

# Accuphase

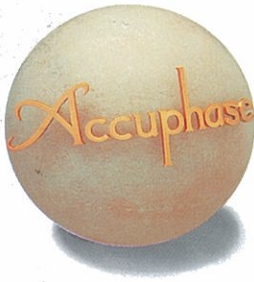
STEREO PREAMPLIFIER

## C-250

● Ideal balanced line amplifier ● Complete mono construction with separate power supplies for left and right channel ● Volume control with mirror-finish resistor elements assures sonic purity ● Logic-controlled relays allow short signal paths ● Headphone amplifier optimized for best sound







**Ideal line amplifier topology using bridged feedback. Complete mono construction featuring separate power transformers and unit amplifiers for left and right channel. Volume control with mirror-finish resistor elements assures smooth sound. High-quality analog disc playback possible with optional phono equalizer unit.**

The C-250 is a new addition to the distinguished line of Accuphase preamplifiers. Based on balanced signal transmission technology developed by Accuphase, the circuit design of the C-250 has been kept deliberately simple, and strictly selected parts and refined performance assure outstanding sound quality. In its standard configuration, the C-250 is a dedicated line amplifier, but Accuphase of course has not forgotten the needs of audiophiles with a cherished collection of analog records. The optional phono equalizer unit AD-250 can be mounted in a special slot on the rear panel, to allow high-grade analog disc reproduction as well.

One of the main circuit features of the C-250 is its ideal line amplifier topology, which provides equally excellent sound quality in balanced or unbalanced operation. The balanced output stage employs symmetrically bridged feedback, resulting in a floating balanced topology, where the signal is kept entirely separate from the ground line. This elaborate design lets the amplifier develop its full potential.

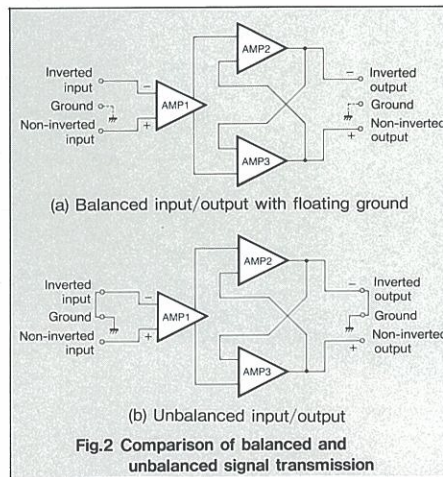
The volume control is a mirror-polished resistor type, and logic relay control allows desirably short signal paths. With the supplied remote commander, the user can switch sources and adjust the volume from any convenient location. A simple yet useful array of functions, and parts and workmanship of the highest order make the C-250 a preamplifier that sounds superb and is a joy to use.

#### Ideal Balanced Line Amplifier

In balanced signal transmission, two identical signals are transmitted simultaneously with inverted phase and combined at the receiving end, thereby canceling out common-mode noise. High-frequency interference such as caused by other electrical equipment cannot intrude into the signal path or the power supply

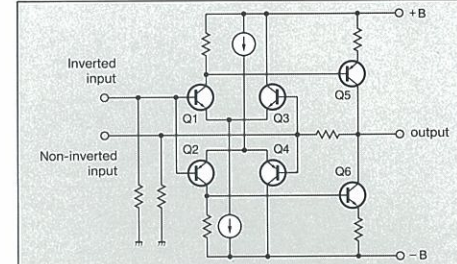
lines, keeping the sound absolutely pure.

Fig. 2 demonstrates the advantages of balanced signal transmission as implemented by Accuphase. (a) shows the circuit in balanced operation and (b) in the unbalanced condition. Basically, the unit consists of three differential amplifiers. In balanced operation, the signal is fed to the (+) and (-) inputs of AMP1 and subsequently to AMP2 and AMP3. The outputs of these two amplifiers are connected to form a cross-feedback loop, which sends the symmetrical (+) and (-) signals with low impedance to

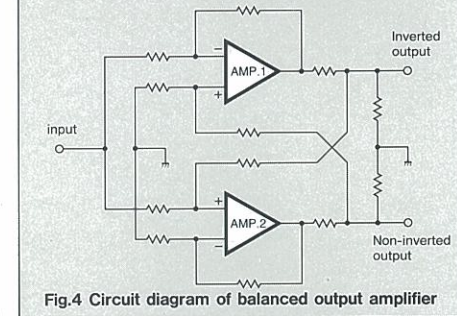


**Fig.2 Comparison of balanced and unbalanced signal transmission**

the next stage. The signals do not depend on the ground line, resulting in an ideal balanced circuit. Even if one side of the output is grounded, both amplifiers continue to operate, and the output voltage does not change. Therefore the circuit can accommodate an unbalanced input or output connection simply by linking one side to ground, without affecting signal amplification characteristics. Fig. 3 shows the balanced input circuit with its discrete differential push-pull configuration. Fig. 4 is a circuit diagram of the balanced output stage.



