

SONY ESPRIT.®

STEREO PREAMPLIFIER

TA-E901

TECHNICAL INFORMATION



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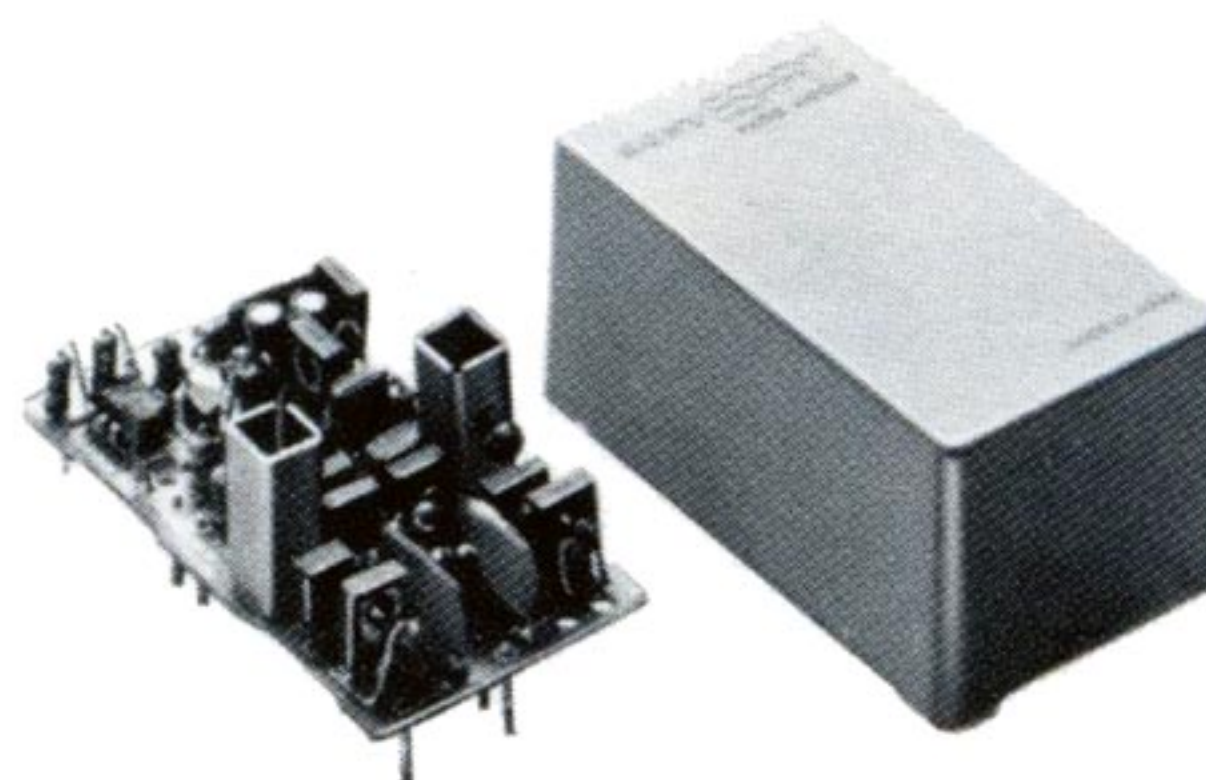
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SPECIAL FEATURES

Module system for all amplifier stages

To prevent even the slightest vibration of individual components, stages such as the head amplifier, equalizer amplifier, etc. are encapsulated in epoxy resin, as independent modules.



Center earthing system

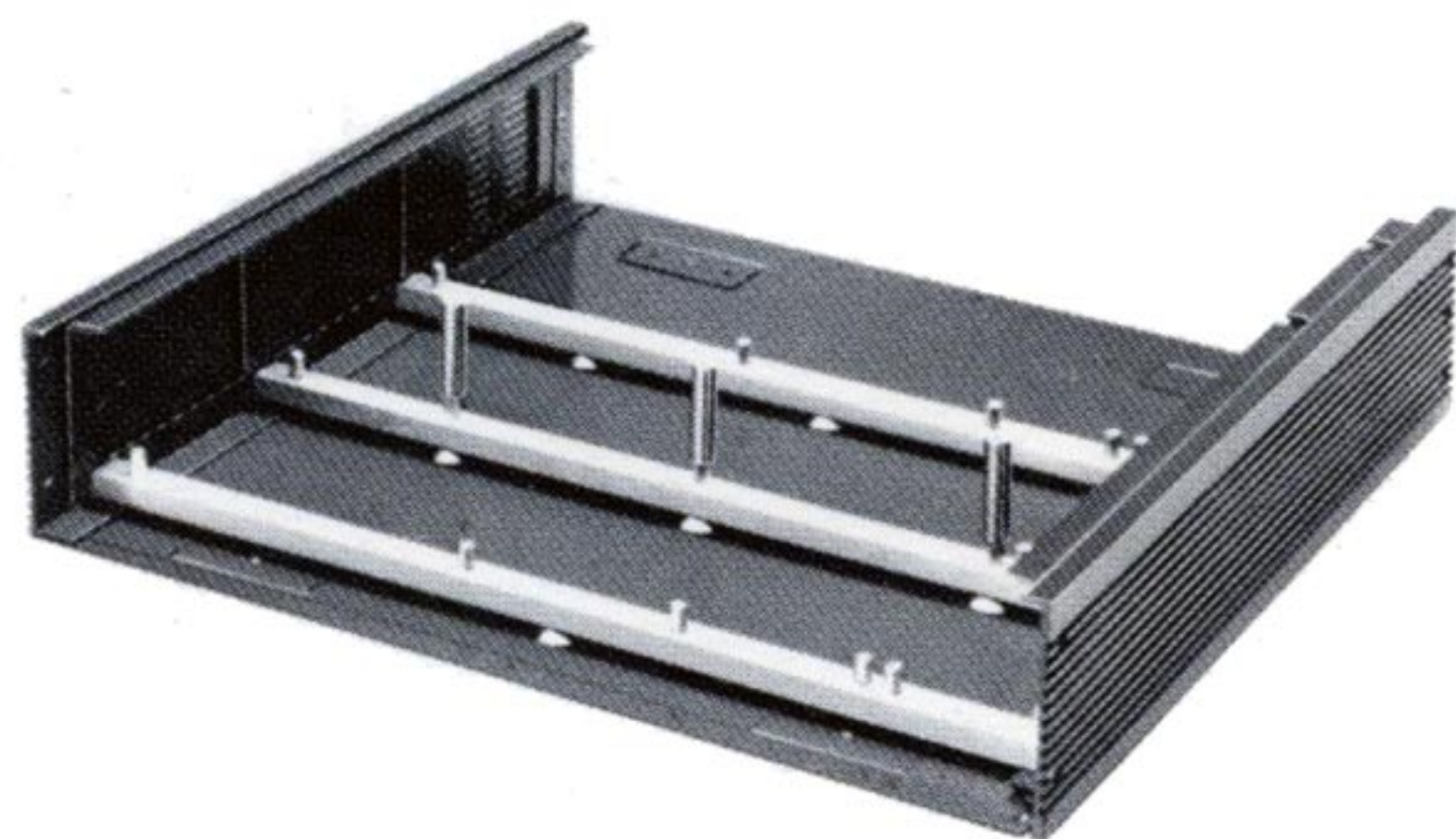
Grounding points are concentrated at the single spot between the input and output terminal sections to eliminate the possible differences in potential between different chassis points and to eliminate ground loops when connecting other equipment.

