

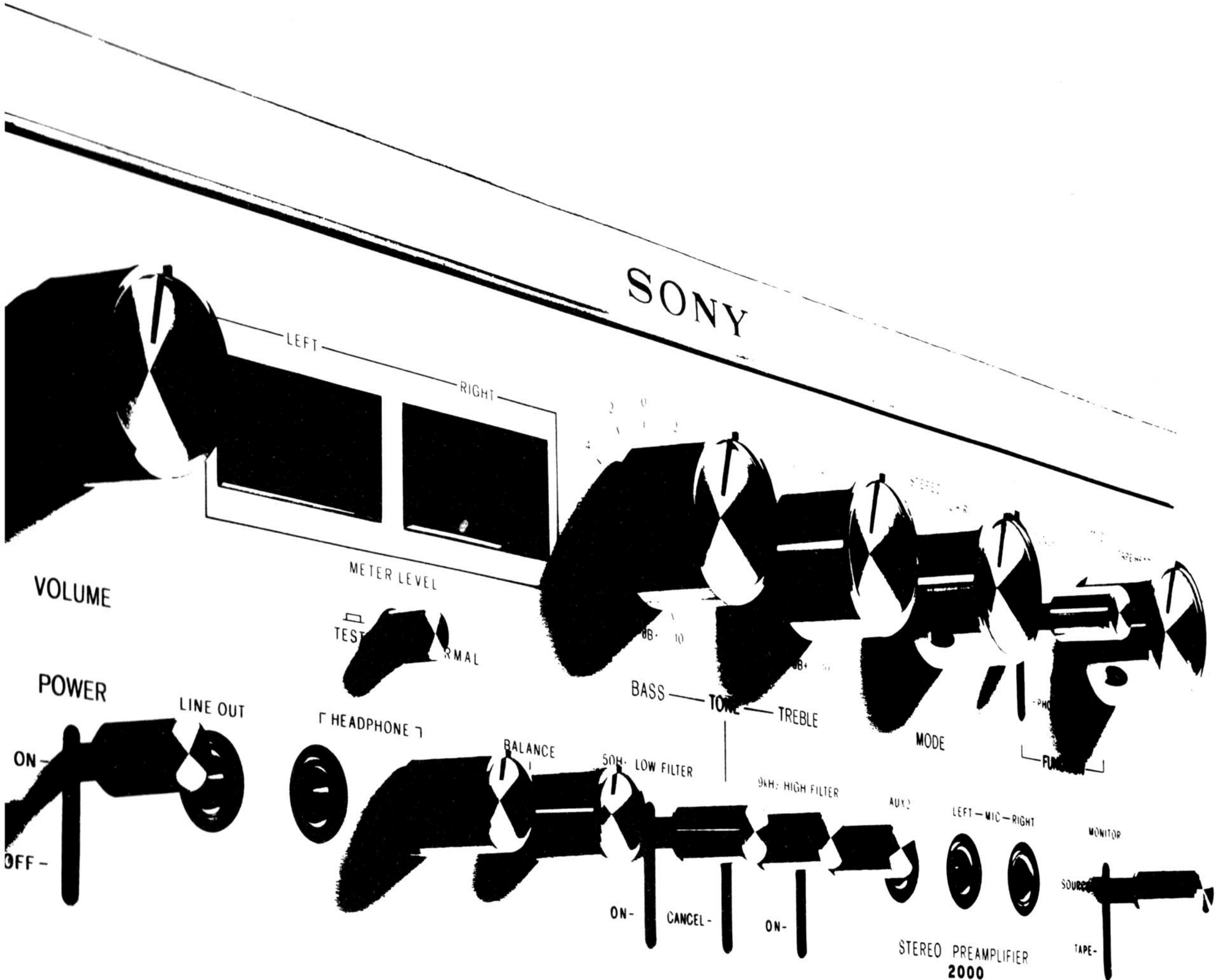
SONY®

**STEREO
PREAMPLIFIER
TA-2000**

**OWNER'S
INSTRUCTION
MANUAL**

BEDIENUNGSANLEITUNG

**MODE
D'EMPLOI**



The TA-2000 is a preamplifier designed for professionals and those discriminating music lovers who wish to build a music reproduction system that represents the foremost in audio technology. The preamp is the clearing house for signals. It accepts and processes inputs from all audio sources and distributes output signals to power amplifiers, recorders, headphones and professional (line) outputs. SONY has devoted its vast experience in solid-state technology to producing this preamplifier; it is eminently suited for its job. It provides the lowest possible distortion, superior signal-to-noise ratio, wide dynamic range and extremely flat frequency response. Each unit has been meticulously tested before its delivery to you.

Please take the time to read through this manual completely, so that you can become familiar with the TA-2000's features and capabilities. Keep this instruction booklet handy for future reference.

Das Modell TA-2000 ist ein Vorverstärker in Studioqualität für anspruchsvolle Musikfreunde, die eine Stereomusikanlage höchster Leistung und in modernster Technik wünschen.

Der Vorverstärker bildet in einer Stereoanlage den "Bahnknotenpunkt". Er nimmt auf und verarbeitet Eingangssignale von allen Klangquellen und liefert Ausgangssignale an die Endverstärker, Tonbandgeräte, Kopfhörer und dgl. In diesem Modell findet die langjährige Erfahrung von SONY in der Transistortechnik ihren Niederschlag. Das Gerät besitzt einen äußerst niedrigen Klirrfaktor, hervorragenden Signal-Rausch-Abstand, weiten Dynamikbereich und sehr flachen Frequenzgang. Jedes Gerät wird vor Auslieferung einer Reihe strengster Prüfungen unterzogen.

Bitte lesen Sie diese Anleitungen langsam und sorgfältig durch, um sich mit Ihrem Gerät gründlich vertraut zu machen. Bewahren Sie das Büchlein zum späteren Nachschlagen auf.

Le TA-2000 est un préamplificateur conçu pour les professionnels et pour ces amateurs de musique avertis qui veulent se constituer un système de reproduction musicale représentant le summum de la technique audio.

Le préamplificateur est un centre de triage pour les signaux. Il accepte et prend soin des entrées provenant de toutes les sources audio et distribue les signaux de sortie aux amplificateurs de puissance, magnétophones, casques d'écoute et sorties (de ligne) professionnelles. SONY a mis toutes les ressources de sa vaste expérience dans la technique des transistors pour la production de ce préamplificateur qui remplit parfaitement sa tâche. Il fournit la distorsion la plus faible possible, un rapport signal/bruit élevé, une gamme dynamique étendue et une réponse de fréquence extrêmement neutre. Chaque élément a été méticuleusement vérifié avant de vous être livré.

Consacrez le temps nécessaire pour la lecture entière de ce mode d'emploi de manière à vous familiariser avec les caractéristiques et les capacités du TA-2000, et conservez cette brochure pour vous y référer éventuellement.

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PRECAUTIONS

The TA 2000 operates on ac 100 V, 117 V, 220 V or 240 V power line. Before operating, check whether or not the TA 2000 is set for operating ac voltage identical to the local power supply in your area. Simple instructions for this adjustment are given in page 6, 'Adaptation to the local power line'.

Do not operate the TA-2000 where the ac voltage is 10% higher than the rated value.

Do not operate the TA-2000 where the room temperature is over 110°F or below 32°F.

Keep the following points in mind regarding the PHONO-2 LEVEL SWITCH.

- If you change the setting of the PHONO-2 LEVEL SWITCH while the power is on, be sure to turn volume all the way down.
- If the PHONO-2 LEVEL SWITCH is set to the LOW position, make sure the cartridge connected to the PHONO-2 jacks has the following characteristics:
 - low level output (less than 1.2 millivolts)
 - low impedance, moving coil system
 - no step-up transformer
- If the PHONO-2 LEVEL SWITCH is set to the NORMAL position, the cartridge connected to the PHONO-2 jacks should have the following characteristics:
 - high level output (greater than 1.2 millivolts)
- Note, distortion and incorrect frequency response will result if a high output cartridge is connected to the PHONO-2 jacks and the LEVEL switch is set to the LOW position.

WICHTIG

Der TA-2000 kann mit Wechselstrom von 100, 117, 220 oder 240 Volt betrieben werden. Bevor das Gerät angeschlossen wird, ist nachzuprüfen, ob es für die am Ort herrschende Stromspannung richtig eingestellt ist. Hinweise zum Umstellen finden Sie auf Seite 6 "Anpassen des Gerätes ans örtliche Stromnetz".

Wenn die Stromspannung mehr als 10% über der Nennspannung des Gerätes liegt, darf es nicht betrieben werden.

Das Gerät darf bei Zimmertemperaturen von über 45°C und auch unter 0°C nicht benutzt werden.

Bei Benutzung des PHONO-2-PEGEL-SCHALTERS sind folgende Punkte zu beachten:

- Wenn der Schalter umgestellt wird, während das Gerät in Betrieb ist, muß die Lautstärke ganz zurückgedreht werden (Linksanschlag).
- Der Schalter darf nur auf [LOW] gestellt werden, wenn der Tonabnehmer folgende Eigenschaften besitzt:
 - geringe Ausgangsspannung (unter 1,2 mV) niederohmige Bauart mit beweglicher Spule kein Anhubtrafo
- Wenn der Schalter auf [NORMAL] steht, soll der Tonabnehmer folgende Eigenschaften besitzen:
 - hohe Ausgangsspannung (über 1,2 mV)
- Verzerrung und falsche Frequenzwiedergabe sind die Folge, wenn irrtümlicherweise ein Tonabnehmersystem hoher Ausgangsspannung an die PHONO-2-Eingänge angeschlossen ist und der PHONO-2-PEGELSCHALTER auf [LOW] steht.