**Fig.3 Circuit diagram of balanced input amplifier**



**Fig.4 Circuit diagram of balanced output amplifier**

#### Modular Construction With Totally Separate Unit Amplifiers

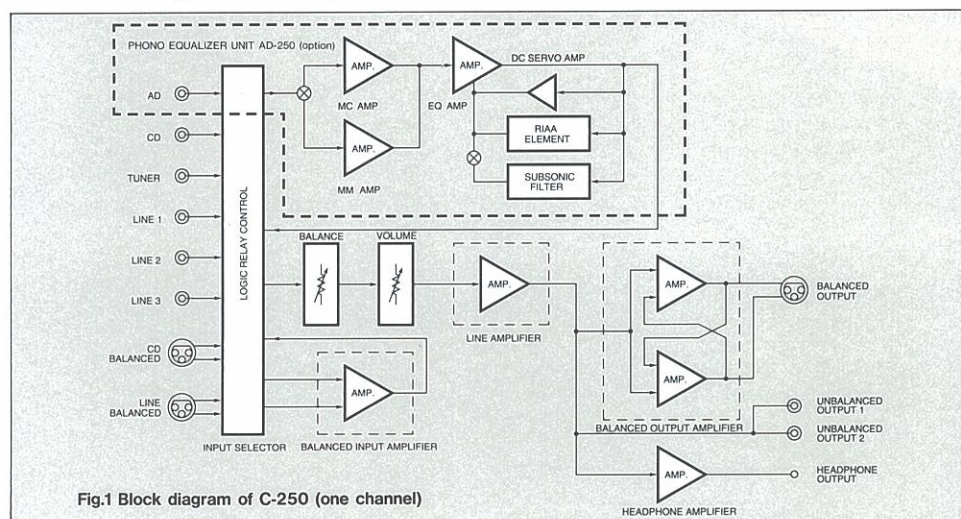
The C-250 contains a total of six unit amplifiers, including the line amplifier, balanced input amplifier and balanced output amplifier for each channel. These units are housed in thick enclosures made of extruded aluminum and mounted to a sturdy motherboard. This prevents interference among unit amplifiers and guards against external vibrations and resonances.

#### Complete Mono Construction With Separate Transformers for Left and Right

The power supply section of the C-250 also spares no expense. Two sets of power transformers and filtering capacitors are used in a dual mono configuration, to preclude any possibility of electrical interaction between the channels. This assures stereo reproduction of the highest order.

#### Volume Control With Mirror-Finish Resistor Elements for Smooth Sound

The volume control is an important component which can have a decisive influence on sound quality. The C-250 therefore uses special low-distortion resistor elements with a mirror-like surface. This ensures minimum contact resistance and superior wear resistance. The contact brush is gold plated and features a multiple contact point design. The outer terminals are integrated with the brush, to eliminate superfluous metal links, thereby reducing distortion that can occur when different metals come into contact. The contact brush is designed to remain stationary; turning the volume knob rotates the resistor element assembly. This innovative design drastically reduces



**Fig.1 Block diagram of C-250 (one channel)**



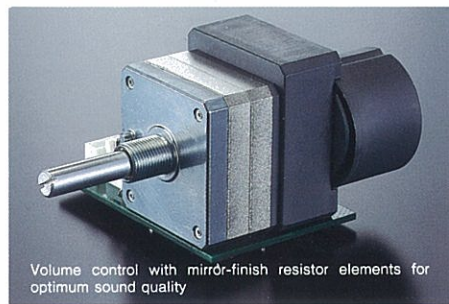


#### Internal layout

- 1 Separate power transformers for left and right channel
- 2 Left-and right-channel line amplifier units
- 3 Balanced output unit amplifier
- 4 Balanced input unit amplifier
- 5 Input/output switching relays
- 6 Dedicated Phono Equalizer Unit AD-250 (option)

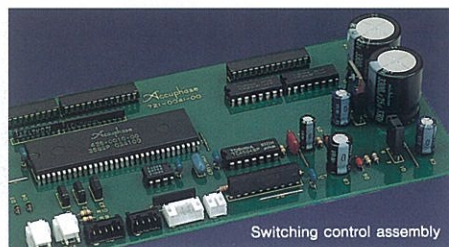
■ Neatly designed motherboard with six unit amplifiers, filtering capacitors, and directly mounted input/output jacks and switching relays

the number of internal contact points and eliminates the need for contact grease, thus contributing to sonic purity.