Rigid chassis construction

External vibrations to the unit will deteriorate tonal quality.

The TA-E901's chassis consists of a thick aluminum frame and solid aluminum bars to support the printed circuit boards.

Furthermore, module amplifiers on the boards, mentioned above, are weighted down by a slab of resin concrete. Internal construction this rigid assures superb tonal quality.



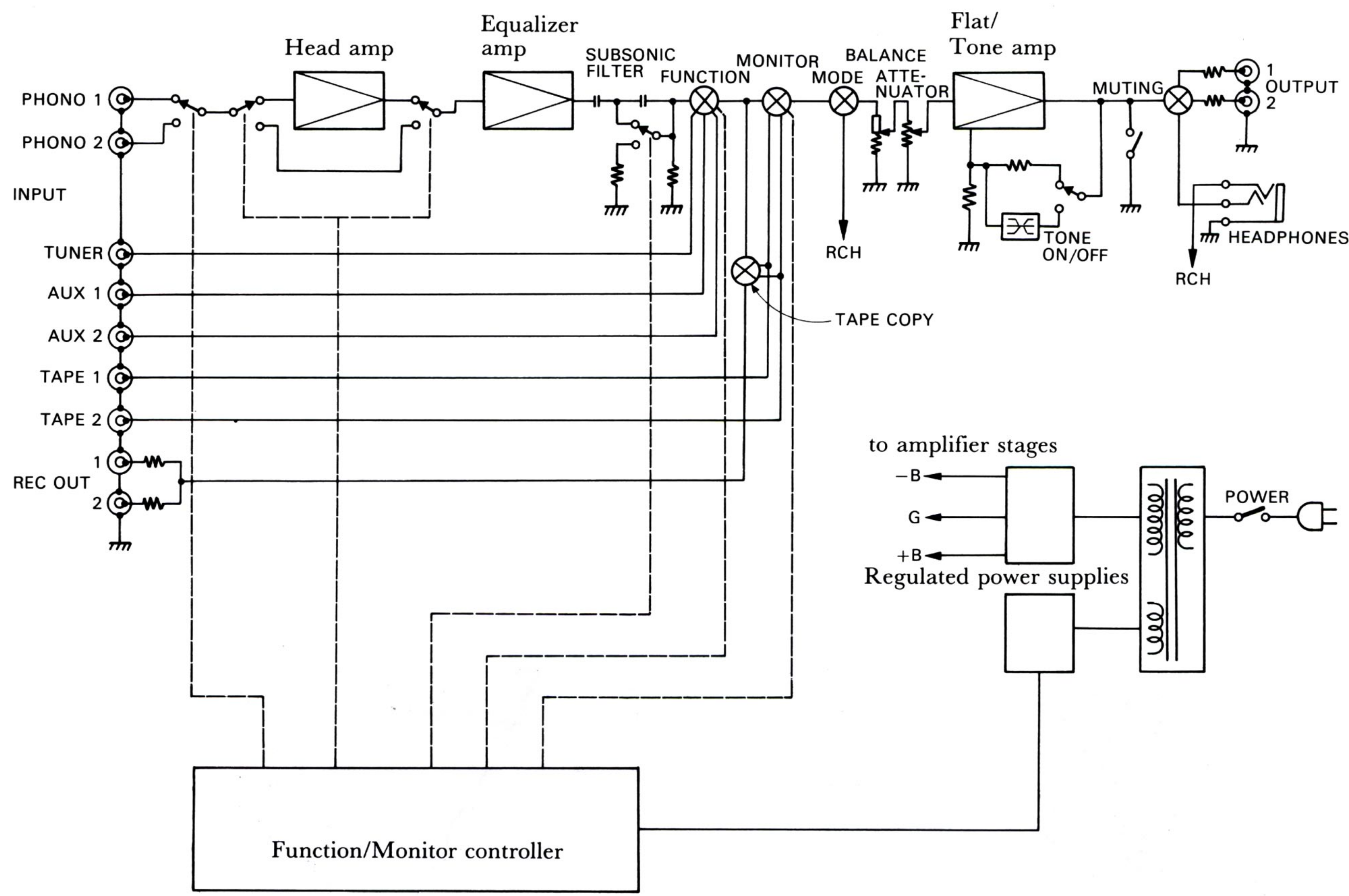
Low noise, low feedback capacitance FETs

Sony developed FETs are used, especially suited for audio equipment and high sound quality.

Quick-access tape/source selection

The TA-E901 employs solenoid-driven switches which outperform the relays, in that they ensure positive switching with a small amount of current and have a negligible effect upon the tonal quality. This feature enables the switches to be laid out directly in the signal-path circuit.

