

Accuphase

MONOPHONIC POWER AMPLIFIER

M-6000

- Two totally identical power amplifier circuits driven in parallel
- 16 parallel push-pull arrangement of MOS-FET devices in output stage
- Input stage configured as double instrumentation amplifier
- Double MCS+ circuit and current feedback topology in amplification stage
- Support for bridged use of two M-6000 units with even higher output power
- Power supply with massive high-efficiency 900-VA toroidal transformer and large filtering capacitors





The ultimate power MOS-FET machine – This super capable yet astonishingly nimble monophonic power amplifier features a double instrumentation amplifier setup for fully balanced signal transmission, augmented by a Double MCS+ circuit and current feedback topology. Experience outstanding sound and drastically improved performance parameters including excellent S/N ratio and minimal THD. A hefty power supply and 16 power MOS-FETs arranged in a parallel push-pull configuration deliver 1200 watts (music signal) into an ultra-low 1-ohm load.

The M-6000 was born out of a thorough re-evaluation of the power amplifier from a new vantage point. Aiming for nothing less than the ultimate in sound quality, this monophonic power amplifier with its massive heat sinks on both sides stands as an impressive achievement. The decisive difference to conventional designs lies in the fact that the M-6000 possesses two completely identical power amplifier circuits which are driven in parallel. Kept entirely separate and mounted on the left and right sides of the chassis, these circuits deliver output current reserves on a previously almost unheard-of level. A damping factor rating of more than 500 demonstrates that this amplifier is capable of driving even the most difficult, ultra-low impedance loads with ease. In a high-output amplifier, the operating conditions of the power supply and the thermal conditions can change dramatically from one moment to the next. To ensure stable circuit operation under such demanding conditions must therefore be a top priority. In the M-6000, two major factors which made driving two power amplifier units in parallel possible are ① the use of power MOS-FET devices, and ② the Double MCS+ circuit topology. Power MOS-FETs are renowned for their excellent high-frequency characteristics, and they exhibit negative thermal behavior by design. This makes it easy to control the temperature balance between two power amplifier units, achieving stable operation even when the load and operating conditions change dramatically. The Double MCS+ circuit works perfectly together with the current feedback approach to ensure perfectly controlled phase characteristics over the entire audible range and even beyond, extending into the ultra high frequency area. This results in further improved overall performance.

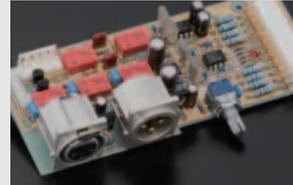
- 16-parallel push-pull arrangement of power MOS-FETs delivers linear power progression: 1200 watts (music signal) into 1 ohm, 600 watts into 2 ohms, 300 watts into 4 ohms, or 150 watts into 8 ohms.
- Strong power supply with large high-efficiency 900 VA toroidal transformer and massive filtering capacitors (48,000 $\mu\text{F} \times 2$).
- Printed circuit boards made from Teflon with low dielectric constant and minimum loss.
 - * Teflon is a registered trademark of DuPont USA.
- Bridged operation of two M-6000 units allows upgrade to monophonic amplifier with even higher power, delivering 2400 watts into 2 ohms (music signal), 1200 watts into 4 ohms, or 600 watts into 8 ohms.
- Double MCS+ (Multiple Circuit Summing) topology and current feedback topology work together for even better S/N ratio.
- 4-stage gain selector (MAX, -3 dB, -6 dB, -12 dB) minimizes residual noise.
- Fully balanced circuitry reliably shuts out external noise.
- Phase selector with Normal and Reverse settings.
- Large analog peak-reading meter:
 - Meter operation and illumination on/off switch
 - Switchable peak hold time: 3 seconds or infinite
- Instrumentation amplifier principle enables fully balanced signal paths throughout the unit.
- Input selector button (balanced/unbalanced) on front panel.
- Massive speaker terminals also accept Y lugs.



