

Accuphase

STEREO PREAMPLIFIER

# C-202

- Cascode class A push-pull amplifier
- Separate voltage regulators for each amplifier unit
- Balanced input/output circuits





# Dedicated CD section ensures ultimate Com No-compromise design with a total of four s

CD amplifier features all-stage class A push-pull totally balanced circuit configuration.

Depending on the type and quality of program sources available at a given time, the demands placed on a control amplifier vary considerably. The requirements in the present and future age of digital audio for a truly outstanding preamplifier can be stated quite simply: flawless reproduction of high-quality digital sources such as Compact Discs, and the ability to accommodate a variety of input combinations.

The Accuphase Stereo Preamplifier C-202 is a product which perfectly translates these requirements into reality. One of its most remarkable features is the totally separate CD amplifier section. Besides the already high-quality regular line amplifier, this separate circuit has been honed for the ultimate in performance and quality. The signal path is kept utterly simple, with only a minimum of functions, for pure, undiluted sound quality. The C-202 also provides balanced input and output circuits. In combination with the Balanced Type Class-A Stereo Power Amplifier P-102, an overall amplifier configuration with balanced signal lines throughout can be realized, which is a dream come true for every audiophile.

The class-A line amplifier of the C-202 offers a total of 8 inputs, for easy connection of a variety of program sources. The necessary tape recording and

playback functions are also provided, and all circuits are designed with utmost regard for sound quality. The left and right channel sections are powered from separate windings of the power transformer, with discrete rectifier and regulator circuits for complete channel separation.

In true Accuphase fashion, the entire amplifier is an example of fine craftsmanship, and only top-quality materials are used throughout. The sophisticated front panel is functional and visually pleasing, with less frequently used controls arranged behind a sub panel. The heavy panel is made from brushed gold aluminum, and the large knobs are cut from solid aluminum and finished by a fine sand-blasting process. The side panels of persimmon wood lend a stunningly beautiful appearance to the amplifier.

Ever since the introduction of the Compact Disc, the opinion was sometimes voiced that direct connection of the CD player to the power amplifier is the preferable way to listen to this medium. However, it has been proven many times that a well-designed preamplifier can further enhance CD reproduction, by refining the musical quality of the sound and improving the depth of the sound stage. The preamplifier is also a prerequisite for effectively managing the ever-increasing number of program sources. The C-202 was created from a thorough understanding of these facts. It is a product that fully reflects the vast technological expertise and know-how of Accuphase.

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## Luxurious four-amplifier configuration with separate L/R 6-dB buffer amplifiers for CD and 20-dB line amplifiers

To maintain ultimate purity in Compact Disc reproduction, the C-202 incorporates a CD section with a buffer amplifier that is completely separate from the main line amplifier, as shown in the block diagram of Fig. 1. The C-202 may be thought of as two units in one cabinet: a conventional high-gain preamplifier and a "straight-line" CD buffer preamplifier. The CD amplifier circuit employs class-A push-pull design throughout. The CD input signal is supplied directly to this amplifier and only an absolute minimum of functions (volume control and attenuator) are present in the signal path. The extremely short and simple signal routing ensures faithful reproduction of even the most subtle musical nuances and lets the sound stage unfold with unsurpassed realism. The line amplifier also uses a class-A push-pull design for all stages. While providing highly pure amplification, it is equipped to handle a variety of program sources and offers the functions required of a high-class preamplifier.

the C-202, and a power amplifier with balanced input to the balanced output jacks of the C-202, an ideal transmission system as shown in Fig. 3 can be configured. Balanced lines are commonly used in recording and broadcasting studios. At the source component, the signal is converted into a positive and negative signal with identical voltage potential but phase-inverted by 180 degrees. These two signals are then sent via a three-conductor cable. No current flows in the ground line, as this connector only serves to link the zero potential of the signal lines. The receiving equipment feeds the two signals to a + amplifier and a - amplifier and mixes their output. As any noise picked up by the connecting cable, etc., has the same phase in both lines, it is canceled by the mixing process and does not enter the next stage. This ingenious principle ensures clear and noise-free signal transmission unobstructed by the adverse effects of noise induction. Besides the balanced jacks, two sets of unbalanced connectors (RCA-type phono jacks) and a headphone output are also provided.

