. Even when the load changes, the output voltage remains almost constant, showing linear current progression. Actual measurement of clipping power at the extremely low load impedance of 1 ohm yields 1,050 watts. At 2 ohms, the figure is 606 watts, at 4 ohms 326 watts, and at 8 ohms 170 watts. This demonstrates the impressive performance reserves of this amplifier.

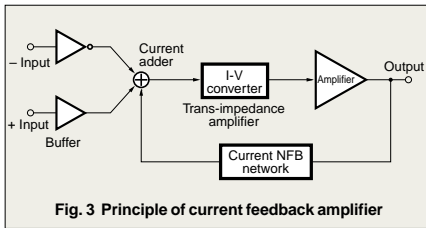


**Fig. 2 Output power vs. load impedance**  
(output voltage/output current: actual measurements)



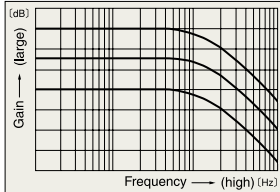
**Fig. 1 Circuit diagram of amplifier section (one channel)**





superb sonic transparency. Minimal amounts of NFB are used for maximum effect, providing natural energy response.

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 remains uniform even when gain changes)

**Printed circuit boards made from Teflon with low dielectric constant and low loss**

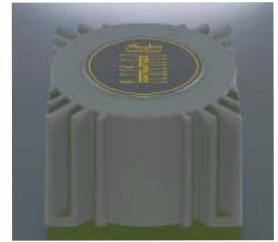
The printed circuit boards for the signal-carrying circuits are made of Teflon, a glass fluorocarbon resin material. Teflon has extremely low specific inductive capacity which is desirable for fast signal transmission. The low dielectric dissipation factor results in minimal transmission losses. High-frequency characteristics and heat resistance are also excellent. For further improved sound quality, the copper foil side is gold plated.

\* Teflon is a registered trademark of DuPont USA.

- Power amplifier assembly with 11 parallel push-pull transistor pairs per channel mounted directly to large aluminum diecast heat sinks, MCS circuitry, and current feedback amplifier

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

The P-7000 features a massive toroidal power transformer with a maximum rating of 1.5 kVA. The transformer is housed in a non-resonant aluminum case filled with a material that transmits vibrations.



This completely prevents any adverse influences on other circuit parts. A toroidal transformer uses heavy-gauge copper wiring on a doughnut-shaped core. This results in low impedance and high efficiency, while allowing compact dimensions.



Two ultra-large aluminum electrolytic capacitors rated for 56,000  $\mu$ F each serve to smooth out the pulsating direct current from the rectifier, providing more than ample filtering capacity.



**Bridged connection allows upgrading to a true monophonic amplifier with 2,000 watts into 2 ohms, 1,000 watts into 4 ohms, and 500 watts into 8 ohms.**

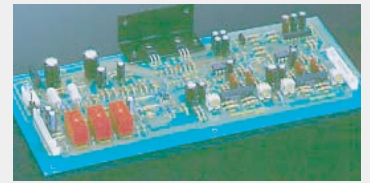
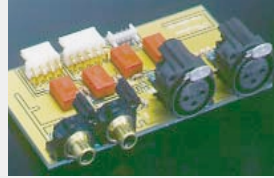
Bridged connection results in a monophonic amplifier with four times the power output compared to stereo operation. Dynamic power with an almost unlimited feel is the result.

**Easy switching between dual mono operation and bridged connection**

A mode selector on the rear panel makes it simple to switch between dual mono, stereo, or bridged operation.



- **Balanced connection prevents induced noise**
- **PCB copper foil and all major signal path components are gold-plated**
- **Large direct-reading analog power meters**
- **Oversize speaker terminals accept also very heavy-gauge speaker cable**

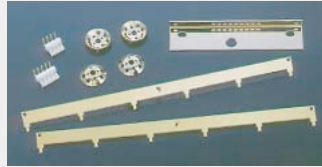


Assembly with meter and protection circuitry

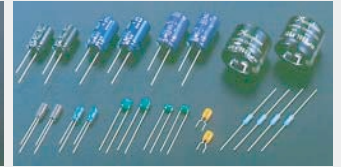
Unbalanced and balanced input connectors