#### Logic-Controlled Relays Assure High Sound Quality and Long-Term Reliability

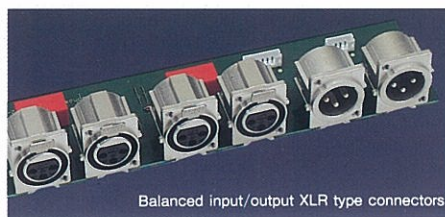
The input source selector is another important aspect of a preamplifier. It is well known that long signal paths are highly detrimental to



sound quality. The C-250 therefore uses high-quality relays developed for professional communication applications. These strategically placed relays are hermetically sealed and filled with nitrogen gas, which assures outstanding long-term performance. A logic control circuit developed by Accuphase makes use of a microprocessor to control all switching actions with optimum timing, so that absolutely no switching noise occurs.

#### Versatile Input/Output Configuration

With the ever diversifying array of program sources available to the discerning audiophile, a preamplifier must be able to accommodate various system needs. The C-250 provides eight RCA-type phono inputs (CD, TUNER, 3 LINE inputs, 2 TAPE inputs, and 1 optional analog disc input) and two balanced inputs (CD and LINE). A total of five outputs are available, including 2 RCA-type phono outputs, 2 tape outputs, and 1 balanced output.



#### Dedicated Headphone Amplifier For Best Sound

Listening via headphones is an alternative way to enjoy music that should not be overlooked. The C-250 provides a separate amplifier for the phone jack designed to provide superior sonic performance. The speaker output can be cut off by a switch, and the main volume control can be used to adjust the headphone listening level.

#### Remote Commander Allows Source Switching and Volume Level Adjustment

The supplied remote commander lets you select your favorite program from the comfort of your armchair. Because the signals from the commander simply activate the high-quality relays controlled by the logic circuit, there is absolutely no degradation of sound quality. Listening level adjustment is performed by a small motor with a clutch mechanism which drives the volume control for smooth, reliable action.





## Dedicated Phono Equalizer Unit AD-250 (Option)

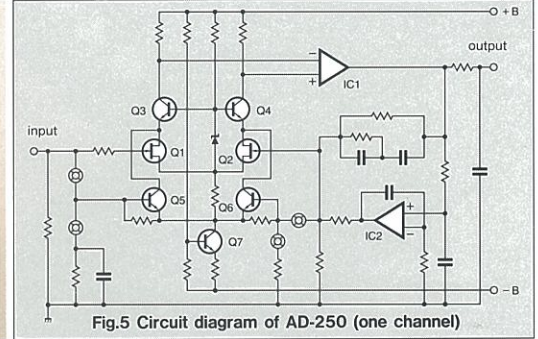
The C-250 in its standard configuration is designed as a pure line amplifier, mainly for reproduction of program sources such as CDs and other digital media. However, many music lovers still own a valuable collection of analog records. For the needs of these audiophiles, the C-250 offers an attractive solution: simply by inserting the dedicated phono equalizer unit AD-250 into a special slot on the rear panel, the C-250 provides phono reproduction capabilities of the highest order.

The AD-250 features a gold-plated glass epoxy printed circuit board, and its circuit topology, as shown in Fig. 5, reflects the long experience of Accuphase in designing top-quality phono equalizers. Dedicated MM and MC input stages of the phono amplifier provide optimum conditions for each type of phono cartridge. The MM

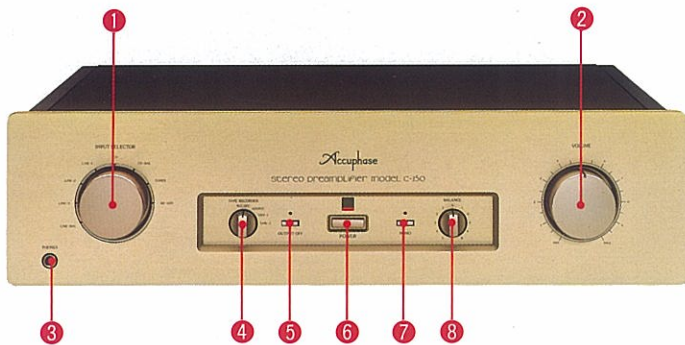
input stage uses two FETs ( $Q_1$ ,  $Q_2$ ) with high S/N ratio, which is ideal for cartridges with high output impedance. The MC input stage, which has to process small signals from cartridges with low impedance, is configured as a low-noise differential circuit ( $Q_3$  -  $Q_6$ ) with a low-

impedance NFB loop.

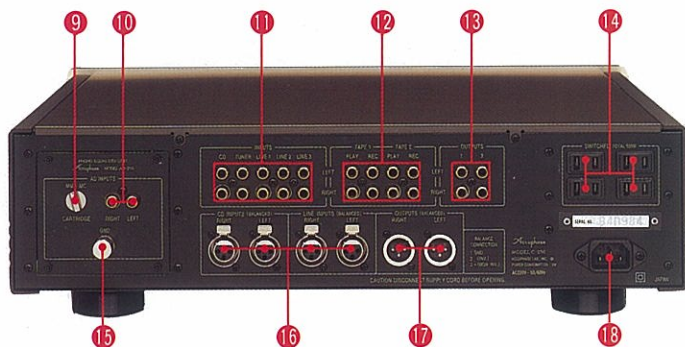
MC input impedance is switchable between 10, 30, and 100 ohms, and a subsonic filter cuts off harmful low-frequency components. These features can be set on the printed circuit board before mounting the equalizer unit in the C-250.