The basic circuit configuration of the initial amplifier stage, which has a decisive impact on sound quality, is shown in Fig. 2. The differential push-pull input circuit receives the balanced signal. If the unbalanced input is used, the cold (-) side is connected to ground by a rear-panel

switch. Transistors Q1a, Q2, and Q1b, Q3 are cascade-connected respectively the buffer stage to ensure superior linearity and resistance to clipping even with very high input levels. Transistors Q12 - Q15 make up the cascade push-pull driver stage that delivers a clean drive signal to the output circuits. The well-thought-out design with meticulous attention to every detail results in an amplifier that boasts excellent dynamic range, very low distortion, and dramatically improved response characteristics, also in the extreme upper range beyond the audio band. As some power amplifiers are not sufficiently sensitive to be driven to full output with an unamplified line signal, the CD amplifier was designed to introduce a 6-dB gain.

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## Balanced cascode class-A push-pull buffer amplifier for unsurpassed CD performance

As can be seen from Fig. 1, the signal path of the CD section contains only a -20 dB attenuator and a volume control, nothing else. But the convenience of tape recording is not lost, as the CD signals are also supplied to the tape outputs. The balanced input and output jacks are an other important advantage of the CD amplifier circuit. By connecting a CD player equipped with balanced outputs to the balanced input of

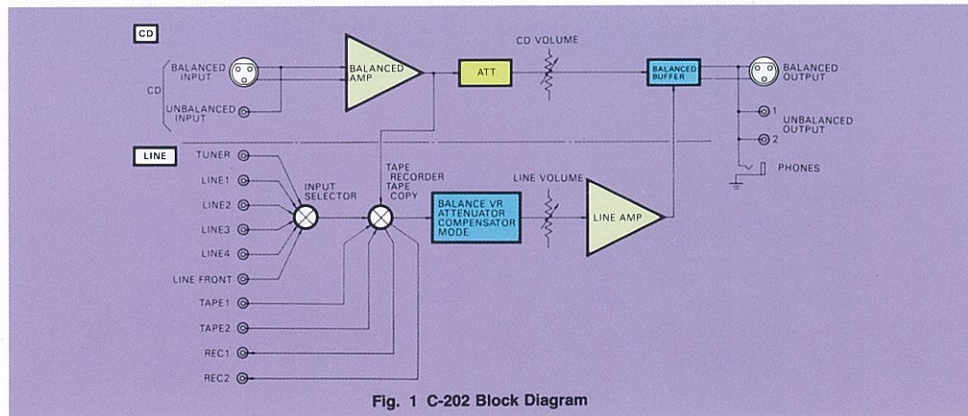


Fig. 1 C-202 Block Diagram

Direct Disc reproduction quality.

Separate amplifiers for left and right channel and CD/line.

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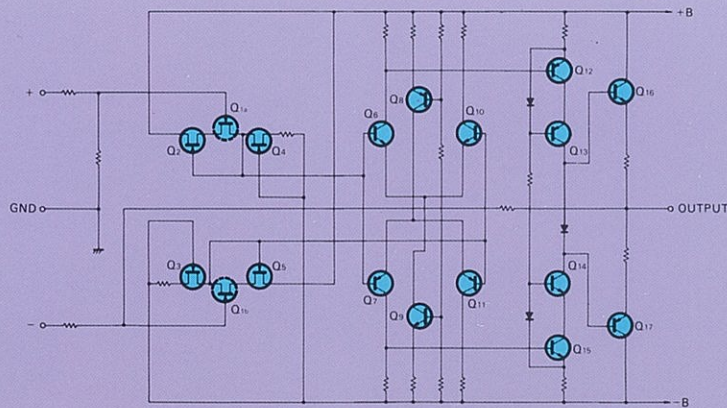