PRECAUTIONS

Le TA-2000 fonctionne sur courant de ville alternatif 100 V, 117 V, 220 V ou 240 V.

Avant de l'utiliser, vérifier que le dispositif d'adaptation de l'amplificateur concorde bien à la tension du courant dans votre secteur.

Voir les instructions pour ce réglage aisé à la page 6 "Adaptation au courant de la ville".

Ne pas utiliser le TA-2000 lorsque la tension courant alternatif est de 10% supérieure aux spécifications du TA-2000.

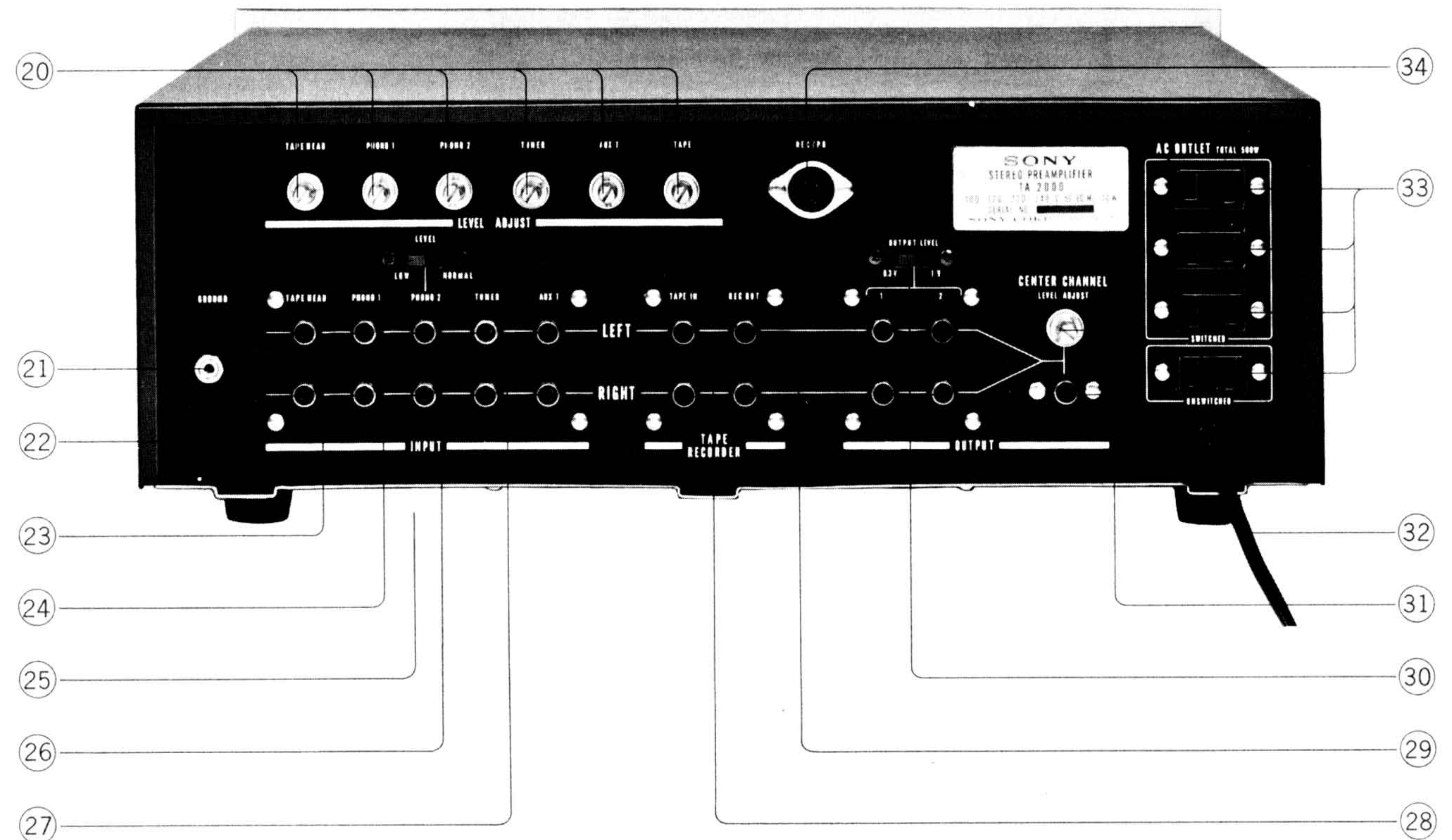
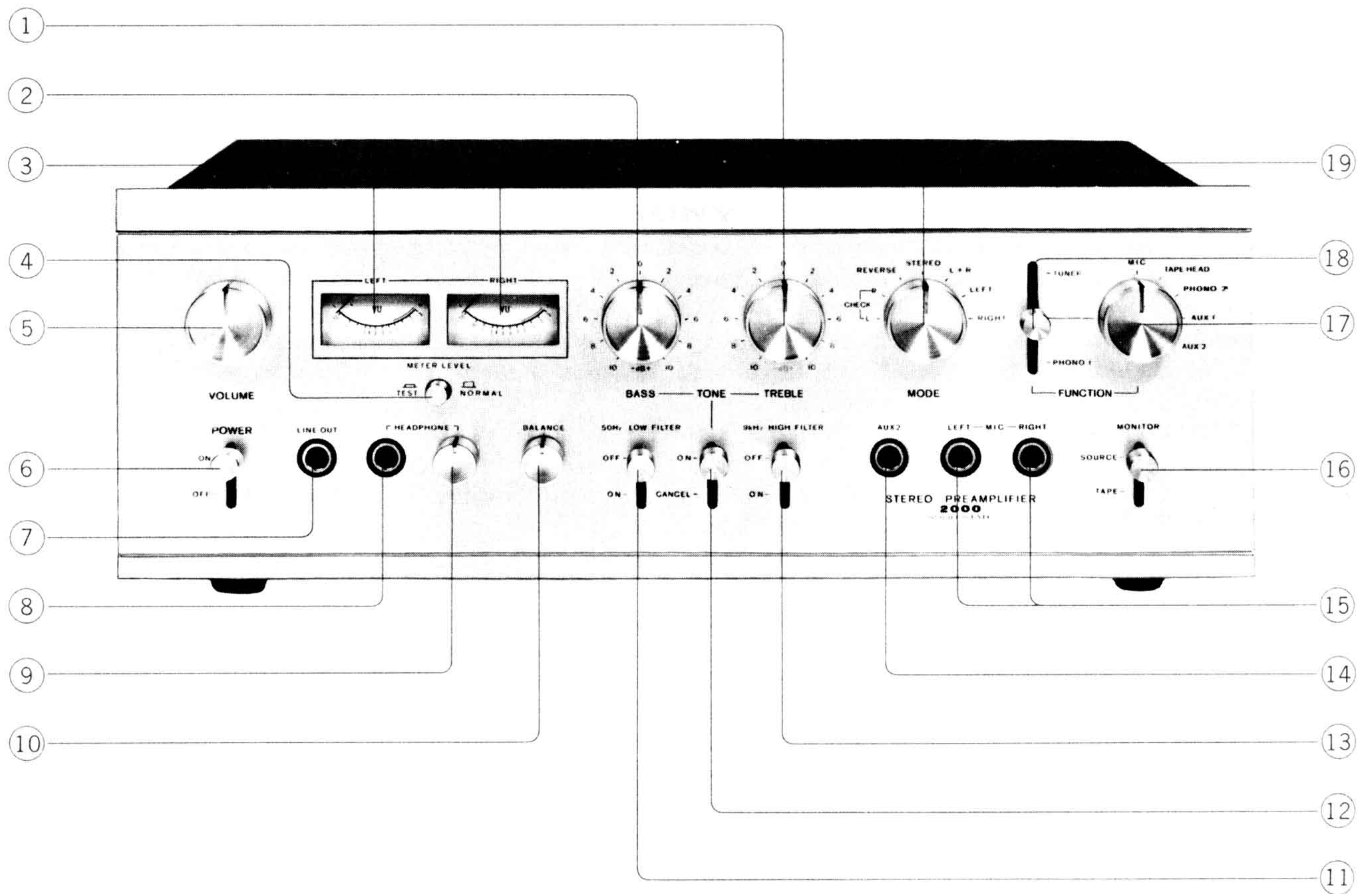
Ne pas utiliser le TA-2000 lorsque la température de la pièce est au-dessus de 45°C ou au-dessous de 0°C.

Faites attention à ces points importants qui concernent le COMMUTATEUR DE NIVEAU PHONO-2.

- Lorsque vous changez la position du COMMUTATEUR DE NIVEAU PHONO-2 alors que le courant passe, prendre bien soin que le volume du son est tourné au minimum.
- Lorsque le COMMUTATEUR DE NIVEAU PHONO-2 est placé à la position [LOW] (bas), s'assurer que la cartouche branchée aux prises [PHONO-2] possède les caractéristiques suivantes:
 - Niveau de débit faible (inférieur à 1,2 millivolt)
 - Système à inductance amovible, de basse impédance
 - Pas de transformateur de poussée
- Lorsque le COMMUTATEUR DE NIVEAU PHONO-2 se trouve à la position [NORMAL], la cartouche branchée aux prises [PHONO-2] doit avoir les caractéristiques suivantes:
 - Niveau de débit élevé (supérieur à 1,2 millivolt)
- NOTE: Une réponse de fréquence déficiente et de la distorsion surviendront lorsqu'une cartouche à débit élevé est branchée aux prises [PHONO-2] alors que le COMMUTATEUR DE NIVEAU est à la position [LOW] (bas).