BLOCK DIAGRAM



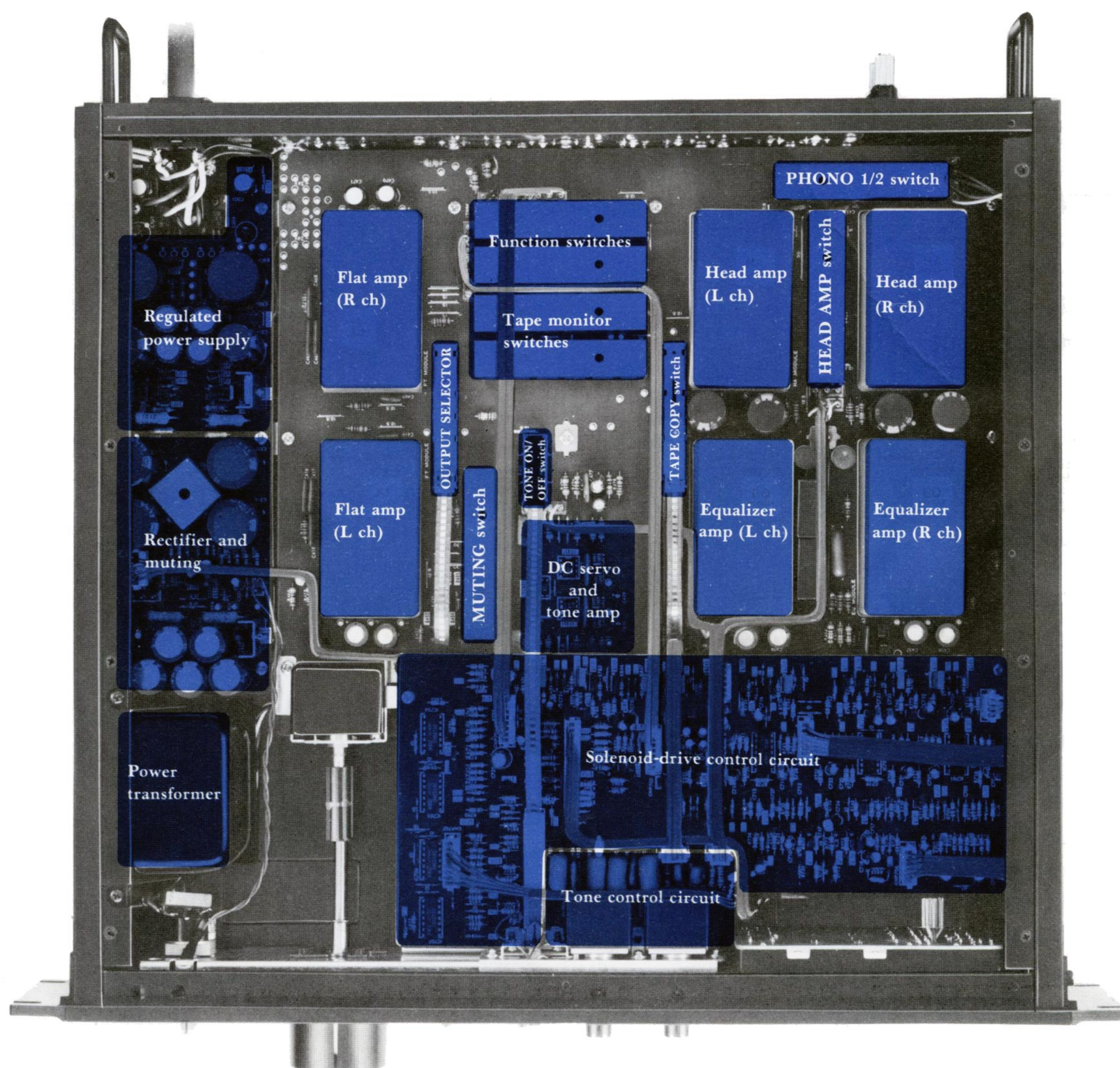
INTERNAL CONSTRUCTION AND LAYOUT

The TA-E901 features the circuit design of a two-monaural amplifier construction in a single cabinet. As the photo shows, each channel has its individual unit amps—head amp, equalizer amp and flat amp—which form a preamplifier.

Switches used in the unit are laid out in the signal path of the printed circuit board and remote controlled by either the solenoids or flexible wires. This makes the signal path the shortest possible and keeps the wiring loss as low as possible.

The TA-E901's cabinet is made of aluminum. The only magnetic materials used are the screws and the corner braces, which require mechanical strength.

The TA-E901 is among the very few preamplifiers on the market constructed in this way.



CIRCUIT DESCRIPTION

HEAD AMPLIFIER

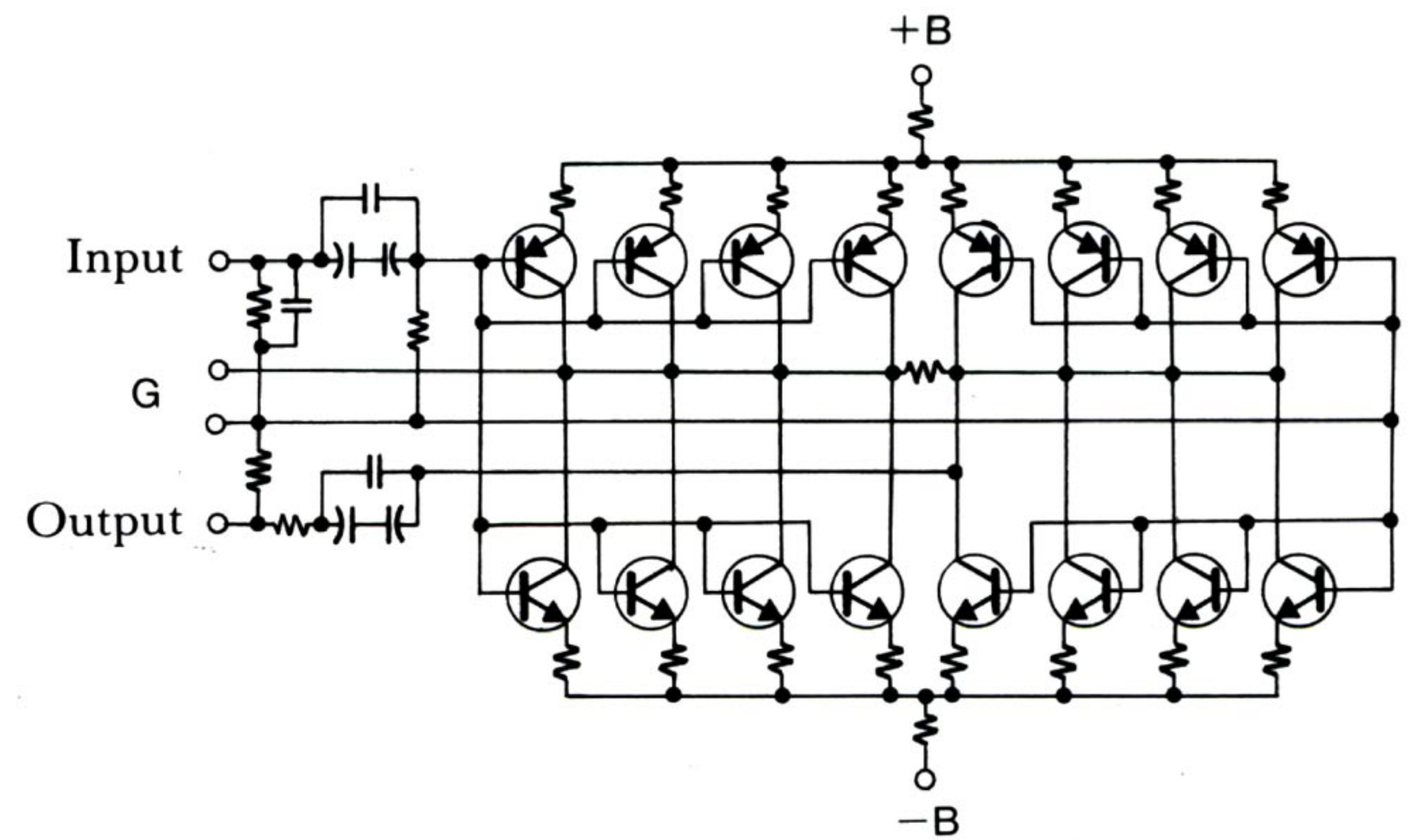
There are two ways to boost the low output voltage of a moving-coil cartridge: the use of a step-up transformer, and the use of a head amplifier. The step-up transformer can provide superior signal-to-noise ratio and better reproduction of middle frequencies than most head amps. But head amps can provide wider and more linear frequency response and lower distortion than the step-up transformers.