High-efficiency toroidal transformer



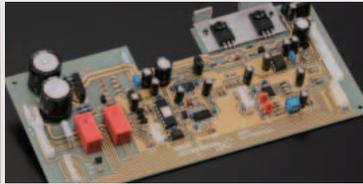
Filtering capacitors



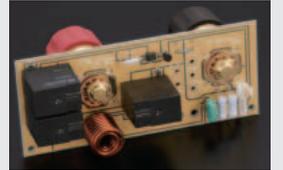
Balanced inputs



Gain control selector



Meter circuitry and protection circuitry assembly



Speaker terminal assembly

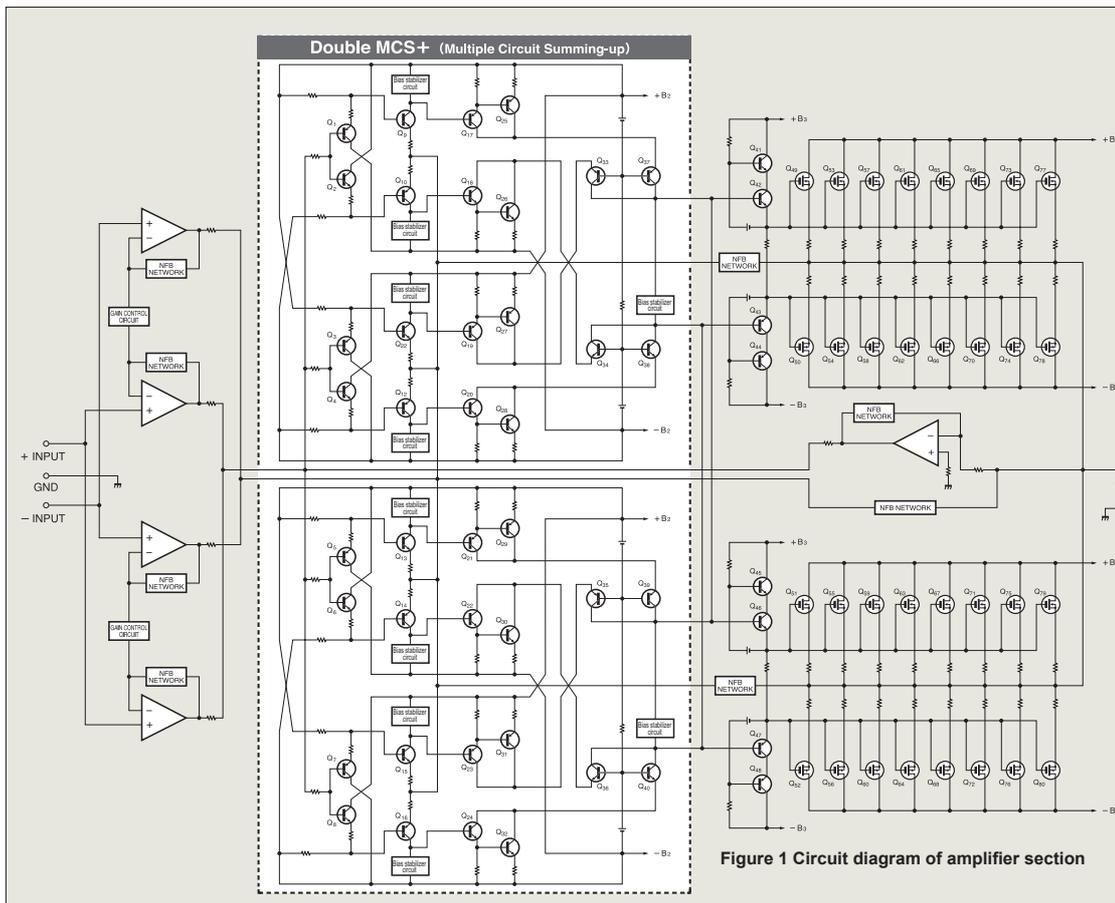
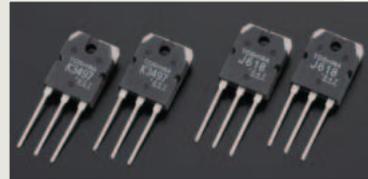
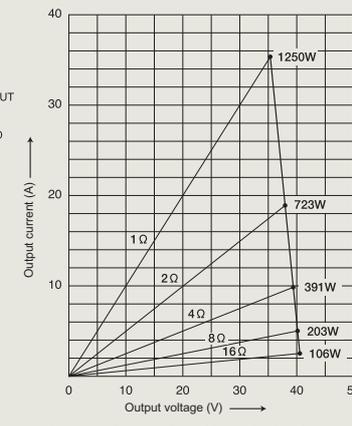


Figure 1 Circuit diagram of amplifier section



■ Two power units, each with an 8-parallel push-pull arrangement of power MOS-FET devices, are driven in parallel.

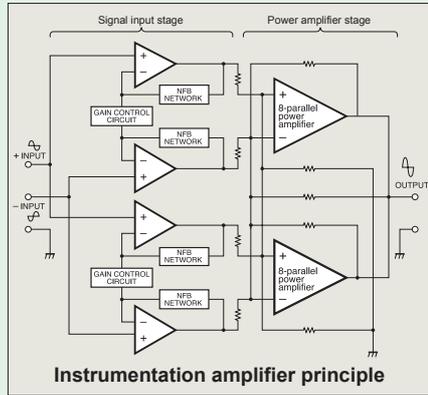


* 1-ohm operation possible with music signals only
Figure 2 Load impedance vs. output power (output voltage/output current)

Instrumentation amplifier configuration and further refined Double MCS+ circuit

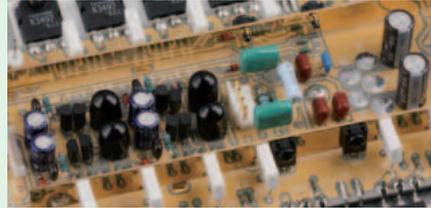
Double instrumentation amplifier configuration allows fully balanced signal paths throughout

The M-6000 employs latest instrumentation amplifier topology in a dual configuration. From the input terminal right through to the output of the power stage, the signal is handled only by balanced amplifiers. This not only eliminates internal noise and distortion components, it also makes the amplifier extremely resistant to changes in the external environment, resulting in dramatically improved stability and reliability.