FRONT PANEL AND REAR PANEL FACILITIES
BEDIENUNGSELEMENTE AUF DER VORDER- UND RÜCKSEITE
DISPOSITIFS DU PANNEAU DE FACE ET DU PANNEAU ARRIERE



- ① Treble tone control
- ② Bass tone control
- ③ Level meters
- ④ Meter switch
- ⑤ Volume control
- ⑥ Power switch
- ⑦ Line output
- ⑧ Headphone output
- ⑨ Headphone level control
- ⑩ Balance control
- ⑪ 50 Hz low filter switch
- ⑫ Tone cancel switch
- ⑬ 9 kHz high filter switch
- ⑭ AUX-2 input
- ⑮ Microphone inputs
- ⑯ Monitor switch
- ⑰ Function selector knob
- ⑱ Function selector lever
- ⑲ Mode selector

- ⑳ Level adjustment screws
- ㉑ Ground terminal
- ㉒ Tape head inputs
- ㉓ PHONO-1 inputs
- ㉔ PHONO-2 inputs and level switch
- ㉕ Tape equalization adjustment screws
- ㉖ Tuner inputs
- ㉗ AUX-1 inputs
- ㉘ Tape inputs
- ㉙ Recording outputs
- ㉚ Preamp outputs and level switch
- ㉛ Center channel output and level adjustment screw
- ㉜ AC power cord
- ㉝ AC outlets
- ㉞ REC/PB connector

- ① Tonblende für Höhen [TREBLE]
- ② Tonblende für Bässe [BASS]
- ③ Pegelanzeiger
- ④ Pegelanzeigerschalter [METER LEVEL]
- ⑤ Lautstärkereglern [VOLUME]
- ⑥ Stromschalter [POWER]
- ⑦ Direktausgang [LINE OUT]
- ⑧ Kopfhöreranschluß [HEADPHONE]
- ⑨ Kopfhörer-Lautstärkereglern [HEADPHONE]
- ⑩ Balancereglern [BALANCE]
- ⑪ Baßfilter 50 Hz [50 Hz LOW FILTER]
- ⑫ Tonblenden Abschaltung [TONE]
- ⑬ Rauschfilter 9 kHz [9 kHz HIGH FILTER]
- ⑭ Hilfeingang-2 [AUX-2]
- ⑮ Mikrophoneingänge [MIC]
- ⑯ Bandmithörschalter [MONITOR]
- ⑰ Eingangswählknopf [FUNCTION]
- ⑱ Eingangswählhebel [FUNCTION]
- ⑲ Kanalwähler [MODE]

- ⑳ Justierschrauben für Pegelanpassung [LEVEL ADJUST]
- ㉑ Erdungsanschluß [GROUND]
- ㉒ Tonbandkopfeingänge [TAPE HEAD]
- ㉓ Plattenspieler-Eingänge-1 [PHONO-1]
- ㉔ Plattenspieler-Eingänge-2 und Pegelschalter [PHONO-2, LEVEL]
- ㉕ Abstimmung für Tonbandgerät (auf der Unterseite des Gerätes)
- ㉖ Tuner-Eingänge [TUNER]
- ㉗ Hilfeingänge-1 [AUX-1]
- ㉘ Tonbandeingänge [TAPE IN]
- ㉙ Ausgänge für Tonbandaufnahmen [REC OUT]
- ㉚ Vorverstärker-Ausgänge und Pegelschalter [OUTPUT LEVEL]
- ㉛ Zentralausgang und Justierschraube [CENTER CHANNEL]
- ㉜ Netzkabel
- ㉝ Zusätzliche Steckdosen [AC OUTLET]
- ㉞ Din-Anschluß [REC/PB]

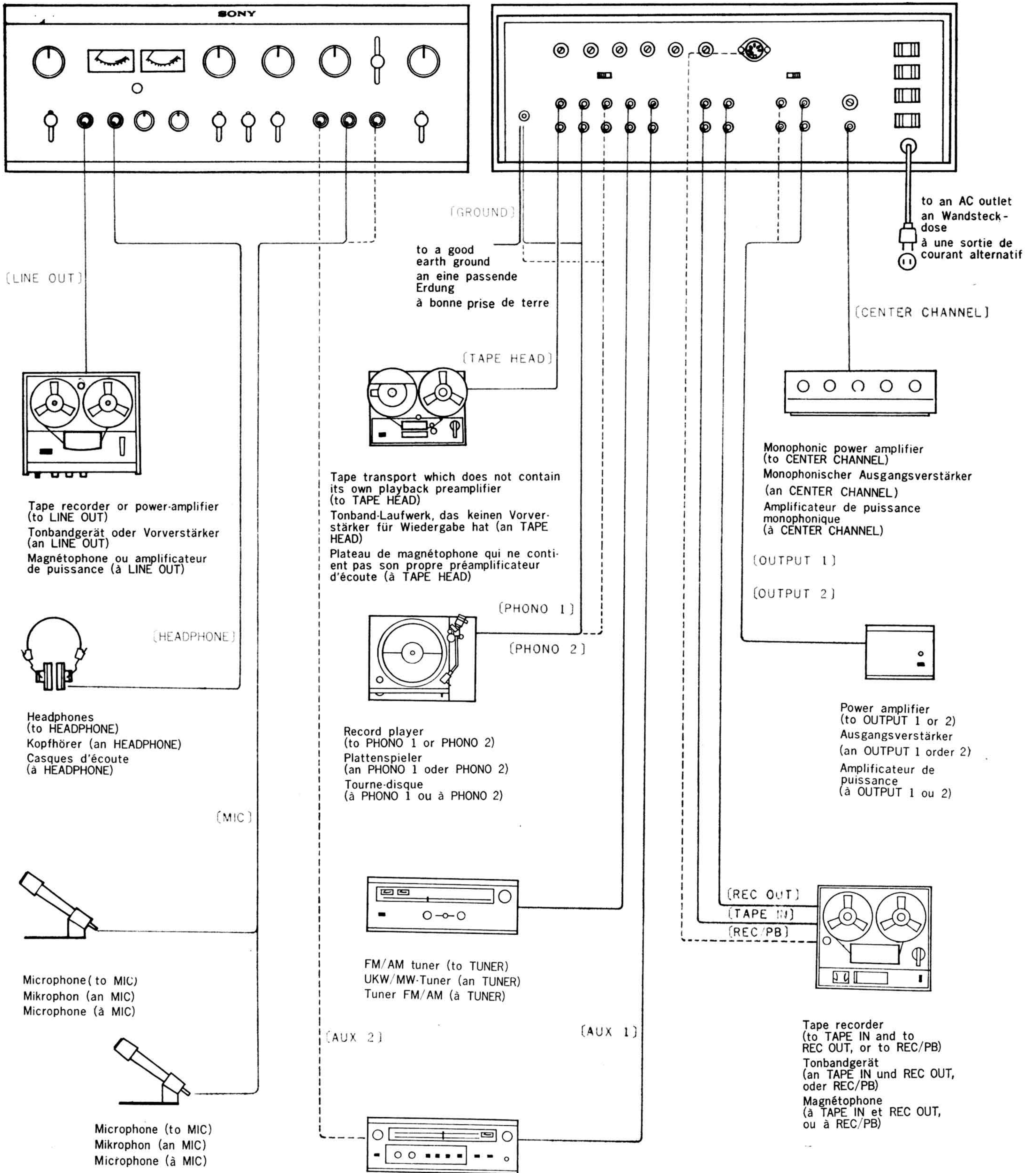
- ① Réglage de la tonalité aiguë [TREBLE]
- ② Réglage de la tonalité grave [BASS]
- ③ Indicateurs de niveau
- ④ Commutateur d'indication de niveau [METER LEVEL]
- ⑤ Réglage du volume du son [VOLUME]
- ⑥ Commutateur de mise en marche/arrêt [POWER]
- ⑦ Sortie de ligne [LINE OUT]
- ⑧ Sortie de casque d'écoute [HEADPHONE]
- ⑨ Réglage du niveau de casque d'écoute [HEADPHONE]
- ⑩ Réglage d'équilibre [BALANCE]
- ⑪ Commutateur de filtre basse fréquence [50 Hz LOW FILTER]
- ⑫ Commutateur de tonalité neutre [TONE]
- ⑬ Commutateur de filtre haute fréquence [9 kHz HIGH FILTER]
- ⑭ Entrée auxiliaire-2 [AUX-2]
- ⑮ Entrées de microphone [MIC]
- ⑯ Commutateur de relais [MONITOR]
- ⑰ Bouton de sélection de fonction [FUNCTION]
- ⑱ Levier de sélection de fonction [FUNCTION]
- ⑲ Sélecteur de mode [MODE]

- ⑳ Vis de réglage de niveau [LEVEL ADJUST]
- ㉑ Prise de terre [GROUND]
- ㉒ Entrées de tête de magnétophone [TAPE HEAD]
- ㉓ Entrées PHONO-1 [PHONO-1]
- ㉔ Entrées et Commutateur de niveau PHONO-2 [PHONO 2, LEVEL]
- ㉕ Vis de réglage d'égalisation de bande
- ㉖ Entrées de tuner [TUNER]
- ㉗ Entrées auxiliaire-1 [AUX-1]
- ㉘ Entrées de magnétophone [TAPE IN]
- ㉙ Sortie d'enregistrement [REC OUT]
- ㉚ Sorties et commutateur de niveau de préamplificateur [OUTPUT LEVEL]
- ㉛ Sortie de canal central et vis de réglage de niveau [CENTER CHANNEL]
- ㉜ Fil d'alimentation courant alternatif
- ㉝ Sorties courant alternatif [AC OUTLET]
- ㉞ Raccord de magnétophone [REC/PB]