After considering the relative merits of both step-up transformer and head amp, we designed the following circuit for the preamplifier function.

As shown in the figure, the head amplifier of the TA-E901 is a complementary-symmetry differential amplifier with the complete absence of negative feedback.

The current from the power source is only the dc bias current so that it doesn't fluctuate with the input signal. Though common NF type head amplifiers can influence each other via the power sources, as the impedance of the NF circuit is low, this head amplifier has stable characteristics with relation to the power source.

This head amplifier boosts the output voltage without affecting the tonal quality, while providing an excellent signal-to-noise ratio.

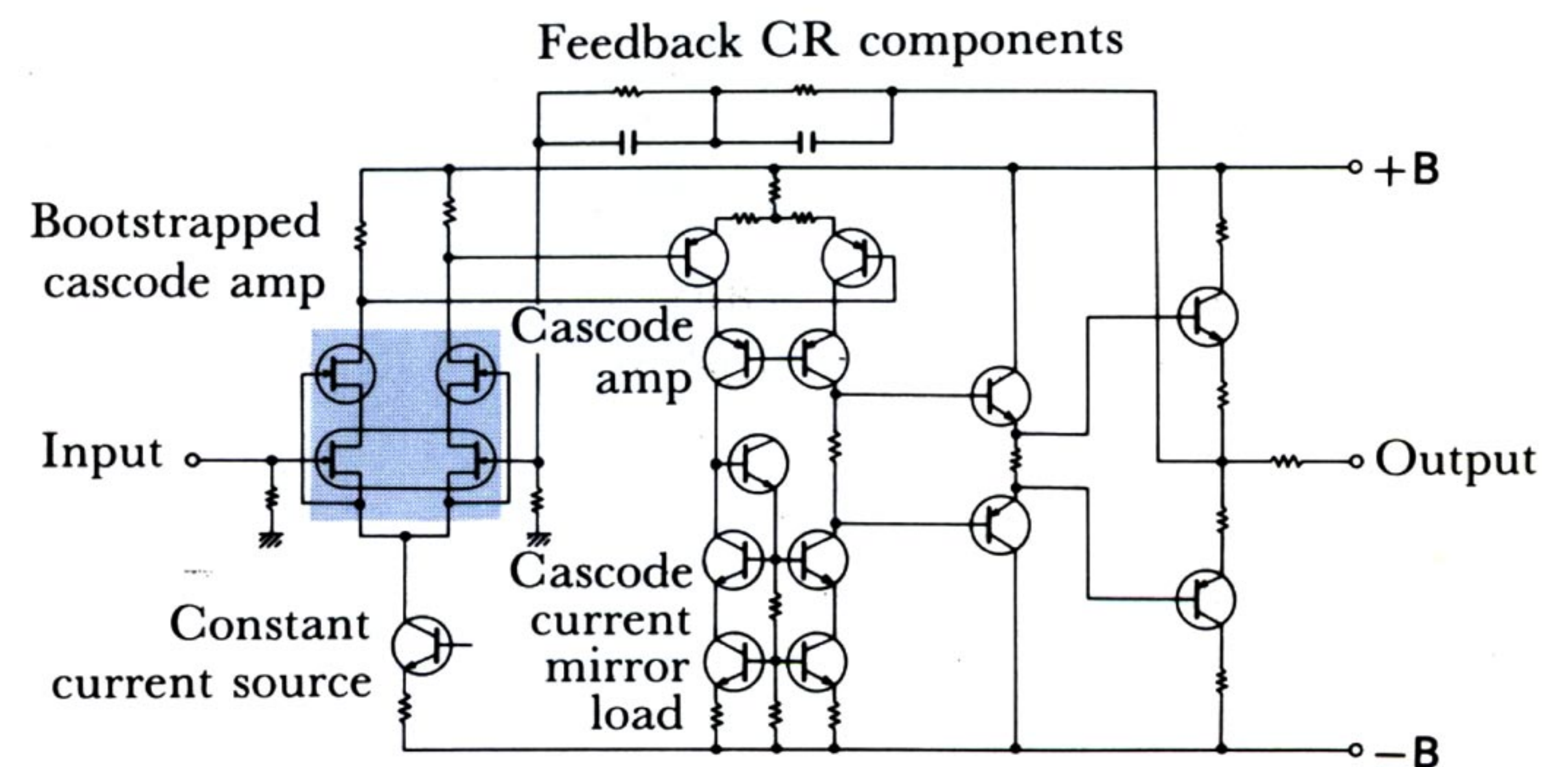


EQUALIZER AMPLIFIER

The first stage of the TA-E901 equalizer amplifier is a dual-FET differential amplifier. The dual-FET has been especially developed for the differential amplifier, which features a remarkably low temperature characteristic and well-balanced electric characteristics, and which has been designed to have high conductance (gm) and low feedback capacitance for high quality sound with excellent signal-to-noise ratio. A cascode bootstrap connection of each component greatly reduces the effects of power supply voltage fluctuation.

In the driving stage, a cascode connection with a PNP transistor differential amplifier reduces the effect of temperature drift and improves linearity. The current-mirror circuit in a cascode connection makes the power consumption of both collectors equal and reduces the temperature drift. The current from the differential circuit is picked up at a single ended output through the current-mirror circuit.