Fig. 2 Balanced Input Amplifier of CD Section

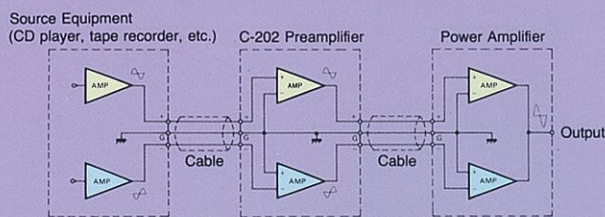
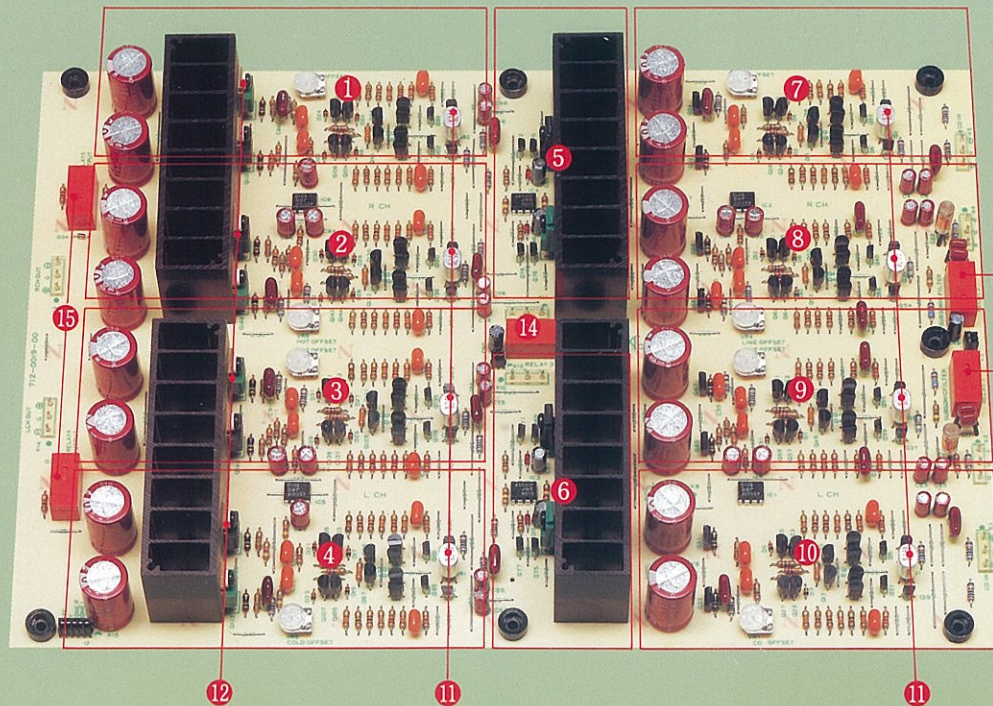


Fig. 3 Principle of Balanced Signal Transmission

**Cascode class-A push-pull line amplifier with 8 inputs offers remarkable flexibility**

The line amplifier section has a total of eight inputs (including facilities for two tape decks and one front-panel input). This section also avoids unnecessary complexity, while providing a sensible array of essential features. These include switches for tape monitoring and tape copy, a -20 dB attenuator, mode switch, compensator for low listening volumes, subsonic filter and balance control. The basic circuit design of the line amplifier is similar to the CD amplifier shown in Fig. 2, with the cold side of the input connected to ground. As with the CD section, one balanced and two unbalanced sets of outputs and a headphone jack are provided, to suit a wide variety of applications.

The C-202 has no built-in phono preamp/equalizer stage. For playback of analog records, you can either make use of the phono amp in your existing amplifier and connect its line-level output to the line input of the C-202, or use a separate phono preamplifier unit.



