Sony
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TA-E1 / N1
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PRE-AMPLIFIER
TA-E1

Summary
Sony's prestige pre-amplifier, the TA-E1, is capable of extracting a tremendous range of information from the Super Audio CD (SACD), the next generation digital audio format. The TA-E1 has been designed to reproduce the extremely high sound quality of SACD and to help cement a high-end audio image for Sony.

Overview
The TA-E1 includes only the most essential functions, enabling it to concentrate on the reproduction of sound information in the high-frequency range, one of the most important features of SACD. The input systems and amplifier blocks are arranged in such a way as to suppress sound deterioration caused by switching and to achieve the ideal signal flow. All parts which have an impact on sound quality, such as the power supply transformers and electrolytic condensers, were carefully tested and reviewed prior to their incorporation into the system.

Basic Structure
The TA-E1 features a highly-rigid construction for added stability and durability. The base chassis has been designed with a 14mm "hybrid construction," a 2-layer configuration comprised of a 10mm aluminum base and two 2mm copper plates. For added strength, the body includes a 7mm aluminum front panel and a 10mm aluminum rear panel. The power supply compartment and signal systems have been laid out separately to avoid

interference, while the ceiling plates of the power supply compartment and signal systems have also been separated.

Basic Circuitry

A high-quality sound relay, designed with a resin-sealed metal contact point, has been positioned to minimize the distance traveled by incoming sound signals. In the amplification stage, the linear phase circuitry has been redesigned for improved high-range frequency characteristics and superb phase characteristics, while the balance input and line amplifier balance output feature a metal core module. To eliminate interference, an independent power supply is provided for each module, which have been ideally positioned to match the signal flow. The TA-E1 also features a MOS-FET in the output stage.

Features

1. Linear Phase Circuit

The newly-developed linear phase circuit offers superior frequency characteristics and improved phase characteristics. The inclusion of a line amplifier allows for high-capacity information processing and a faster response.

2. Metallic Core Module

The balance input, balance output and line amplifier blocks each utilize a metallic core module for enhanced sound quality and reliability.

3. 50mm Dual Volume Control for High Sound Quality

Sound volume adjustment is one factor which can have a tremendous impact on sound quality. For the TA-E1, Sony has developed a high-precision volume control with an inter-locking error rate of just +/-0.5dB for the -100dB ~ 0dB range. This volume control is equipped with an oxygen-free copper jack and metal-plated multi-point brush for improved sound quality. The resistance section incorporates a CP (conductive plastic) resistant component, similar to those used in highly sophisticated mixing consoles. This CP resistant component achieves low distortion, high sound quality and high reliability. The external case, with a sturdy 50mm diameter and maximum thickness of 9.5mm, is constructed of cut brass, achieving a stable, solid feel.

* Note: The CP resistant component is formed by heat molding after the resistant film is printed on a base plastic material. It is highly reliable and contributes to high-quality sound reproduction.

4. Amorphous Power Supply Transformer
The power supply transformer incorporates an amorphous core, which has been housed in a ceramic case. This configuration achieves a reduction in reactive power, electric noise and mechanical vibration while dramatically improving the S/N ratio and volume of listening information conveyed.
* The amorphous metal is composed of strong magnetic metals, including iron, nickel and cobalt. This metal alloy lacks a crystaline structure and features a higher rate of magnetic penetration and reduced hysteresis and excess current losses. Amorphous metal reduces conversion loss by approximately one-third compared to conventional materials.

5. 7 Inputs (Fig. 1)

The TA-E1 features 7 inputs: Line 1, Line 2, CD, SACD, Balanced Line, Tape 1 and Tape 2.

6. 1 Unbalanced Output, 1 Balanced Output (Fig. 1)

7. Direct Input Jack
Ensuring that top priority is given to high-quality sound reproduction, the direct input jack has been positioned in such a way as to minimize the number of contact points.

8. Balanced Output Circuitry*
The high CMRR utilizes balance output circuitry that eliminates the gain difference between the balanced and unbalanced components. This is the same type of circuitry used in professional studio recording equipment.