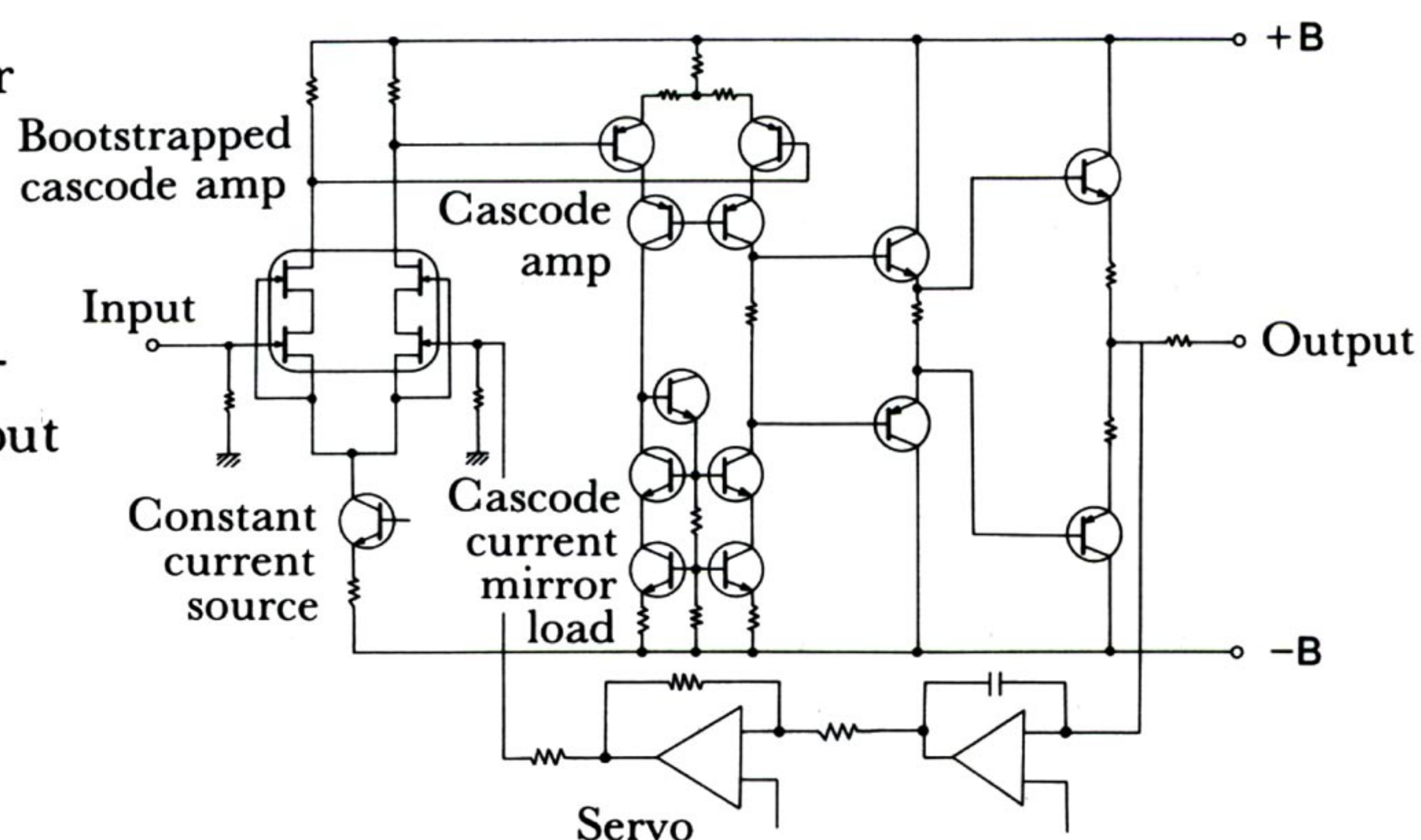
The final stage incorporates a Darlington compound emitter-follower push-pull amplifier to enable it to drive load requiring a higher output.



FLAT AMPLIFIER

The flat amplifier is almost the same as the equalizer amplifier except that it employs a package of dual-FETs in pairs at the first-stage input and lacks a feedback network.

This packaged device provides not only a more-than-adequate S/N figure for a 150 mV reference input, but also minimum input and feedback capacitances, assuring the tonal quality over the extended high frequency regions. The flat amplifier also includes a DC servo which serves to stabilize the DC output voltage and to minimize the DC feedback below the frequency range of 0.13 Hz.