- |   |                                 |
|---|---------------------------------|
| 1 Right-channel balanced output amplifier (cold signal) | 9 Left-channel line amplifier   |
| 2 Right-channel balanced output amplifier (hot signal)  | 10 Left-channel CD amplifier    |
| 3 Left-channel balanced output amplifier (cold signal)  | 11 Input stage dual FETs        |
| 4 Left-channel balanced output amplifier (hot signal)   | 12 Output circuit MOS FETs      |
| 5 Right-channel voltage regulator circuit               | 13 Subsonic filter ON/OFF relay |
| 6 Left-channel voltage regulator circuit                | 14 CD/line switching relay      |
| 7 Right-channel CD amplifier                            | 15 Output muting relay          |
| 8 Right-channel line amplifier                          |                                 |

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## Logic-control relays permit straight and short signal paths

Long signal paths which are often thought necessary to accommodate functions such as input switching and tape monitoring tend to degrade high-frequency response and are the cause of signal instability. In the C-202, all switching is performed by relays which are arranged strategically so as to permit the shortest possible signal paths. These relays are controlled by an electronic logic to assure accurate and precise operation. The quality of these relays is an essential factor that has been given great consideration in the design of the C-202. Only hermetically-sealed relays developed specifically for audio applications are used, with cross-bar twin contacts for minimum contact resistance and outstanding long-term reliability.

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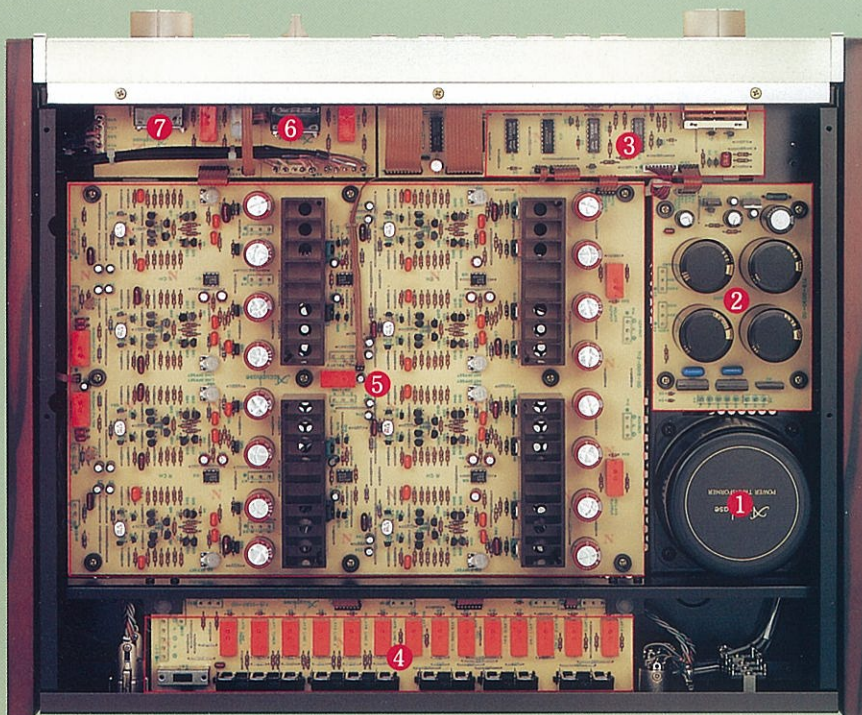
## Separate power transformer windings and rectifier circuits for left and right channels and separate voltage regulators for each amplifier unit eliminate any possibility of interference

As all signals continuously flow back through the power supply, this component should also be considered a part of the amplifier circuit. In the C-202, an amply dimensioned power transformer with separate windings for the left and right channels is used, each with its own rectifier circuit. Four filter capacitors of 10,000  $\mu$ F each provide smoothing capacity previously unheard of in a preamplifier. To make optimum use of the clean current provided by this power supply, each amplifier unit has its own voltage regulator located in close proximity to the actual circuits. This Multiple Power Supply design ensures low power-supply impedance even up to extremely high frequencies, for utterly stable and pure amplification.