HOW TO SETUP YOUR STEREO SYSTEM

AUFBAU EINER STEREOANLAGE

INSTALLATION DE VOTRE SYSTEME STEREO

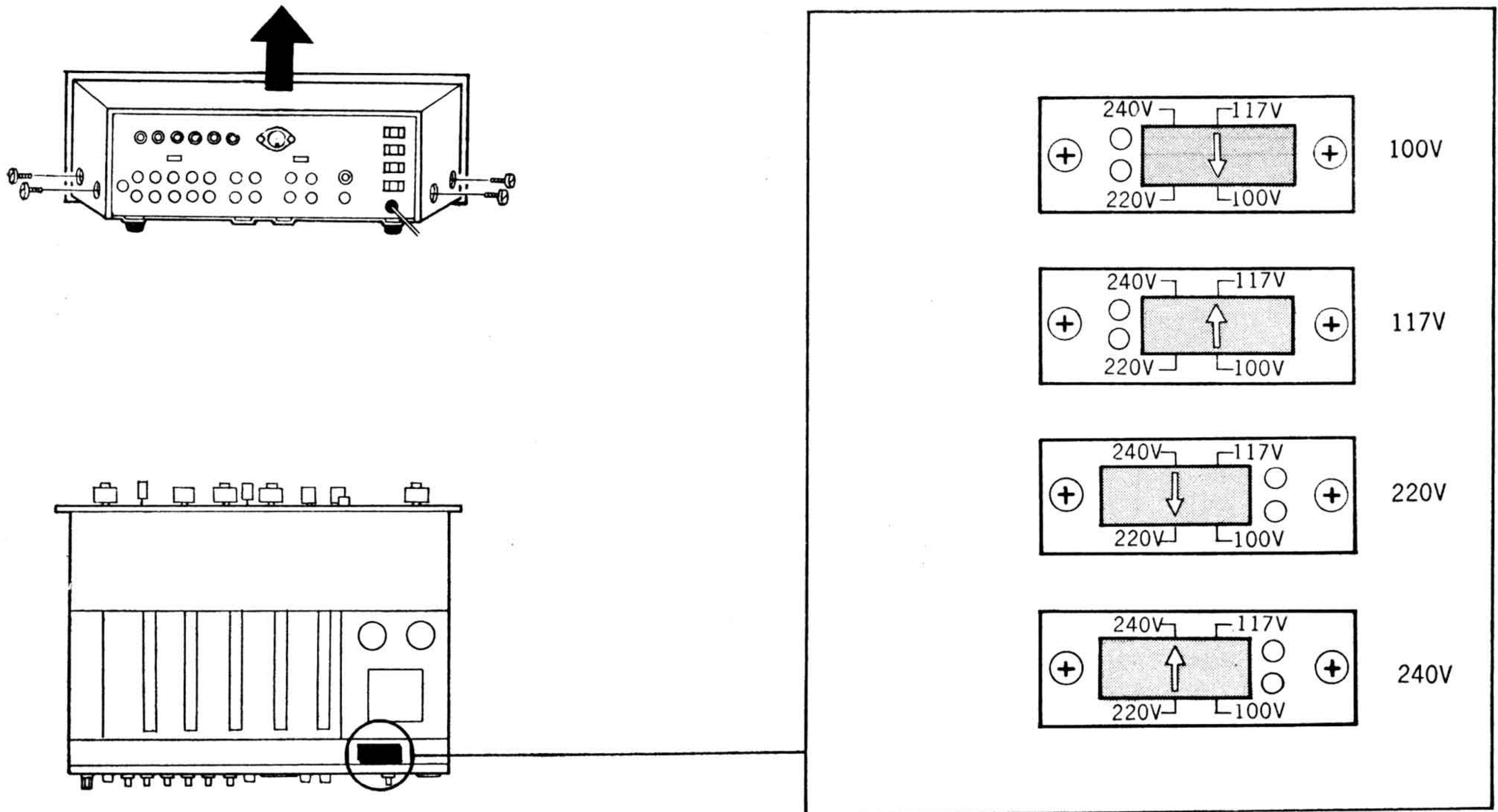


Any sound source, such as tuner, tape recorder, electric musical instrument etc. (to AUX 1 or AUX 2)

Alle Klangquellen, wie Tuner, Tonbandgerät, elektrische Musikinstrumente usw. (an AUX 1 oder AUX 2)

N'importe quelle source du son tels que tuner, magnétophone, instrument musical électrique etc. (à AUX 1 ou AUX 2)

**ADAPTATION TO THE LOCAL POWER LINE
ANPASSEN DES GERÄTES ANS ÖRTLICHE STROMNETZ
ADAPTATION AU COURANT DE LA VILLE**



The TA-2000 operates on ac power line voltage of either 100 V, 117 V, 220 V or 240 V.

Before operating, check whether or not the TA-2000 is set for operating ac voltage of your local power line. If necessary, reset the Voltage Selector Plug as follows:

1. Loosen the four (4) screws of the chassis and remove the cover.
2. Pull out the Voltage Selector Plug, located as shown, and firmly reinsert it so that the top arrow mark of the plug points to the proper voltage figure.
3. Replace the chassis cover.

NOTE: When the TA-2000 is to be operated on ac 110 V power line, insert the Voltage Selector Plug to 117 V position.

In this case, the output power becomes approximately 10% lower than the specified value.

Der TA-2000 kann mit Wechselstrom von 100, 117, 220 oder 240 Volt betrieben werden.

Vor dem Anschließen des Gerätes ist nachzuprüfen, ob das Gerät richtig auf die örtliche Stromspannung eingestellt ist. Falls erforderlich, kann es durch Umstecken des Spannungswahlsteckers auf folgende Weise umgestellt werden:

1. Die 4 Halteschrauben des Chassis lösen und die Abdeckung abnehmen.
2. Den Spannungswahlstecker, dessen Lage aus der Abbildung ersichtlich ist, herausziehen und in der Stellung wieder einsetzen, daß die obere Pfeilmarkierung des Steckers auf die gewünschte Stromspannung zeigt.
3. Abdeckung wieder aufsetzen.

Zur Beachtung: Zum Betrieb mit 110 Volt Wechselstrom wird der Spannungswahlstecker auf 117 Volt gestellt. In diesem Fall ist jedoch die Ausgangsleistung ungefähr 10% niedriger.

(Fortsetzung folgt Seite 20.)

Le TA-2000 fonctionne sur courant alternatif de 100 V, 117 V, 220 V, ou 240 V.

Avant de l'utiliser, vérifier si le TA-2000 a bien été ajusté à la tension du courant de ville local. Si nécessaire, déplacer la fiche de sélection de voltage selon le procédé suivant:

1. Dévisser les quatre (4) vis du bâti et retirer le couvercle.
2. Retirer la fiche de sélection de voltage (comme montré sur la figure ci-dessus) et la replacer à fond de manière que la flèche qui y est marquée pointe vers le voltage approprié.
3. Remettre le couvercle du bâti.

NOTE: Lorsque le TA-2000 fonctionne sur courant alternatif de 110 V, fixer la fiche de sélection de voltage à la position 117 V.

Dans ce cas, le débit est d'environ 10% plus bas que la tension indiquée.

(Suite à la page 34.)

CONNECTIONS

AC CONNECTIONS

AC POWER CORD ⑳

Connect this ac power cord to an ac outlet. The power used by the TA-2000 is 10 watts.

AC OUTLETS ㉓

Supply ac power to the components connected to these outlets. The three upper outlets (marked SWITCHED) are controlled by the front-panel POWER SWITCH. The bottom outlet (marked UNSWITCHED) remains live; therefore the component connected to this outlet should be controlled by its own power switch. A record player should be connected to this outlet to avoid accidental damage to the turntable drive system and/or the cartridge caused by turning off the TA-2000 while the record player is still in cycle.

The maximum rating for these outlets is 500 watts total.

INPUT AND OUTPUT CONNECTIONS

Connection notes

- Use a shielded cable of low stray capacitance for connections.
- Keep the connecting cables as short as possible.
- Insert the shorting plugs (supplied) for muting input terminals into the high-gain inputs (TAPE HEAD, PHONO-1, PHONO-2) when these inputs are not in use. Do not insert these plugs into the RECORDING OUTPUT, PREAMP OUTPUT or CENTER-CHANNEL OUTPUT terminals.
- When using the supplied connecting cord (with binaural plug), be sure to connect the black-phono plug to the left channel, and the red-phono plug to the right channel.

LINE OUTPUT ⑦

(located at the front panel)

This front panel output is for convenient, temporary connections to amplifiers or tape recorders. Use binaural type plug and cord (supplied). The input impedance of the equipment connected to this output should be at least 50 K ohms. The output voltage of this output is switched to 1 volt or 0.3 volt by the PRE-AMP OUT LEVEL SWITCH.

When this output is used, the PRE-AMP OUTPUTS marked 2 and the CENTER CHANNEL OUTPUT on the rear panel are disconnected (the PRE-AMP OUTPUTS marked 1 remain 'live').