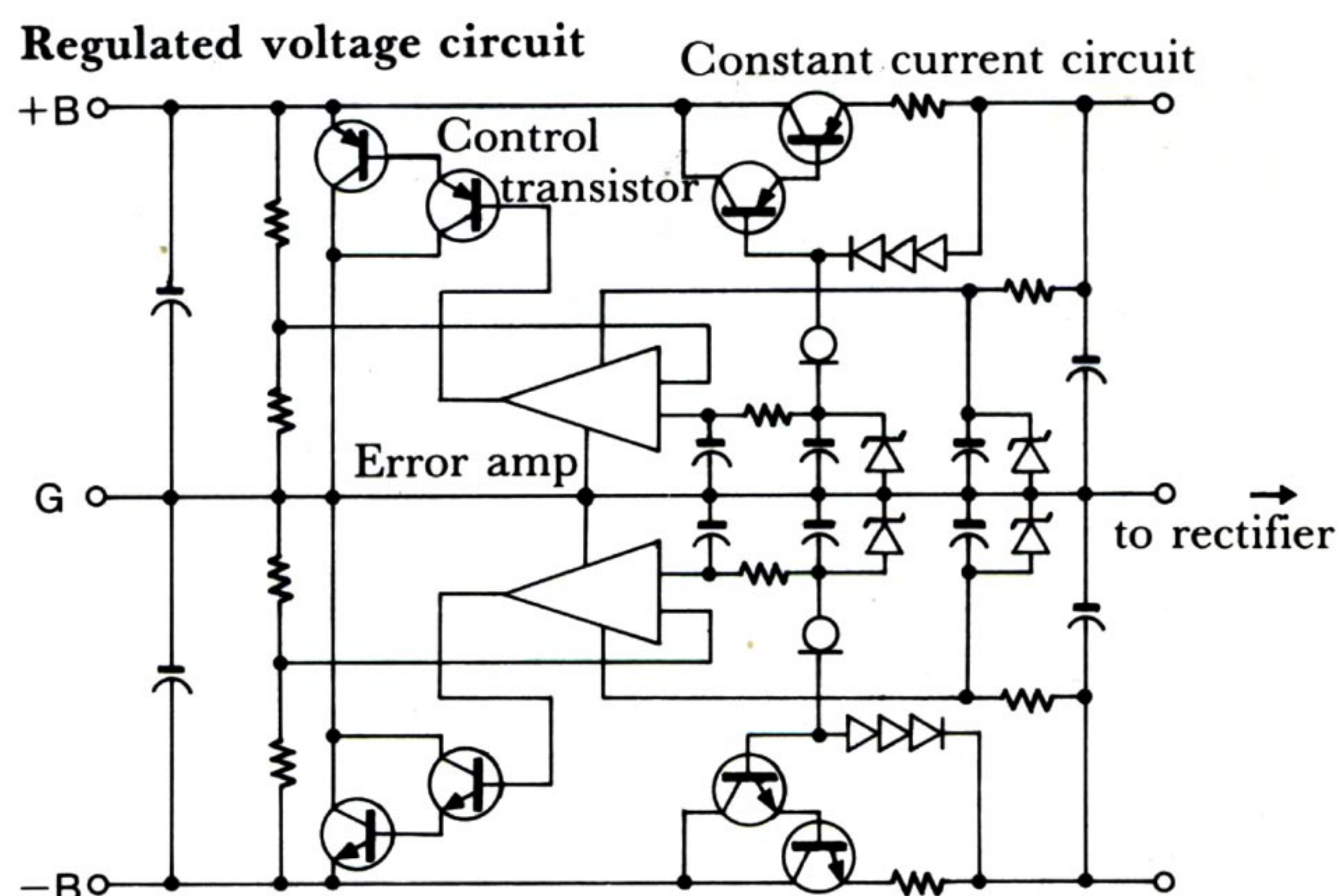
LOGIC CONTROL CIRCUIT

This control circuit commands the solenoid-driven function and tape monitor switches. These switches alternate on/off actions, depending on the polarities of a logic control signal. They are so designed that the on or off status remains until the control signal of opposite polarity flows in the solenoid, or until a heavy shock to the unit is applied. This means switches keep their on or off status, regardless of whether the power switch is turned on or off.

POWER SUPPLY SECTION

The TA-E901 employs a shunt regulator to power all stages.

The shunt regulator provides constant voltage, reacting automatically to changes in input voltage or load current demand in such a way that the voltage applied to the amplifier stages remain constant. Furthermore, as the circuit design illustrates, collectors of the control transistors are grounded. This allows the control transistors to be directly fixed to the rigid aluminum chassis, thereby preventing the transistor vibration caused by the current flow.



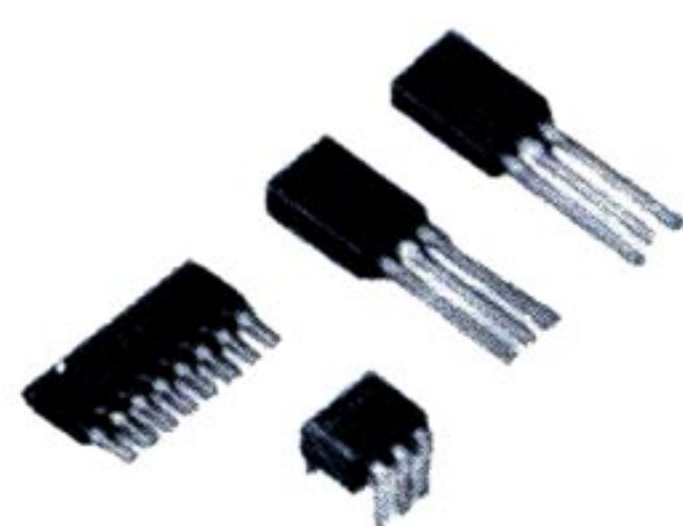
PRECISION PARTS

In any well-designed amplifier, the quality of the active and passive electronic components used is a key factor, just as much as circuit design and construction. Sony engineers have critically analyzed the construction of all components used in the TA-E901, and through listening tests selected only these components which meet the highest standards of precision and quality construction.

FETs and Bipolar Transistors

Amplifying devices such as FETs and transistors are subjected to intensive inspection so that any device with undesirable characteristics (such as a rolled-off frequency response in the higher audible region, or high-order distortion when used where there is high feedback capacitance or input capacitance) can be spotted and discarded.

Sony's own semiconductor manufacturing division can meet any circuit design requirement and provide high-quality amplifying devices with the electronic characteristics required for audio applications.



Transformer

To prevent the amplifier stages from being affected by spray capacitance and hum caused by the ac line, the TA-E901 employs in its power supply a cut-core transformer which has a carefully thought-out configuration that isolates its primary and secondary windings, and its secondary winding and core with insulators. This design greatly reduces the spray capacitance to the lowest possible level and assures true fidelity sound.

Wiring Materials

Because the tonal quality can also be affected by the materials used in the wiring, only Type 1 non-oxygenated copper (of at least 99.99% purity) is used for the power cord and wiring.

Resistors

Resistors are also a key factor in achieving good tonal quality.

The TA-E901 employs resistors which have excellent temperature characteristics, low deviation from their rating and a low distortion figure.

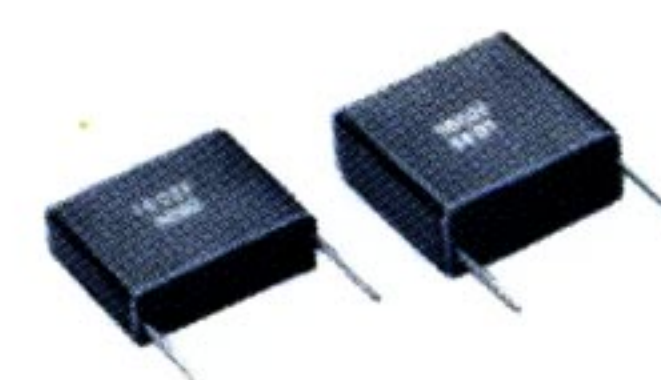
In the important signal path circuits, resistors with ample power rating are used; in some places, they are connected in series or parallel to achieve the desired power rating.