9. New 3-Terminal Electrolytic Condenser (patent pending) (Fig. 2)
The TA-E1 incorporates a newly-developed 3-jack electrolytic condenser. With this design, the input jack from the rectifier diode of the power supply circuit and the output jack from the amplifier side are separated. Because the input and output are set apart, high-frequency ripple is reduced, while the S/N ratio, L/R sound expansion and sound depth are improved. (Fig. 3)

10. High-Purity Wire (6N-OFC)
Because connection materials inside an amplifier can affect sound quality, Sony selected 6N-OFC high-purity wire for use in the TA-E1. 6N-OFC is made from OFC (Oxygen-Free Copper), which has a metal concentration less than 1ppm for all metal elements except copper. Physically, this 6N-OFC is extremely soft, allowing it to reduce the mechanical Q of wiring materials for less sound resonance. Additionally, 6N-OFC offers superb electronic characteristics, helping to reproduce sound with greater fidelity.

Specifications (tentative)

1. Gain:	18dB (pre-out from CD)
2. Input impedance:	20k Ohms (unbalanced)
	40k Ohms (balanced)
3. Input sensitivity:	250mV (unbalanced), 125mV (balanced)
4. Rated output:	2.0V (max. output: 12V)
5. Output impedance:	220 Ohms (unbalanced)
	1k Ohms (balanced)

6. Frequency characteristics: 5Hz ~ 300kHz (0 ~ -1dB)
7. S/N (A-Fil): 115dB
8. Harmonic distortion: 0.005% (20Hz ~ 20kHz)
9. Dimensions: 430mm x 108mm x 445mm (W x H x D)
10. Weight: 21.5kg

Note:
Balanced Output Circuitry

Commonly used in office equipment, the balanced transmission is a system in which the +/- symmetrical signals, both of whose phases are reversed, are transmitted simultaneously. This configuration is superior at eliminating common-mode noise, making it an indispensable transmission system in the modern home environment, as ownership of PCs and other digital equipment increases.

(Fig.5) shows the operating principles of the balanced output circuitry. By feeding back the output of each amplifier to the other side, Amplifier 1 and Amplifier 2 are able to transmit symmetrical +/- signals. Even if one output side is grounded, both amplifiers still operate, allowing for a constant output voltage.

STEREO POWER AMPLIFIER
TA-N1

Summary

Sony's prestige power amplifier is capable of extracting a tremendous range of information from Super Audio CD (SACD), the next generation digital audio format. This stereo power amplifier, the TA-N1, is designed to reproduce the extremely high sound quality of SACD and to help cement a high-end audio image for Sony.

Overview

Designed to drive speakers of all varieties, the TA-N1 features an output stage capable of providing a high current volume through its powerful power supply and low impedance. To prevent interference, the block which handles subtle sound signals is separated from the block for high-volume electric current flow. This allows for superior reproduction of top-quality sound at all volume levels. All parts which have an impact on sound quality, such as the power supply transformers and electrolytic condensers, were carefully tested and reviewed prior to their incorporation into the system.

Basic Structure

The 16kg heat sink blocks are incorporated into the left and right sides of the main body, which is enhanced with a 15mm front panel and 10mm rear panel constructed of extremely rigid aluminum. The power transformer and the electrolytic condenser are mounted on the center chassis for enhanced stability, while non-magnetic aluminum is used for the front panel, rear panel and center chassis for reduced interference.

Basic Circuitry

A high-quality sound relay, designed with a resin-sealed metal contact point, has been positioned to minimize the distance traveled by incoming sound signals. In the amplification stage, the linear phase circuitry has been redesigned for improved high-range frequency characteristics and superb phase characteristics. In the output stage, a non-magnetic, gold-plated power MOS-FET has been used in parallel for each channel.

Features:

1. Linear Phase Circuit
The TA-N1 incorporates newly-developed linear phase circuit, which offers superb frequency characteristics and phase characteristics. The linear phase circuit is utilized in the pre-drive stage of the power amplifier.

2. Metallic Core Module
A metallic core module has been used in the pre-drive stage for enhanced sound quality and reliability.