HEADPHONE OUTPUT ⑧ and LEVEL CONTROL ⑨

(located at the front panel)

Accepts headphones of greater than 600-ohm impedance equipped with a standard binaural headphone plug.

The volume level for the headphone can be adjusted by turning the LEVEL CONTROL KNOB located at the right of the HEADPHONE OUTPUT; clockwise rotation will increase the volume.

With the use of the supplied cord (with binaural plug), you can obtain a high level output; rated output is 3 volts and maximum output is 10 volts.

MICROPHONE INPUTS ⑮

(located at the front panel)

These inputs accept microphones with impedances of less than 10 K ohms and output levels of 1.2 millivolts or more.

LEVEL ADJUSTMENT SCREWS ㉔

These semi-fixed adjustment screws control the input level of the associated inputs—TAPE HEAD, PHONO-1, PHONO-2, TUNER, AUX-1 and TAPE IN—so that all input levels of the TA-2000 can be set to the same value. These screws are turned fully clockwise at the factory to provide maximum input sensitivity; counterclockwise rotation will decrease the volume level. All inputs, with the exception of TAPE IN, are muted when the associated ADJUSTMENT SCREWS are turned fully counterclockwise.

GROUND TERMINAL ㉔

Connect the ground wire from the record player, tape deck and other sound source components to this terminal; loosen the terminal screw and insert the ground wires from other components into the hole and tighten the screw cap. If there is some residual hum, connect this terminal directly to a good earth ground.

TAPE HEAD INPUTS ㉔

These inputs accept playback signals directly from the playback head of a tape transport (a transport that does not contain its own playback preamplifier).

The maximum sensitivity of these inputs is 1.2 millivolts and the input impedance is 500 K ohms. Any playback head having less than 10 K ohm impedance at 1 kHz may be used.

The TAPE HEAD input sensitivity is semi-fixed and adjustable; refer to 'LEVEL ADJUSTMENT SCREWS ㉔'. The TA-2000 is equalized for NAB tape characteristics at a tape speed of 7½ ips. However, the contour can be changed at the TAPE EQUALIZATION ADJUSTMENT SCREWS located at the bottom of the TA-2000. Refer to "TAPE EQUALIZATION ADJUSTMENT SCREWS ㉔".

PHONO-1 ㉔, PHONO-2 ㉔ INPUTS

These inputs are for connection to a record player equipped with a magnetic high-level cartridge*. The input sensitivity at the PHONO-1 and PHONO-2 (LEVEL SWITCH set to the NORMAL position) inputs is 1.2 millivolts and the input impedance is 47 K ohms. These inputs are equalized for RIAA characteristics. The PHONO-1 and PHONO-2 input sensitivity is semi-fixed and adjustable, refer to "LEVEL ADJUSTMENT SCREWS ㉔".

*High-level in this case refers to cartridges which have more than 1.2 mV/5 cm/sec output.

PHONO-2 LEVEL SWITCH ㉔

PHONO-2 inputs have a slide switch for selecting low- or high-level cartridges; when setting the switch to the NORMAL position, the PHONO-2 inputs have the same sensitivity and impedance as the PHONO-1 inputs. When setting the switch to the LOW position, the PHONO-2 inputs have the input sensitivity 0.06 millivolt and an input impedance of 200 ohms.

If you have both high- and low-level cartridges, connect the high-level cartridge to the PHONO-1 inputs and connect the low-level cartridge to the PHONO-2 inputs and set the LEVEL SWITCH to the LOW position.

Caution:

The PHONO-2 LEVEL SWITCH is a setup switch and should not be reset while the system is powered. If it is necessary to reset this switch in an operating system, be sure to turn volume all the way down to prevent accidental speaker damage.

CARTRIDGES:

PHONO-1 and PHONO-2 (with the LEVEL SWITCH at the NORMAL position) accept a maximum input voltage of 100 millivolts. The cartridges connected to these inputs should have less than 20 millivolt output at 5 cm/sec.

For a very low-output moving coil type cartridge (which does not contain a step-up transformer), use the PHONO-2 inputs and set the LEVEL SWITCH to the LOW position.

TAPE EQUALIZATION ADJUSTMENT SCREWS ⑳

(located at the bottom)

These adjustment screws are provided for TAPE HEAD input equalization. The TAPE HEAD inputs of the TA-2000 are equalized for NAB tape characteristics to accept any playback head. However, when the head requires compensation, adjust these screws. Clockwise rotation boosts high-frequency response; counterclockwise rotation reduces high-frequency response. See 'TAPE HEAD EQUALIZER CURVES' on page 50.

Precise adjustment can be obtained with the use of a NAB standard test tape and the LEVEL METERS of the TA-2000.

TUNER INPUTS ㉑

These inputs accept signals from an FM/AM tuner. These inputs have a maximum sensitivity of 120 millivolts and an input impedance of more than 100 K ohms. The frequency response is flat.

The SONY FM Stereo Tuners ST-5000 or ST-5000 FW are recommended.

The TUNER input sensitivity is semifixed and adjustable, refer to 'LEVEL ADJUSTMENT SCREWS ㉑'.

AUX (auxiliary)-1 ㉒, AUX-2 ㉓ INPUTS

(AUX-2 is located at the front pannel)

These inputs accept any input program source having at least 120 millivolt output level. The input impedance is higher than 100 K ohms and frequency response is flat. For permanent connections use the rear panel AUX-1 inputs, and for temporary connections, use the front panel AUX-2 input by plugging in the binaural-type plug and cord (supplied).

The AUX-1 input sensitivity is semifixed and adjustable, refer to 'LEVEL ADJUSTMENT SCREWS ㉑'.

TAPE INPUTS ㉔

These inputs accept line outputs (or monitor outputs) of a tape recorder or a tape deck (which contains its own playback preamplifier). These inputs have a maximum sensitivity of 120 millivolts and an input impedance of more than 100 K ohms. The frequency response is flat.

The TAPE input sensitivity is semifixed and adjustable, refer to 'LEVEL ADJUSTMENT SCREWS ㉑' on page 7.

RECORDING OUTPUTS ㉕

These outputs supply signals to a tape recorder. The input impedance of the tape recorder connected to these outputs should be greater than 10 K ohms. To make a stereophonic recording, connect a stereophonic program to the TA-2000 and set the MODE SELECTOR to the STEREO position. To make a monophonic recording from a stereophonic source, set the MODE SELECTOR to the L+R position. To make a monophonic recording from a monophonic source, set the MODE SELECTOR to either LEFT or RIGHT according to which input channel is connected to the signal source.

Controls on the front panel—TONE, VOLUME and BALANCE controls—have no effect on the recording results.

PREAMP OUTPUTS and LEVEL SWITCH ㉖

These outputs connect to power amplifiers that have input sensitivities of more than 0.3 volt or 1 volt. A pair of paralleled outputs is provided for each channel for use by tape recorders, professional line outputs, etc. The outputs at both sets of connectors can be set to 0.3 volt or 1 volt at the LEVEL SWITCH*.

When plugging in the LINE OUTPUT or HEADPHONE OUTPUT on the front panel, the outputs marked 2 are disconnected, but outputs marked 1 remain 'live'.

This facility is convenient when the TA-2000 feeds source programs to two sound systems; connect the power amplifier of the sound system in another room to the outputs marked 1 and the local sound system to the outputs marked 2. In this way you can use the HEADPHONE OUTPUT or LINE OUTPUT on the front panel without affecting the remote sound system.

*The PREAMP OUT LEVEL SWITCH regulates the output levels of the CENTER CHANNEL OUTPUT and LINE OUTPUT simultaneously.

RELATION OF OUTPUTS AND MODE SELECTOR

The signals fed from the output connectors of the TA-2000 are summarized in the table below.

Mode selector position Outputs	CHECK L	CHECK R	REVERSE	STEREO	L+R	LEFT	RIGHT
LEFT channel of Preamp output, Line output, Headphone output	L+R	—	R	L	L+R	L	R
RIGHT channel of Preamp output, Line output, Headphone output	—	L+R	L	R	L+R	L	R
Center channel output	L+R	L+R	L+R	L+R	L+R	L	R
LEFT channel of Recording output	L+R(L)*	L+R(L)*	L	L	L+R	L	L
RIGHT channel of Recording output	L+R(R)*	L+R(R)*	R	R	L+R	R	R

* When the MONITOR SWITCH is set at the TAPE position, the Recording outputs provide the signal in the parentheses.

The voltage amplification gain of the PREAMP, CENTER CHANNEL, LINE OUTPUTS is increased 10 dB when setting the LEVEL SWITCH to the 1 V position. For the details, refer to the 'VOLTAGE AMPLIFICATION' on page 16.

CENTER CHANNEL OUTPUT and LEVEL ADJUSTMENT SCREW ⑳

This output supplies monophonic signals; when the MODE SELECTOR is set to the STEREO, REVERSE, L+R, CHECK L or CHECK R positions, this output supplies L+R signals. When the selector is set to the LEFT or RIGHT positions, this output supplies either signal according to the selector setting.

Use this output for center woofer systems to reinforce low frequencies, or to fill the 'hole in the middle' which may occur when the distance between both channel speakers is large, or for a peripheral monophonic sound system in another room. For details, refer to pages 12, 13.

When the LINE OUTPUT or the HEADPHONE OUTPUT is in use, this output is disconnected. The rated output level of the CENTER CHANNEL OUTPUT is switched to 1.5 volt or 0.45 volt by the LEVEL SWITCH of the PREAMP OUTPUT and these levels can be adjusted by turning the associated LEVEL ADJUSTMENT SCREW; counterclockwise rotation will decrease the output volume level.