Capacitors

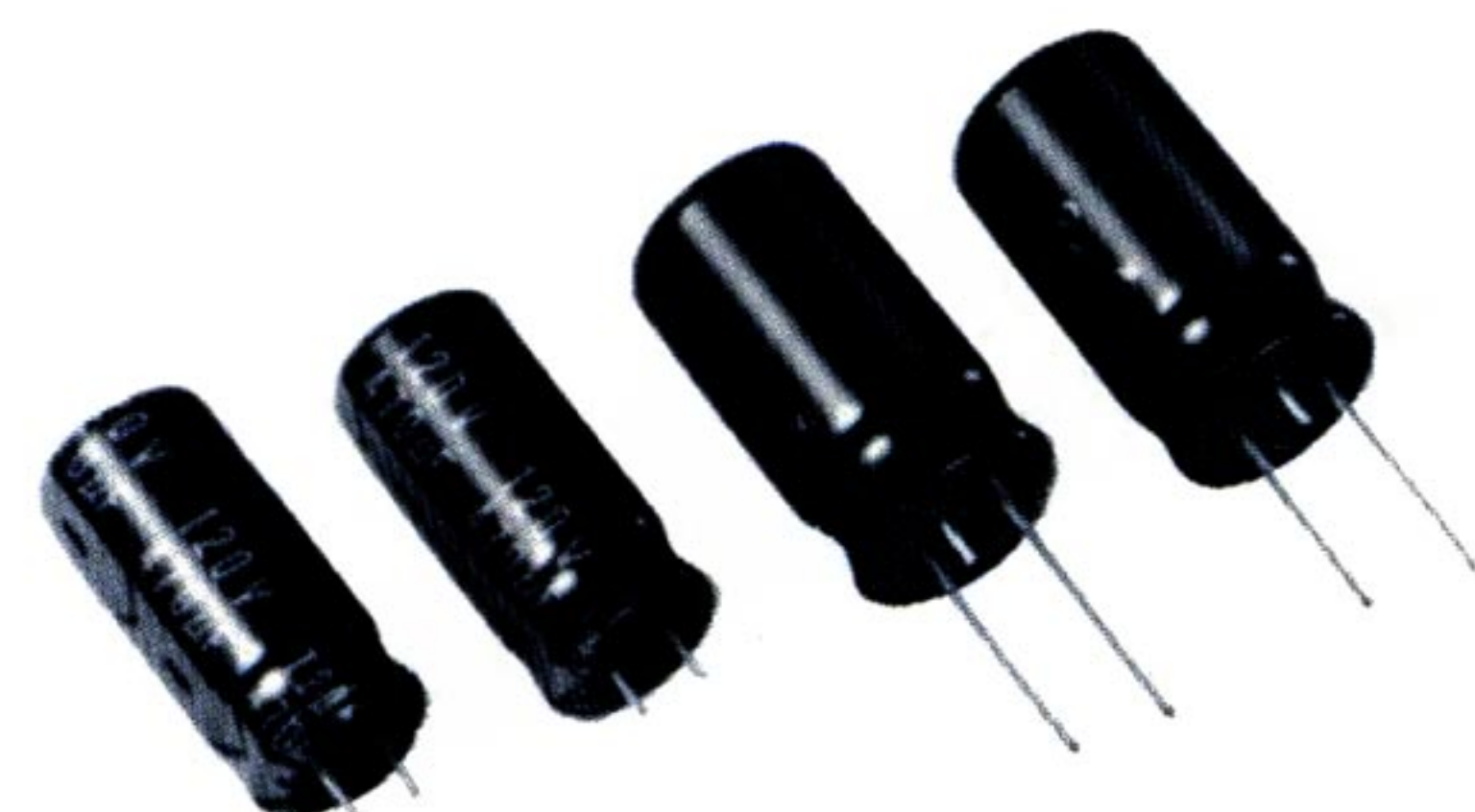
(1) Film capacitors

Recent research has shown that film capacitors have had such problems as losses or mechanical resonances caused by the potentials applied. Because the presence of these conditions degrades the tonal quality, the TA-E901 employs capacitors which consist of tightly wound film, carefully selected leads and electrodes, and with superior mechanical and electrical characteristics.



(2) Electrolytic capacitors

The power supply sections require a large number of electrolytic capacitors for stable operation. Since the quality of the power supply capacitors used has a great influence on the tonal quality, the TA-E901 employs high-grade electrolytic capacitors, selected after a detailed study of everything from the electrical foil, electrolytes, lead material, plating, and the capacitor's internal impedance.



SPECIFICATIONS

Inputs

		Sensitivity	Impedance	Maximum input level (1 kHz)	S/N (A network)
PHONO 1	MM	2.5 mV	50 kΩ	180 mV	84 dB, 80 dB *
PHONO 2	MC	0.125 mV	200 Ω	9 mV	72 dB, 70 dB *
TUNER, AUX 1,2 TAPE 1, 2		150 mV	50 kΩ	12 V	102 dB, 88 dB *

* '78 IHF

Outputs

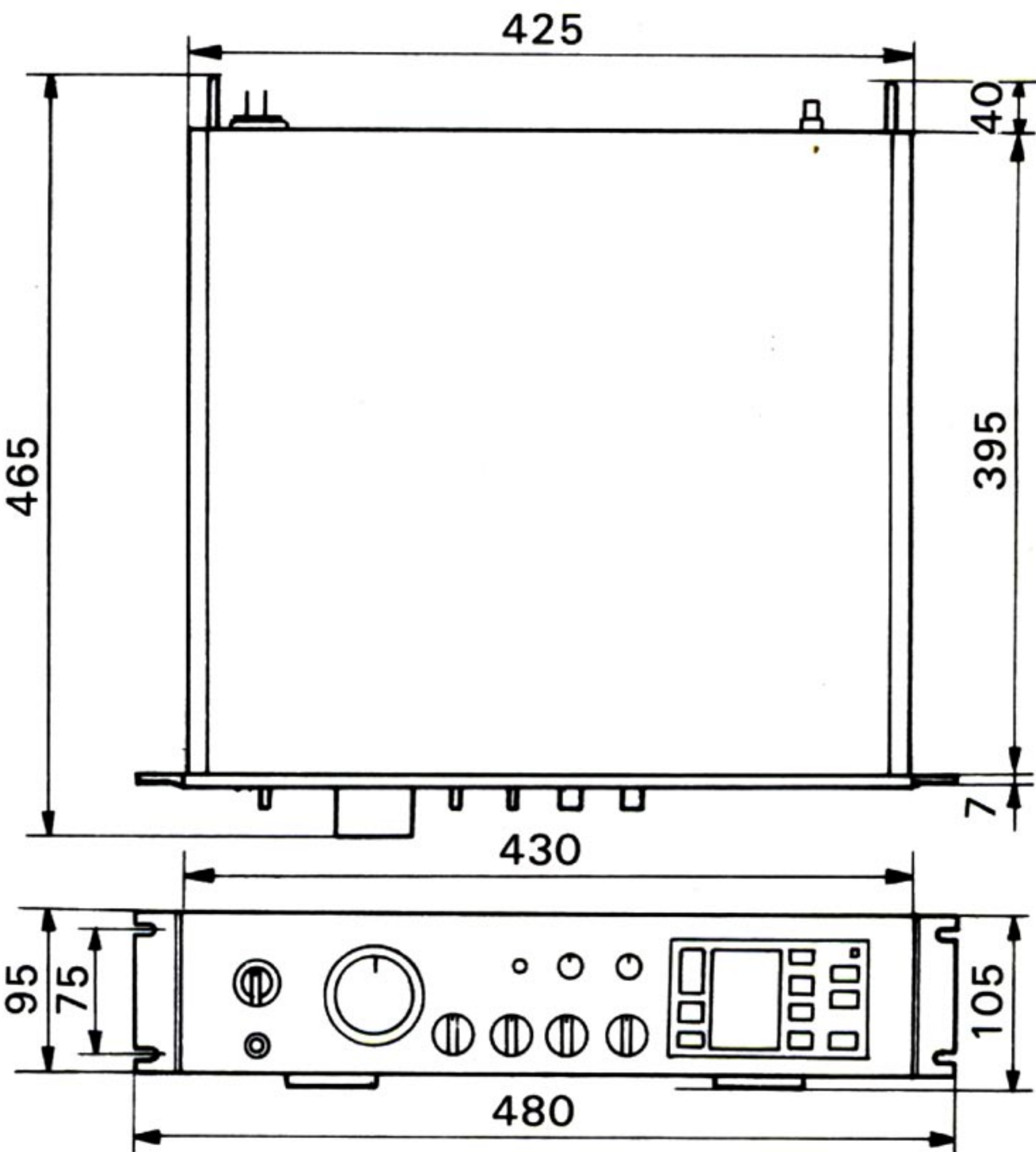
	Voltage	Impedance
REC OUT 1, 2	150 mV (max. 12 V)	1 kΩ
OUTPUT 1, 2	1.5 V (max. 12 V)	100 Ω
HEADPHONES	670 mV	10 Ω