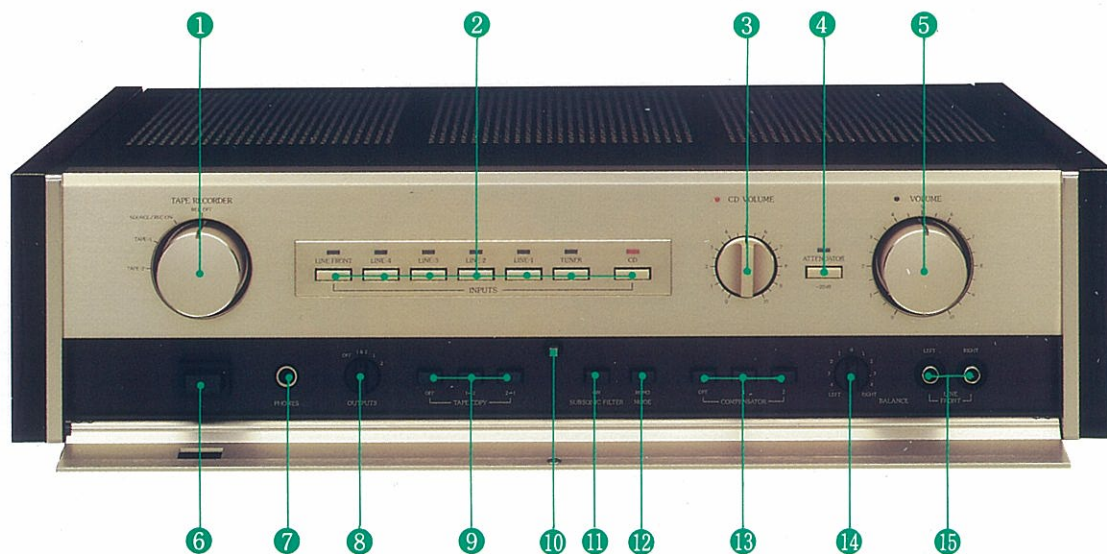
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## Natural Persimmon Wood Side Panels

In the honored Accuphase tradition, the front panel of the C-202 is finished in brushed gold aluminum. By attaching the side panels of exquisite persimmon wood, the visual appeal of the amplifier can be even further enhanced, for a harmonious blend with the listening room.



- 1 Power transformer
- 2 Main power supply PCB
- 3 Logic control PCB
- 4 Input/output circuit control relay PCB
- 5 Amplifier PCB (details see opposite page)
- 6 CD volume control
- 7 Line volume control

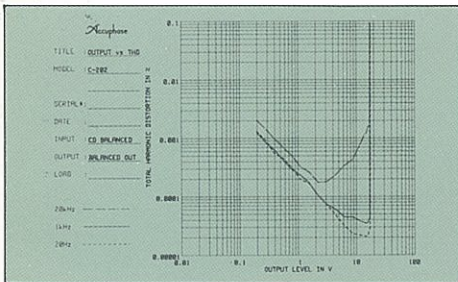


- ① **TAPE RECORDER** select switch  
REC OFF, SOURCE/REC ON, TAPE-1, TAPE-2
- ② **INPUTS** selector  
CD, TUNER, LINE-1, LINE-2, LINE-3, LINE-4, LINE FRONT
- ③ **CD VOLUME** control
- ④ **ATTENUATOR**  
OFF, -20 dB
- ⑤ Line **VOLUME** control
- ⑥ **POWER** switch
- ⑦ Headphone jack
- ⑧ **OUTPUTS** selector  
OFF, 1 & 2, 1, 2
- ⑨ **TAPE COPY** switch  
OFF, 1→2, 2→1
- ⑩ Magnet catch for subpanel
- ⑪ **SUBSONIC FILTER**  
OFF, ON (-12 dB/oct)
- ⑫ **MODE** selector  
STEREO, MONO
- ⑬ **COMPENSATORS** switch  
OFF, 1, 2
- ⑭ **BALANCE** control
- ⑮ **LINE FRONT** input jacks
- ⑯ **BALANCED** CD input connectors  
XLR-3-31 type, for XLR-3-12C type plug (①: GND, ②: cold, ③: hot)
- ⑰ **BALANCED/UNBALANCED** selector
- ⑱ **UNBALANCED** CD input jacks
- ⑲ **TUNER** input jacks
- ⑳ **LINE 1** input jacks
- ㉑ **LINE 2** input jacks
- ㉒ **LINE 3** input jacks
- ㉓ **LINE 4** input jacks
- ㉔ **TAPE 1** input jacks
- ㉕ **TAPE 1** output jacks
- ㉖ **TAPE 2** input jacks
- ㉗ **TAPE 2** output jacks
- ㉘ Unbalanced **OUTPUTS** jacks (unbalanced/1 ohm)
- ㉙ Unbalanced **OUTPUTS** jacks (unbalanced/1 ohm)
- ㉚ **BALANCED OUTPUTS** connectors  
XLR-3-32 or equivalents, for XLR-3-11C or equivalents  
(①: GND, ②: cold, ③: hot)
- ㉛ AC outlets (**SWITCHED**)\*
- ㉜ AC outlet (**UNSWITCHED**)\*