Large size speaker terminals

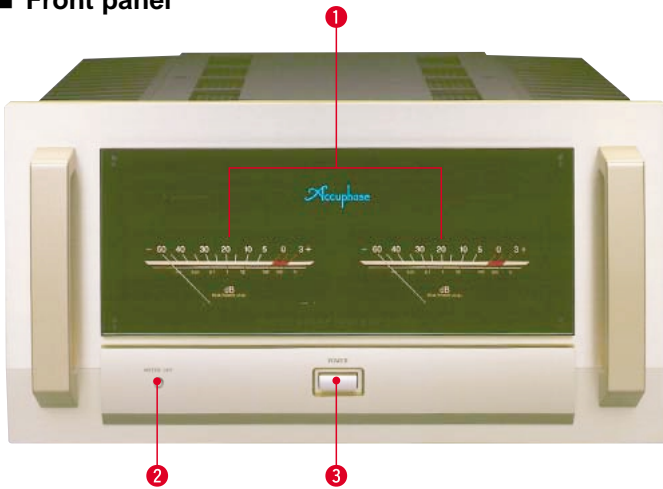


Gold-plated parts

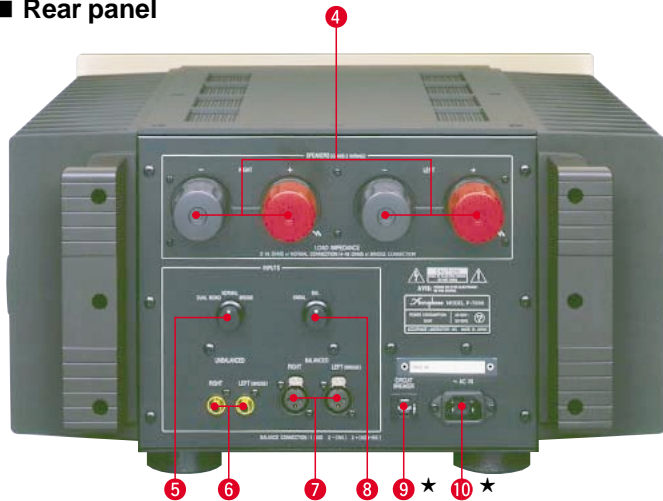


High-quality, high-reliability parts

**Front panel**



**Rear panel**



- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>1 Power meters (Output indication in dB and %)</li> <li>2 Meter operation/Illumination switch ON OFF</li> <li>3 Power switch</li> <li>4 Speaker output terminals</li> <li>5 Mode selector DUAL MONO NORMAL BRIDGE</li> <li>6 Unbalanced inputs</li> </ul> | <ul style="list-style-type: none"> <li>7 Balanced inputs               <ul style="list-style-type: none"> <li>① Ground</li> <li>② Inverted (-)</li> <li>③ Non-inverted (+)</li> </ul> </li> <li>8 Input selector BALANCE UNBALANCE</li> <li>9 AC circuit breaker*</li> <li>10 AC input connector* (for supplied power cord)</li> </ul> |
|--|--|

**Remarks**

- ★ This product is available in versions for 120/230 V AC. Make sure that the voltage shown on the rear panel matches the AC line voltage in your area.
- ★ The shape of the AC inlet and plug of the supplied power cord, and the circuit breaker current rating depend on the voltage rating and destination country.

■ Supplied accessories: • AC power cord

**Parallel drive of output devices**

Semiconductor devices for high frequency applications usually employ a multi-chip design where a number of small transistors or FETs are connected in parallel. This approach allows reducing inherent impedance and residual noise as compared to single device operation. In other words, linearity is improved. In physical terms, increasing the surface area of the chip prevents spot overheating by providing better heat dissipation, resulting in more stable operation. Parallel connection in the output stage of the P-7000 uses a similar principle for distributing the current, which lets the amplifier easily deal with sudden demands for high current, such as caused by pulsive source signals. However, a parallel circuit as implemented by Accuphase is much more than a simple physical connection. Accuphase's extensive know-how gained through many years of intensive research and experimentation is in evidence here. Careful control of temperature characteristics, current matching of individual devices, and many other advanced measures are implemented. The overall result is minimized distortion at low currents and improved S/N ratio, which manifests itself as dramatically improved clarity and transparency at low listening levels. Ample current reserves make it possible to drive even extremely low loads with effortless authority. No-holds-barred performance and superb sound are the hallmarks of Accuphase amplifiers.

**GUARANTEED SPECIFICATIONS**

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

- **Continuous Average Output Power** (20 - 20,000 Hz)
  - Stereo operation
    - 1,000 watts per channel into 1 ohm (\*)
    - 500 watts per channel into 2 ohms (both channels driven)
    - 250 watts per channel into 4 ohms
    - 125 watts per channel into 8 ohms
  - Monophonic operation (bridged connection)
    - 2,000 watts into 2 ohms (\*)
    - 1,000 watts into 4 ohms
    - 500 watts into 8 ohms
- Note: The rating marked (\*) is for music signals only.
- **Total Harmonic Distortion**
  - Stereo operation (both channels driven)
    - 0.05%, with 2 ohm load
    - 0.03%, with 4 to 16 ohm load
  - Monophonic operation (bridged connection)
    - 0.03%, with 4 to 16 ohm load
- **Intermodulation Distortion** 0.003%
- **Frequency Response**
  - At rated output: 20 - 20,000 Hz +0, -0.2 dB
  - At 1 watt output: 0.5 - 160,000 Hz +0, -3.0 dB
- **Gain** 28.0 dB (in stereo and monophonic operation)
- **Output Load Impedance**
  - Stereo operation: 2 to 16 ohms
  - Monophonic operation: 4 to 16 ohms
- **Damping Factor** 300 (stereo/monophonic operation)
- **Input Sensitivity** (with 8 ohm load)
  - Stereo operation
    - 1.26 V for rated output
    - 0.11 V for 1 watt output
  - Monophonic operation
    - 2.52 V for rated output
    - 0.11 V for 1 watt output
- **Input Impedance**
  - Balanced: 40 kilohms
  - Unbalanced: 20 kilohms
- **Signal-to-Noise Ratio** 122 dB at rated output (A-weighted, input shorted)
- **Output Level Meters** Logarithmic scale, dB/% indication
- **Power Requirements** AC 120V / 230V, 50/60 Hz (Voltage as indicated on rear panel)
- **Power Consumption**
  - 125 watts idle
  - 930 watts in accordance with IEC-65
- **Maximum dimensions**
  - Width 465 mm (18-5/16")
  - Height 258 mm (10-3/16")
  - Depth 545 mm (21-7/16")
- **Weight**
  - 49.5 kg (109.1 lbs.) net
  - 59.0 kg (130.1 lbs.) in shipping carton



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