REC/PB CONNECTOR ㉓

This 5-pin connector permits single-cable connections between the TA-2000 and the tape recorder that employs the same type of integrated input/output connector. Connections are made with a single-cable SONY Connector Cable RC-2 (optional).

The TAPE INPUT LEVEL ADJUSTMENT SCREW has no effect on signals carried by this connector.

OPERATING CONTROLS

TREBLE TONE CONTROL ①

Clockwise rotation will increase and counterclockwise rotation will decrease, the prominence of treble tones. Center position provides flat response. Each switch step of this control changes treble response approximately 2 dB at 10 kHz.

BASS TONE CONTROL ②

Clockwise rotation will increase, and counterclockwise rotation will decrease, bass notes. Each switch step of this control changes bass response approximately 2 dB at 100 Hz.

LEVEL METERS ③ and METER SWITCH ④

The meters indicate the volume levels at the PREAMP OUTPUTS in use. Meter sensitivity can be varied by switching the METER SWITCH. In the TEST position of the switch, the reading on the meters shows the actual output value of the TA-2000; a 0 VU reading means that each channel supplies rated output (1 volt or 0.3 volt).

When setting the switch to the NORMAL position, the sensitivity of the meter increases 14 dB and the pointers are more responsive. In ordinary operation, or in stereo balancing, set the switch to the NORMAL position. For the TEST use, refer to page 11.

VOLUME CONTROL ⑤

Regulates volume level. Clockwise rotation will increase volume level.

POWER SWITCH ⑥

Set ON to apply power to the amplifier. The LEVEL METERS will light when the amplifier is powered.

BALANCE CONTROL ⑩

Regulates the level of either left or right channels to produce the optimum stereo effect. Clockwise rotation will decrease the left-channel volume. Counterclockwise rotation will decrease right-channel volume.

50 Hz LOW FILTER SWITCH ⑪

In the ON position, this switch cuts off signals by 12 dB/octave below 50 Hz. Low frequencies below 50 Hz, such as the rumble created by turntables, record changers or the disc itself, are cut when this switch is turned on.

TONE CANCEL SWITCH ⑫

In the ON position, the BASS and TREBLE CONTROLS work normally. In the CANCEL position, tone control circuits are eliminated from the signal path and an absolutely flat frequency response is obtained (regardless of the preset position of the BASS and TREBLE TONE CONTROLS).

9 kHz HIGH FILTER SWITCH ⑬

In the ON position, this switch cuts off signals by 12 dB/octave above 9 kHz. High frequencies above 9 kHz, such as surface noise of discs or tapes when reproducing old and badly worn recordings or high-frequency distortion in discs or tapes, are cut when this switch is turned on.

MONITOR SWITCH ⑯

TAPE

Tape programs connected to either the TAPE INPUTS or the REC/PB CONNECTOR can be played back only by setting this switch to the TAPE position.

SOURCE

When reproducing all programs except for the above case, set the switch to the SOURCE position and set the FUNCTION SELECTOR LEVER or KNOB to the proper position (the tape program connected to the TAPE HEAD INPUTS is produced at this switch position).

This lever can also be used as source/tape comparison, when recording with a 3-head tape recorder (having a third head with preamplifier for playback). The sound being recorded is produced when the switch is in the SOURCE position, and the sound that has been recorded on the tape is produced when the switch is thrown to the TAPE position. In this case, the 3-head tape recorder should be connected to the TAPE INPUTS.

FUNCTION SELECTOR KNOB ⑰

When the FUNCTION SELECTOR LEVER is set in the center position, this knob selects any one of the five program sources: MIC, TAPE HEAD, PHONO-2, AUX-1 and AUX-2.

FUNCTION SELECTOR LEVER ⑱

Selects input sources; the upper is TUNER, the lower is PHONO-1. The center position corresponds to any one of the five programs selected by the FUNCTION SELECTOR KNOB.

MODE SELECTOR ⑱

Determines the mode of the reproduced program at PREAMP OUTPUTS, LINE OUTPUT, HEADPHONE OUTPUT.

CHECK L

Connects monophonic L+R signal to the left output. The right output is disconnected.

CHECK R

Connects monophonic L+R signal to the right output. The left output is disconnected.

REVERSE

Reverses LEFT and RIGHT channels; connects the LEFT channel input to the right output and the RIGHT channel input to the left output.

STEREO

Delivers normal stereophonic signals.

L+R

Connects monophonic L+R signal to both outputs.

LEFT

Connects LEFT channel signal to both outputs.

RIGHT

Connects RIGHT channel signal to both outputs.

For the reproduced mode at the RECORDING OUTPUTS, refer to the chart 'Relation of outputs and mode selector' on page 8.

OPERATING INSTRUCTIONS

Before turning ON the TA-2000 for the first time, turn the VOLUME CONTROL fully counterclockwise.

OPERATION SUMMARY

1. Complete the connections between the program source components, TA-2000, the power amplifier and the speakers.
2. Turn on the TA-2000 and other components of your system. Before operating the controls on the TA-2000, allow approx. 2 seconds for warm-up.
3. Set the MODE SELECTOR to the STEREO position for normal stereophonic reproduction.
4. To playback a tape connected to TAPE INPUTS or REC/PB CONNECTOR, set the MONITOR SWITCH to the TAPE position.
Except for the above case, set the MONITOR SWITCH to the SOURCE position and set the FUNCTION SELECTOR LEVER and/or KNOB to the desired input position: TUNER, PHONO-1, MIC, TAPE HEAD, PHONO-2, AUX-1 or AUX-2.
5. Adjust VOLUME and TONE CONTROLS for your listening preference.

Now you will hear the finest sound reproduction that modern technology can provide.

BALANCING THE STEREO SYSTEM

The spatial feeling of direction and depth that stereophonic sound produces is greatly degraded if the volume of both channels is not balanced. If you hear some volume difference between channels, check the following items and correct the balance of your sound system.

Once the system has been balanced electrically, the front panel BALANCE CONTROL can be reset as needed to compensate for imbalance in the original program source.

1. Set the BALANCE CONTROL to the center position (marked [I] above the knob).
2. Set the METER SWITCH to the NORMAL position.
3. Set the MODE SWITCH to the L+R position and reproduce a program.
 - a. If there are differences between indications on the LEVEL METERS, the volume level in both channel outputs may be unbalanced. This difference can be corrected by turning the BALANCE CONTROL; adjust the BALANCE CONTROL until both meters swing equally and you hear both speakers with the same output volume.
Stereophonic sound recording/reproduction requires the use of two independent sound paths and each channel contains different signals. Therefore, it is normal for the meters to indicate different output levels at times when a stereophonic record is being played (and the MODE SWITCH is set to STEREO).
 - b. If both meters show the same level, but you still hear a volume difference between channels, there may be a problem in the acoustic conditions of your listening room. Furniture placement, room shape, etc. may affect performance. There may be differences between the speakers. These conditions should be corrected with the input-level adjustment on the power amplifier.

BALANCING INPUT LEVELS

Input levels should be balanced so that all program sources produce the same output volume. This eliminates the need to reset the volume control when switching between program sources. Balance input levels as follows.

1. Complete the connections between sound sources and the TA-2000.
2. Set the MODE SELECTOR to the L+R position.
3. Listen to each program source and find the one with the lowest volume.
4. Keep the FUNCTION SELECTOR (LEVER or KNOB) set to the source found in Step 3, and establish a comfortable listening level by turning the VOLUME CONTROL. Use this level as a standard for balancing the input levels.
5. Turn all LEVEL ADJUSTMENT SCREWS all the way down except for the standard source input (Step 3). Turn the LEVEL ADJUSTMENT SCREW of the standard input to the maximum level (fully clockwise position).
6. Compare the volume level of other sources by switching the FUNCTION SELECTOR (LEVER or KNOB) back-and-forth between the standard source (Step 3) and other sources, and adjust the LEVEL ADJUSTMENT SCREWS until the same sound level

is obtained from each source. The LEVEL METERS will be helpful in these adjustments.

NOTE :

- Before adjusting the input levels, be sure to balance the volume level of both channels.
- Keep the amplifier's volume at the original setting while these adjustments are being made.
- There are no provisions for adjusting signal levels fed in at the REC/PB CONNECTOR (input).

TEST USE OF THE LEVEL METERS

The LEVEL METERS on the TA-2000 indicate output volume level for each channel. These precisely-adjusted VU meters will serve for measuring frequency response, channel separation of your cartridge, and for frequency response and azimuth correction of the tape heads.

0 VU position on the meter indicates 0 dB output.

When making tests, be sure to turn the volume control of the power amplifier all the way down to protect the speakers from accidental damage (use headphones).

The TONE CANCEL SWITCH should be set to the CANCEL position, and the 50 Hz LOW and 9 kHz HIGH FILTERS should be set to the OFF positions to reproduce the actual response of your sound sources. The VOLUME CONTROL of the TA-2000 should be kept at the original setting while testing.

Graph papers are attached on pages 51, 52.

CARTRIDGE TEST

There are two types of test record; one is based on RIAA standard and the other is based on a standard other than RIAA. The reproduction characteristic of the TA-2000 is the inverse of the RIAA standard recording characteristic; therefore, the use of the RIAA test record is recommended.