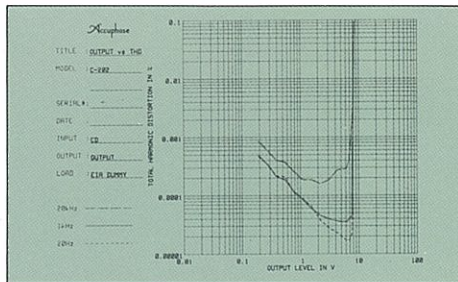
\* The switched and unswitched outlets may not be supplied depending on the safety standards or regulations applicable in the particular country to where the units destined.

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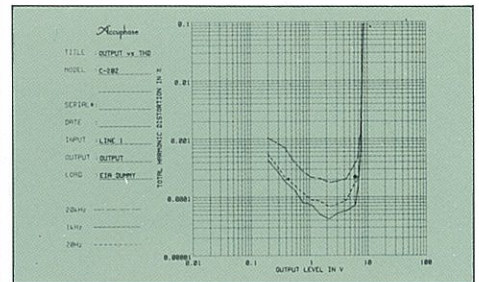
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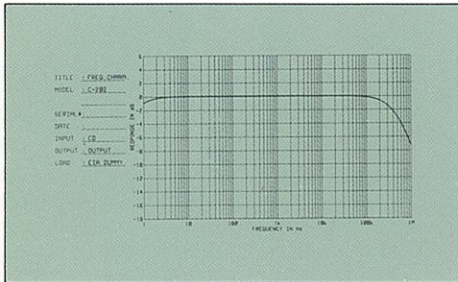
Output voltage vs. THD (input: CD balanced, output: balanced)



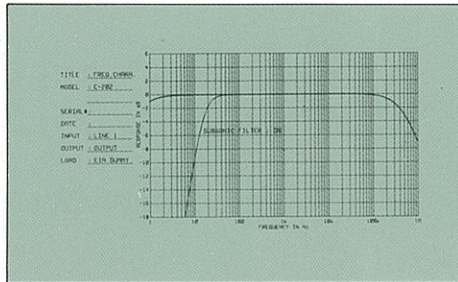
Output voltage vs. THD (input: CD unbalanced, output: unbalanced)



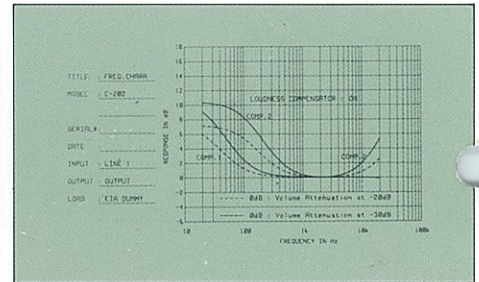
Output voltage vs. THD (input: line unbalanced, output: unbalanced)



Frequency response (input: CD unbalanced, output: unbalanced)



Frequency response (input: line unbalanced, output: unbalanced)



Compensator frequency response (input: line unbalanced, output: unbalanced)