Double MCS+ in amplifier stage further improves S/N ratio

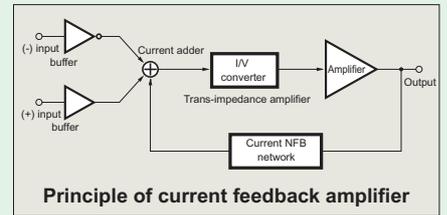
The input stage of the amplifier section features another Accuphase innovation. Double MCS+ makes ample use of cascode drive circuits and dedicates each component to a clearly defined task, thereby



ensuring stable performance. Four circuits for amplifying the input signal are connected in parallel to keep distortion to a minimum and to further enhance S/N ratio and other parameters. The resulting level of sound quality is simply stunning.

Current feedback assures excellent phase characteristics in high range

As shown in the illustration, the M-6000 uses the output signal current rather than voltage for feedback. Since the impedance at the current feedback point is very low, there is almost no phase shift. A minimal amount of NFB therefore results in maximum improvement of circuit parameters.



■ Power amplifier assembly with 8-parallel push-pull power MOS-FET arrangement for output stage mounted directly to large diecast aluminum heat sink, also comprising MCS+ circuitry and current feedback amplifier. Two completely identical circuits are used.

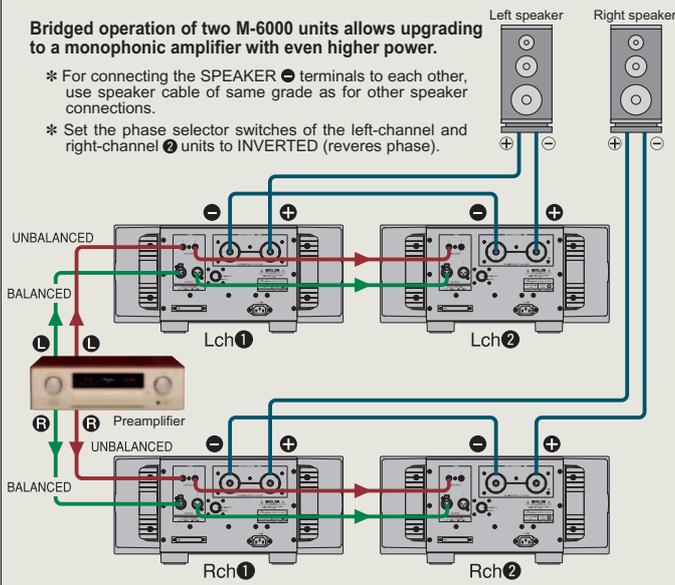


- Using four M-6000 units, bridged operation or bi-amping is possible.
- Connect the input signal either to the balanced or the unbalanced inputs.

Example for bridged connection

Bridged operation of two M-6000 units allows upgrading to a monophonic amplifier with even higher power.

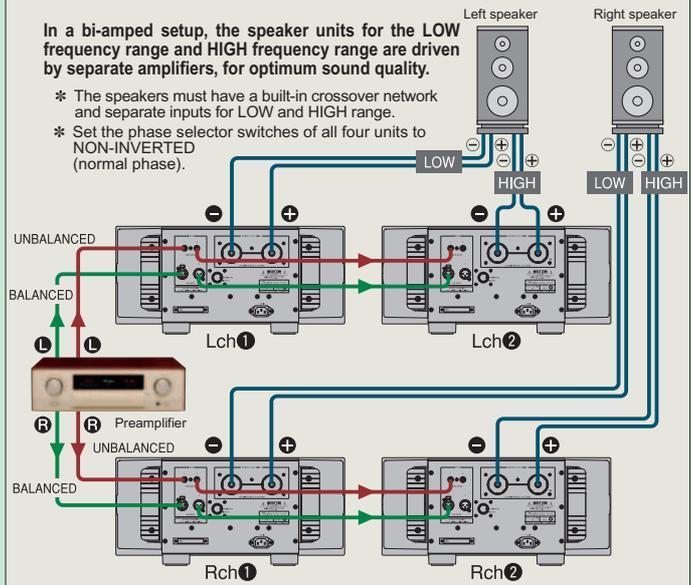
- * For connecting the SPEAKER terminals to each other, use speaker cable of same grade as for other speaker connections.
- * Set the phase selector switches of the left-channel and right-channel units to INVERTED (reverses phase).