1. Frequency response test

While measuring frequency response the METER SWITCH can be used in either the TEST or NORMAL position.

a. With the RIAA record

Adjust the VOLUME CONTROL so that the LEVEL METERS indicate 0 VU (0 dB) for 1 kHz tone reproduction. Then reproduce the series of the frequency tone bands and read the LEVEL METERS. Plot each output value on the graph paper. The test record is cut to reproduce uniform output (0 VU) from band to band. If there are any variations in output, it will be measured as a deviation from 0 VU level.

If the cartridge has very low output level and the output for 1 kHz tone reproduction does not read 0 VU, or if the peak of the frequency response goes over +3 VU, set the standard level at a readable position.

b. With other standard records

Adjust the VOLUME CONTROL so that the LEVEL METERS indicate 0 VU at 1 kHz tone reproduction.

Reproduce the series of the frequency tone bands, plot each band output value. Compensate the curve for the difference between the RIAA reproduction characteristics and the standard on which the record is based. For details on compensation, refer to the instructions supplied with the record.

2. Channel separation test

Use a test record that contains left and right channel tones on different bands.

Set the PHONO-1 (or PHONO-2) LEVEL ADJUSTMENT SCREW fully clockwise. Set the METER SWITCH to the TEST position. Set the BALANCE CONTROL fully counterclockwise.

a. Cross talk from LEFT to RIGHT

- 1) Reproduce a band which contains only the LEFT channel.
- 2) Set the MODE SELECTOR to the STEREO position and adjust the VOLUME CONTROL so that the left meter reads 0 VU.
- 3) Move the MODE SELECTOR to the REVERSE position and the left meter will show cross talk value from LEFT to RIGHT.
- 4) Plot the cross talk value at each frequency.
- 5) If the cross talk value becomes less than -20 dB, set the METER SWITCH to the NORMAL position. The meter sensitivity increases 14 dB. Therefore, correct the reading by subtracting 14 dB and plot the actual value on the paper.

b. Cross talk from RIGHT to LEFT

Reproduce a band which contains only the RIGHT channel. Adjust the VOLUME CONTROL so that the left meter reads 0 VU (the MODE SELECTOR should be placed at the REVERSE position). Then move the MODE SELECTOR to the STEREO position, and the left meter shows the cross talk value from RIGHT to LEFT.

TAPE RECORDER TEST

Use the NAB standard test tape.
Set METER SWITCH to the NORMAL.

1. Azimuth adjustment of the head

Connect the tape recorder to the TAPE INPUTS or TAPE HEAD INPUTS of the TA-2000.

Use a test tape that contains high frequency tones for adjustment of the playback head gap azimuth error.

The volume control of the TA-2000 should be set to the position at which the LEVEL METERS show an adequate level for easy reading.

While playing the gap-azimuth adjustment tape, slowly rotate the azimuth adjustment screw of the playback head to maximum output level; the test tape is recorded with the record gap perpendicular to the longitudinal axis of the tape; therefore correct azimuth adjustment will provide the maximum output level.

2. Frequency response check

After obtaining the correct azimuth adjustment, check the frequency response of the tape recorder. Use a tape which contains a series of tones.

If you use a tape transport that does not have its own preamplifier, connect the tape transport to the TAPE HEAD inputs.

Adjust the input level of the tape inputs of the TA-2000 so that the LEVEL METERS indicate 0VU at 700 Hz (recording level of -10 dB). Then reproduce the series of the frequency tones and read the LEVEL METERS at each band. Plot each output value on the graph paper.

If you use a tape deck that contains its own pre-amplifier, connect the tape deck to the TAPE INPUTS. Check the frequency response of the tape deck as explained below. In this case the readjustment of the equalizer should be made at the tape deck.

The TAPE HEAD inputs of the TA-2000 are equalized for NAB tape characteristics to provide a flat response. However, if the response has some variation, the head requires compensation. Adjust the TAPE EQUALIZATION ADJUSTMENT SCREWS at the bottom of the TA-2000.

MULTI-CHANNEL AMPLIFICATION SYSTEM

Conventional multi-channel speaker systems employ a crossover network to divide the audio spectrum into three tone ranges. Each range, lows, mid frequencies and highs, is then routed to a speaker designed to handle the corresponding range.

A far superior way of dividing the frequency ranges is to make the division at the inputs to three separate power amplifiers, rather than at the output of a single power amplifier. This permits an easily controlled frequency divider that is not affected by changing speaker characteristics.

The SONY 3-Channel Dividing Stereo Preamplifier, Model TA-4300, is recommended in the multiple amplification systems described above. It is placed between the preamplifier and three power amplifiers (3-per channel) as shown in Fig. 1. The TA-4300 permits accurate selection of crossover frequencies to match speaker requirements.

The SONY Stereo Power Amplifiers, Model TA-3120, are recommended for use as the power amplifier units in multi-channel systems.

Precaution

Observe the following precautions in assembling high-power multiple channel systems.

Capacitors should be placed in the line that connects the power amplifiers to the speakers in the mid- and high-range channels. These capacitors prevent low frequency transients from damaging the mid-range and high-frequency speakers if the input to the power amplifiers are inadvertently connected or disconnected while power is applied. Use metalized paper, metalized mylar or oil-filled capacitors. Do not use electrolytic capacitors (including the non-polarized types).

Select capacitor values with the aid of the chart in Fig. 2. Find the point where the crossover frequency crosses the slanted line that represents speaker impedance. Read the capacitance of the horizontal scale. For example, a 16-ohm speaker with a crossover frequency of 1.2 kHz requires a series capacitor of 17 μ F.

Use the nearest commercially-available values to those found on the chart. In the example above, a 20 μ F capacitor can be used.

The cutoff frequency is one octave below the crossover frequency (600 Hz in the example given above). At lower frequencies, response falls off at the rate of 6 dB per octave.

Center-Woofer System

Stereo sound systems are sometimes characterized by an apparent lack of lows.

The stereo effect relies upon mid- and high-frequencies because human hearing is quite directional in this range. However, low-frequency sounds, below 200 Hz, produce no directional sensation at all. Therefore, you can reinforce lows with a monophonic channel that carries mixed low-frequency signals. The use of the CENTER CHANNEL OUTPUT preserves the stereo effect because musical sounds are composed of fundamental frequencies and harmonic multiples of those fundamentals. When a low frequency note is reproduced, the intensity of the fundamental note is provided by the center-channel speaker, but the harmonics are produced in the LEFT and RIGHT speakers. Thus, low frequency volume is augmented, but the apparent directional response is retained.

In systems using CENTER CHANNEL output, the LEFT and RIGHT speakers should be placed with the usual care required for good stereo effect. However, the center-channel speaker, since its output is non-directional, can be placed in any convenient location.

Setting up a center-woofer system

The basic arrangement of a center-woofer system is shown in Fig. 3. Note that filters are employed between the preamplifier and the power amplifiers. The filter eliminates high-frequency signals in the feed to the center-channel woofer. They also reduce low-frequency signals in the feed to the full-range speakers. This system delivers more effective sound reproduction with less overall distortion, because harmonic and IM distortion can be avoided in the full-range speakers, even if these speakers are rather small.

Recommended low-pass filters to be used in the feed to the center-channel power amplifier are shown in Fig. 4 and 5. The 'active' filter of Fig. 4 will work with a power amplifier of any input impedance. The passive filter of Fig. 5 requires a power amplifier whose input impedance is at least 50K ohms. The high-pass filter in Fig. 6 is recommended for use in the feeds to the left and right channel power amplifiers.

The following gives some construction details and adjustment procedures for building the filters and adjusting the system.

Active low-pass filter (Fig. 4)

- Power amplifier input impedance is not critical.
- Use high-quality, low-noise NPN type silicon transistors. Ratings should be $V_{CE0} \geq 30$ volt and $P_C \geq 250$ milliwatts. If PNP transistors are used, reverse the polarity of the power supply and the 10 μ F/25V capacitor.
- The filter should be fully shielded.
- Balance the volume between the center channel and the left and right channels by turning the CENTER-CHANNEL LEVEL ADJUSTMENT SCREW on the TA-2000.

Passive low-pass filter (Fig. 5)

- The power amplifier must have an input impedance of at least 50K ohms.
- The filter should be enclosed in a metal box for complete shielding.
- To balance the system, set the CENTER CHANNEL OUTPUT LEVEL ADJUSTMENT SCREW fully clockwise. Balance the volume between the center channel and the left and right channels by adjusting the input level control on the center-channel power amplifier.

Passive high-pass filter (Fig. 6)

- Shield the components of the filter to avoid stray pickup.

Cutoff frequencies

Low-pass filter (Fig. 4 and 5)...190 Hz
 At higher frequencies, response falls off at the rate of 12 dB per octave.
 High-pass filter (Fig. 6)...150 Hz
 At lower frequencies, response falls off at the rate of 6 dB per octave.

Using the SONY TA-4300

The SONY 3-Channel Dividing Stereo preamplifier can be used as a low-pass filter. In this case connect the CENTER CHANNEL OUTPUT of the TA-2000 to the LEFT or RIGHT input of the TA-4300 and connect the associated low frequency output of the TA-4300 to the center channel power amplifier. Set the low-crossover frequency of the TA-4300 to 150 or 250 Hz.

To Fill in the 'Hole in the Middle'

If the distance between both channel speakers is large, the spatial feeling of the stereophonic sound may be degraded with so-called 'hole in the middle' effect. The supplemented monophonic signal (full range) at the CENTER CHANNEL OUTPUT will be helpful to fill this hole between the speakers; connect a monophonic power amplifier and a full range speaker.