Harmonic distortion	Less than 0.008% (at 8 V output)
Intermodulation (IM) distortion (60 Hz : 7kHz = 4 : 1)	Less than 0.008% (at 8 V output)
Frequency response	PHONO 1,2 : RIAA equalization curve ±0.2 dB TUNER, AUX, TAPE : 5 Hz – 200 kHz \pm_{-1}^0 dB BASS : ±10 dB at 60 Hz (turnover freq. 300 Hz) TREBLE : ±10 dB at 25 kHz (turnover freq. 5 kHz) SUBSONIC 12 dB/octave attenuation below 15 Hz
Tone controls	
Filter (PHONO inputs)	
Residual noise	12 μV (A weighting network, IHF)

General

System	Head amplifier Complementary-symmetry differential amplifier with no NFB loop Equalizer amplifier and Flat amplifier 1st : Bootstrapped cascode differential amplifier 2nd : Cascode differential amplifier Output : Darlington emitter-follower single ended push-pull output (Equalizer amp : NF type)
Power requirements	The U.S.A. and Canadian models : 120 V ac, 60 Hz, 27 watts The Continental European model : 220 V ac (or 240 V ac adjustable by authorized Sony personnel), 50 Hz, 35 watts The United Kingdom model : 240 V ac (or 220 V ac adjustable by authorized Sony personnel), 50 Hz, 35 watts
Ac outlets (only for the U.S.A. and Canadian models)	One SWITCHED (450 watts capacity) One UNSWITCHED (450 watts capacity) Approx. 480 × 105 × 465 mm) (w/h/d) (19 × 4 ¹ / ₄ × 18 ³ / ₈ inches)
Dimensions	
Weight	Approx. 12.5 kg (27 lbs 9 oz), net Approx. 13.9 kg (30 lbs 11 oz), in shipping carton
Supplied accessories	Shorting plugs (2) Mounting hardware (1 set)

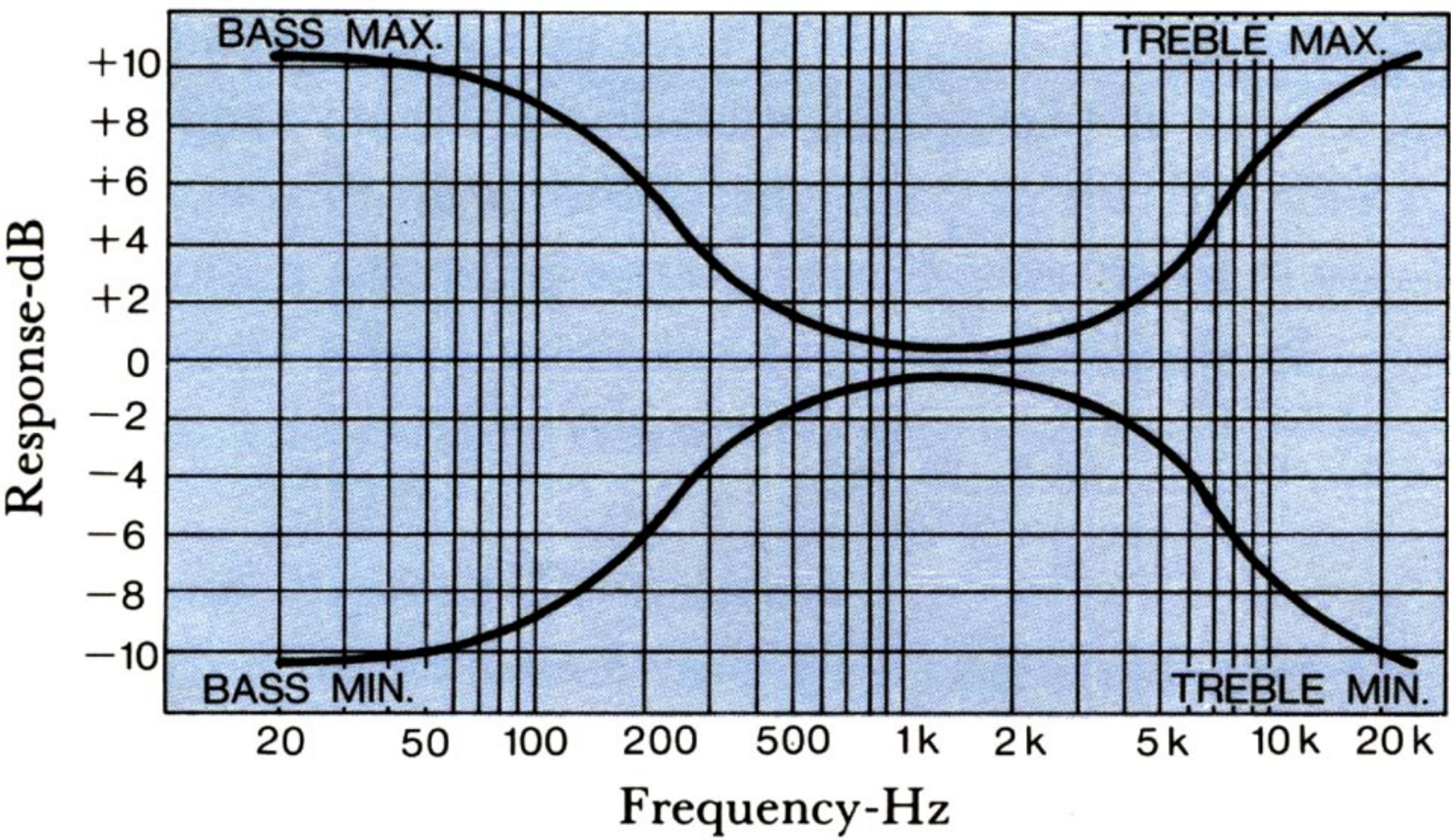
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We would ask you to check with your appointed Sony dealer if clarification on any point is required.



unit : mm

OPERATING CURVES

Tone Control



Subsonic Filter