### FRONT PANEL



### REAR PANEL (OPTION:AD-250)



- 1 Input selector
- 2 VOLUME control
- 3 Headphone jack
- 4 Recording output on/off tape monitor switch
- 5 Output On/Off selection Button
- 6 POWER switch
- 7 Stereo/Mono Mode Selector
- 8 BALANCE Adjustment
- 9 EQUALIZER GAIN switch
- 10 AD (analog disc) input jack
- 11 Line input jack
- 12 Tape input jack/Recording output jack

- 13 Unbalanced output jack (2 pairs)
- 14 AC outlet (switched)\*
- 15 Ground Terminal
- 16 Balanced input CD/LINE connectors
- 17 Balanced output connectors
- 18 AC power connector

#### Remarks

\*These switched AC outlets may not be supplied depending on the safety standards or regulations applicable in the particular country to where the unit is destined.

### Guaranteed Specifications

\*Guaranteed specifications are measured according to EIA standard RS-490. AD denotes Analog Disc input.  
\*Specifications are measured with phono equalizer unit AD-250 installed.

**Frequency Response** BALANCED/UNBALANCED INPUT  
20~20,000Hz +0 -0.2dB  
AD INPUT  
20~20,000Hz ±0.2dB

**Total Harmonic Distortion** 0.005% (for all inputs)

Input Sensitivity, Input Impedance	Sensitivity		Input impedance
	Rated output	0.5 V output	
AD:MM	8.0mV	2.0mV	47k Ω
AD:MC	0.25mV	0.063mV	10 Ω·30 Ω·100 Ω *
BALANCED	252mV	63mV	40k Ω
UNBALANCED	252mV	63mV	20k Ω

\*MC input impedance set by internal DIP switches in the AD-250

**Rated Output Level and Impedance** BALANCED/UNBALANCED OUTPUT : 2.0V, 50 Ω  
**Headphone jack** TAPE REC : 252mV, 200 Ω AD source  
**S/N Ratio** Suitable impedance : 4-100 ohms

Input terminal	Input shorted, IHF-A weighting S/N ratio at rated output	S/N ratio (EIA)
AD:MM	95dB	88dB
AD:MC	79dB	85dB
BALANCED	97dB	96dB
UNBALANCED	119dB	97dB

**Maximum Output Level (THD 0.005%)** BALANCED/UNBALANCED OUTPUT : 7.0 V  
TAPE REC : 7.0 V (AD source)

**Maximum AD Input Level (1 kHz, THD 0.005%)** MM/INPUT : 250mV  
MC/INPUT : 8mV

**Minimum Load Impedance** BALANCED OUTPUT : 600 Ω  
UNBALANCED OUTPUT : 1k Ω  
TAPE REC : 10k Ω

**Gain** BALANCED/UNBALANCED INPUT → BALANCED/UNBALANCED OUTPUT : 18dB  
AD MM INPUT → REC OUTPUT : 30dB  
AD MM INPUT → BALANCED/UNBALANCED OUTPUT : 48dB  
AD MC INPUT → REC OUTPUT : 60dB  
AD MC INPUT → BALANCED/UNBALANCED OUTPUT : 78dB

**Subsonic Filter Characteristics** 25Hz, -12dB/octave  
(Set by internal DIP switches in AD-250)

**Power Requirements** 100V, 120V, 220V, 230V, 240V, (Voltage as indicated on rear panel) AC, 50/60Hz

**Power Consumption** 9 watts

**Maximum Dimensions** 475mm(18-7/10" )width  
140mm(5-1/2" )height  
401mm(15-3/4" )depth  
414mm(16-3/10" )depth(with AD-250)

**Weight** 13.8kg(30.4lbs.) net  
13.9kg(30.6lbs.)with AD-250 net  
18.3kg(40.3lbs.)in shipping carton  
18.4kg(40.5lbs.)with AD-250in shipping carton

#### Supplied Remote Commander RC-10

Remote control principle: infrared pulse  
Power supply: 3V DC (IEC R03 batteries(size AAA)×2)  
Dimensions: 66mm (2-19/32 inches) width,  
175mm (6-7/8 inches) height,  
20mm (25/32 inches) depth  
Weight :190g (0.42 lbs.) (including batteries)

\*Specifications and design subject to change without notice for improvements.

**Accuphase**  
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PRINTED IN JAPAN F9410Y 851-0123-00(AD1)