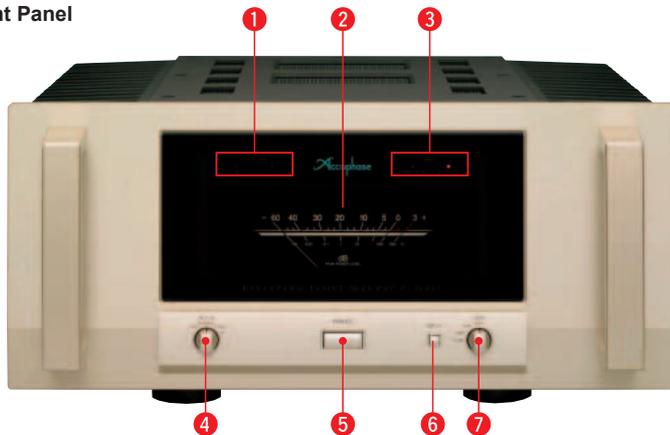
Example for bi-amping connection

In a bi-amped setup, the speaker units for the LOW frequency range and HIGH frequency range are driven by separate amplifiers, for optimum sound quality.

- * The speakers must have a built-in crossover network and separate inputs for LOW and HIGH range.
- * Set the phase selector switches of all four units to NON-INVERTED (normal phase).



Front Panel



Rear Panel



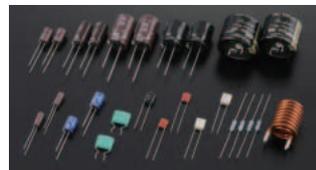
- 1 Hold time indicator
- 2 Power meter (dB and % indication)
- 3 Input indicator
- 4 Meter illumination/operation/hold time selector
OFF / NORMAL / 3 SEC / ∞
- 5 Power switch
- 6 Input selector button
BALANCED UNBALANCED
- 7 Gain selector
MAX, -3 dB, -6 dB, -12 dB
- 8 Unbalanced inputs
(One is for signal output during bridged operation)
- 9 Speaker terminals
- 10 Balanced inputs
(One is for signal output during bridged operation)
- 11 Phase selector switch
NON-INVERTED (normal phase)
INVERTED (reverse phase)
- 12 AC power connector*

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



■ Parts selected for high sound quality and reliability



■ Major signal path parts are gold-plated

Guaranteed Specifications

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

- **Continuous Average Output Power** (20 - 20,000 Hz)
 - 1,200 watts into 1 ohm (*)
 - 600 watts into 2 ohms
 - 300 watts into 4 ohms
 - 150 watts into 8 ohms

Output in bridged mode (using two M-6000 units)

- 2,400 watts into 2 ohms (*)
- 1,200 watts into 4 ohms
- 600 watts into 8 ohms

Note: The rating marked (*) is for music signals only.

- **Total Harmonic Distortion**
 - 0.05% with a 2-ohm load
 - 0.03% with a 4 to 16-ohm load
- **Intermodulation Distortion** 0.01%
- **Frequency Response**
 - At rated continuous average output: 20 - 20,000 Hz +0, -0.2 dB
 - At 1 watt output: 0.5 - 150,000 Hz +0, -3.0 dB
- **Gain** 28.0 dB (GAIN selector in MAX position)
- **Gain Selection** MAX, -3 dB, -6 dB, -12 dB
- **Output Load Impedance**
 - Continuous output: 2 to 16 ohms
 - With music signal: 1 to 16 ohms
- **Damping Factor** 500
- **Input Sensitivity**
 - 1.38 V for rated continuous average output
 - 0.11 V for 1 watt output
- **Input Impedance**
 - Balanced: 40 kilohms
 - Unbalanced: 20 kilohms
- **Signal-to-Noise Ratio** (A-weighted) 120 dB with input shorted, at rated continuous average output
- **Output Level Meter**
 - 60 to +3 dB (dB/% indication)
 - Logarithmic compression scale
 - Display illumination off switch
 - Peak hold time select: 3 seconds, ∞
- **Power Requirements** AC120 V/230 V (Voltage as indicated on rear panel) 50/60 Hz
- **Power Consumption**
 - 180 watts idle
 - 550 watts in accordance with IEC 60065
- **Maximum Dimensions**
 - Width: 465 mm (18-5/16")
 - Height: 220 mm (8-11/16")
 - Depth: 500 mm (19-11/16")
- **Mass**
 - 38.5 kg (84.9 lbs) net
 - 48.0 kg (105.8 lbs) in shipping carton



ACCUPHASE LABORATORY, INC.