3. New Torus Toroidal Power Transformer
The TA-N1 incorporates a 1.5kVA/11kg heavy torus toroidal power transformer, which is housed in an NF (non-flammable) ceramic case that provides superior oscillation slowdown characteristics. This torus toroidal power transformer meets the strict standards for power harmonic distortion. It is efficient at improving sound quality by cleaning the electric current.

NF ceramic is a compound solid material made from the by-products of chemical reactions among its major component particles—lime (CaO), silica (SiO_2), alumina (Al_2O_3) and iron oxide (Fe_2O_3)—and particulate silica oxides, with water as the binding material. This NF ceramic material, which used to wrap the filler, offers excellent oscillation slowdown characteristics.

5. Non-Magnetic, Gold-Plated Power MOS-FET
Designed exclusively for audio use, the non-magnetic, gold-plated power MOS-FET incorporated into the TA-N1 offers up to 150W power output. Conventional power MOS-FETs are created with nickel plating, which is magnetic. This material makes it difficult to achieve flexible sound extension in the mid- and high-frequency ranges, which is supposed to be one of the benefits of the MOS-FET. Since the base and lead of Sony's new MOS-FET are created from non-magnetic gold plate, this problem has been eliminated. Moreover, since each channel is connected in parallel with the MOS-FET, the TA-N1 is able to deliver more powerful bass reproduction.

6. 2 Unbalanced Inputs, 1 Balanced Input (Fig.6)

7. 2-System Speaker Jack
The amplifier incorporates gold-plated speaker jacks which are compatible with banana and Y-lug inputs.

8. Large-Capacity, High-Speed Power Supply Rectifier Diode
Two 30A-rated high-speed rectifier diodes are used in parallel connection for achieving low impedance and low noise.

9. New Electrolytic Condenser (15000µF/80V)
The electrolytic condenser has been constructed of an exceptionally thick layer of 4N high-purity aluminum foil, called anodo foil, which has been processed with extremely low-magnification etching. This design reduces oscillation caused by the reduction of foil resistance from coulomb power. The coil configuration has been designed with consideration given to the direction of electric currents flowing in and out of the condenser elements, controlling stray current flow. The condenser elements have been covered with a filler that provides high internal loss, helping to suppress oscillation-caused modulation.

10. Left/Right Independent Protection Circuitry
Includes DC detection, electric current limiter and temperature detection (heat sink operates at 100-degrees C).

Specifications (tentative)

1. Gain:	28dB
2. Input impedance:	20k Ohms (unbalanced)
	40k Ohms (balanced)
3. Rated output	8Ohms: 200W + 200W
	4Ohms: 400W + 400W
4. Load impedance:	4Ohms~16Ohms
5. S/N (A-Fil):	110dB
6. Frequency characteristics:	5Hz ~ 300kHz (0 ~ -1dB)
7. Harmonic distortion:	0.008% (8 Ohms/10W)
9. Dimensions:	480 x 245 x 530mm (W x H x D)
10. Weight:	70kg

Note:
Linear phase circuit

1. Operating principles (Fig. 4)
The operating principles of the linear phase circuit can be illustrated using the block chart below. The input signals first come into the 0dB buffer amplifier, and then flow through Rs. Electric current is returned to Rs from the output stage through Rf. Accordingly, the difference between the electric current flow that is determined by the input signals and the returned current is output to the input buffer amplifier. If this electric current is detected and the detected current is converted to voltage (IV conversion), a gain of G = 1 + Rf/Rs is obtained.

The point to which the current returns features extremely low impedance, minimizing slowdown in the high-frequency range. Additionally, since phase rotation is less likely to develop, less phase compensation is required. As a result, the through rate increases and response to input signals improves, allowing for pure, powerful reproduction of even complex music sources.

2. Features:
• Wider band width
• Better phase characteristics
• Higher through rate
• Higher stability, less oscillation

3. Sound characteristics
The linear phase circuitry allows for more powerful yet precise sound, with better sound separation. A feeling of speed is achieved in all bandwidths, ideal for not only classical music, but for all music genres.

4. Circuitry chart: Refer to attachments.