## GUARANTY SPECIFICATIONS (in accordance with EIA RS-490 standard measuring methods)

### CD SYSTEM

- **FREQUENCY RESPONSE**
  - 1 Hz to 400,000 Hz : +0, -3.0 dB
  - 20 Hz to 20,000 Hz : +0, 0.2 dB
- **TOTAL HARMONIC DISTORTION**
  - 0.005%
- **INPUT SENSITIVITY**
  - Balanced input : 1.0V
  - Unbalanced input : 1.0V
- **INPUT IMPEDANCE**
  - Balanced input : 40 kilo-ohms
  - Unbalanced input : 20 kilo-ohms
- **RATED OUTPUT**
  - Balanced output : 4.0V
  - Unbalanced output : 2.0V
- **OUTPUT IMPEDANCE**
  - Balanced output : 50 ohms
  - Unbalanced output : 1 ohm
- **HEADPHONE JACK**
  - Suitable impedance : 4 ohms to 100 ohms
- **GAIN**
  - Balanced input → Balanced output : 12 dB
  - Balanced input → Unbalanced output : 6 dB
  - Unbalanced input → Balanced output : 12 dB
  - Unbalanced input → Unbalanced output : 6 dB
- **SIGNAL-TO-NOISE RATIO**
  - Rated input (input short, A-weighted) : 108 dB
  - EIA signal-to-noise ratio : 97 dB
- **MAXIMUM OUTPUT LEVEL**
  - Balanced output : 10V
  - Unbalanced output : 5V

- **MAXIMUM INPUT LEVEL**
  - Balanced input : 10V
  - Unbalanced input : 8V
- **MINIMUM LOAD IMPEDANCE**
  - Balanced output : 600 ohms
  - Unbalanced output : 1 kohms
  - TAPE REC : 10 kohms
- **ATTENUATOR**
  - 20 dB
- **LINE SYSTEM**
  - **FREQUENCY RESPONSE**
    - 1 Hz to 500,000 Hz : +0, -3.0 dB
    - 20 Hz to 20,000 Hz : +0, -0.2 dB
  - **TOTAL HARMONIC DISTORTION**
    - 0.005%
  - **INPUT SENSITIVITY**
    - 200mV
  - **INPUT IMPEDANCE**
    - 20 kohms
  - **RATED OUTPUT**
    - Balanced output : 4.0V
    - Unbalanced output : 2.0V
  - **OUTPUT IMPEDANCE**
    - Balanced output : 50 ohms
    - Unbalanced output : 1 ohm
  - **HEADPHONE JACK**
    - Suitable impedance : 4 ohms to 100 ohms
  - **GAIN**
    - Balanced output : 26 dB
    - Unbalanced output : 20 dB

- **SIGNAL-TO-NOISE RATIO**
  - Rated input (input short, A-weighted) : 110 dB
  - EIA signal-to-noise ratio : 94 dB
- **MAXIMUM OUTPUT LEVEL**
  - Balanced output : 10V
  - Unbalanced output : 5V
- **MINIMUM LOAD IMPEDANCE**
  - Balanced output : 600 ohms
  - Unbalanced output : 1 kohms
  - TAPE REC : 10 kohms
- **ATTENUATOR**
  - 20 dB
- **LOUDNESS COMPENSATOR (volume attenuation at -30 dB)**
  - COMP 1 : +3 dB at 100 Hz
  - COMP 2 : +8 dB at 100 Hz, +6 dB at 20 kHz
- **SUBSONIC FILTER**
  - 10 Hz cutoff, -12 dB/oct.
- **SEMICONDUCTOR COMPLEMENT**
  - 110 Transistors, 54 FETs, 12 ICs and 79 Diodes
- **POWER REQUIREMENT**
  - Voltage selection : 100V, 117V, 220V and 240V
  - 50/60 Hz
  - Power consumption : 40 watts
- **DIMENSIONS**
  - 475 mm (18-6/8 inches)(width) × 135 mm (5-3/8 inches)(max. height) × 373 mm (14-11/16 inches)(depth)
- **WEIGHT**
  - 11 kg (24.2 lb) net, 15.5 kg (34.1 lb) in shipping carton

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