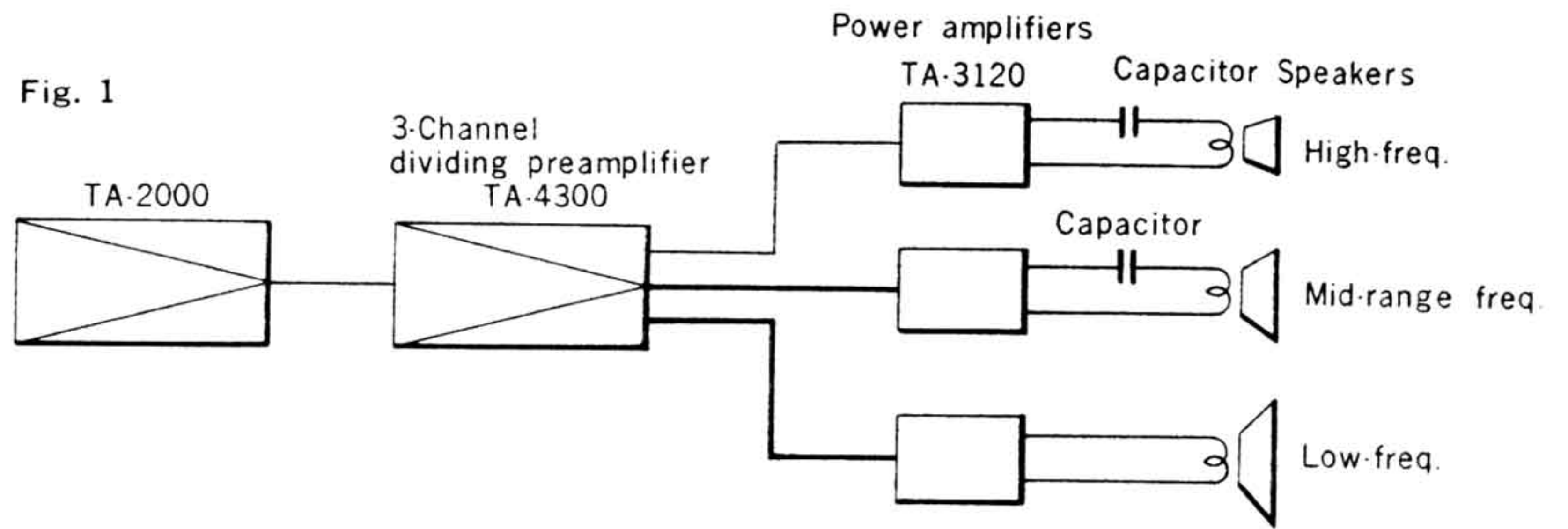


Fig. 1

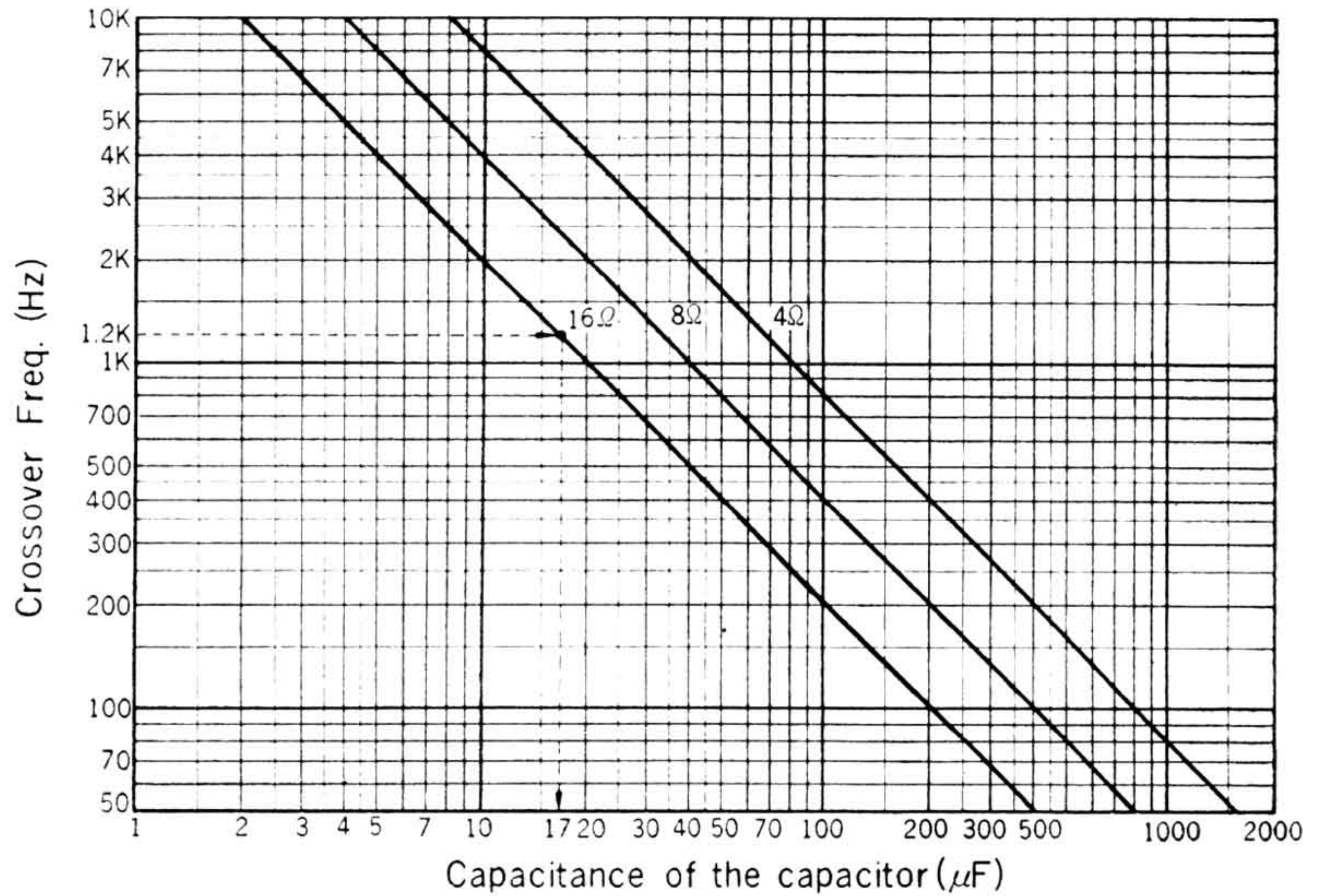


Fig. 2

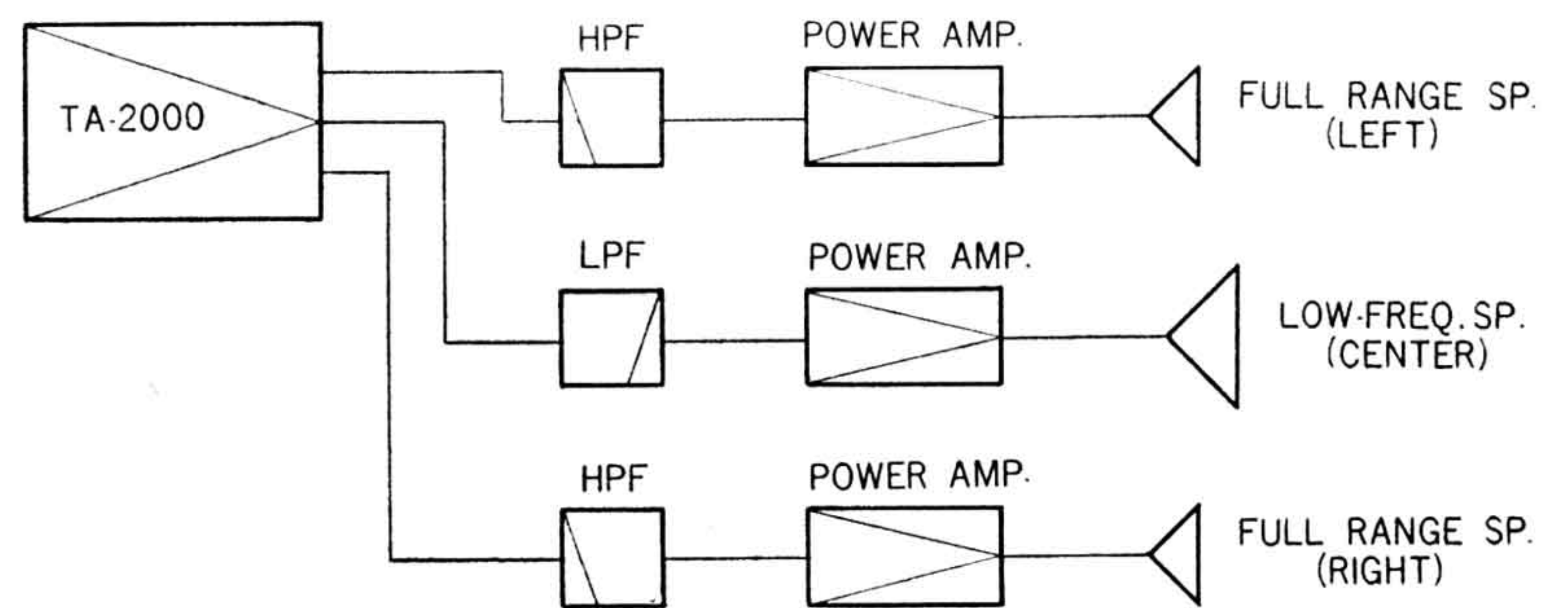


Fig. 3

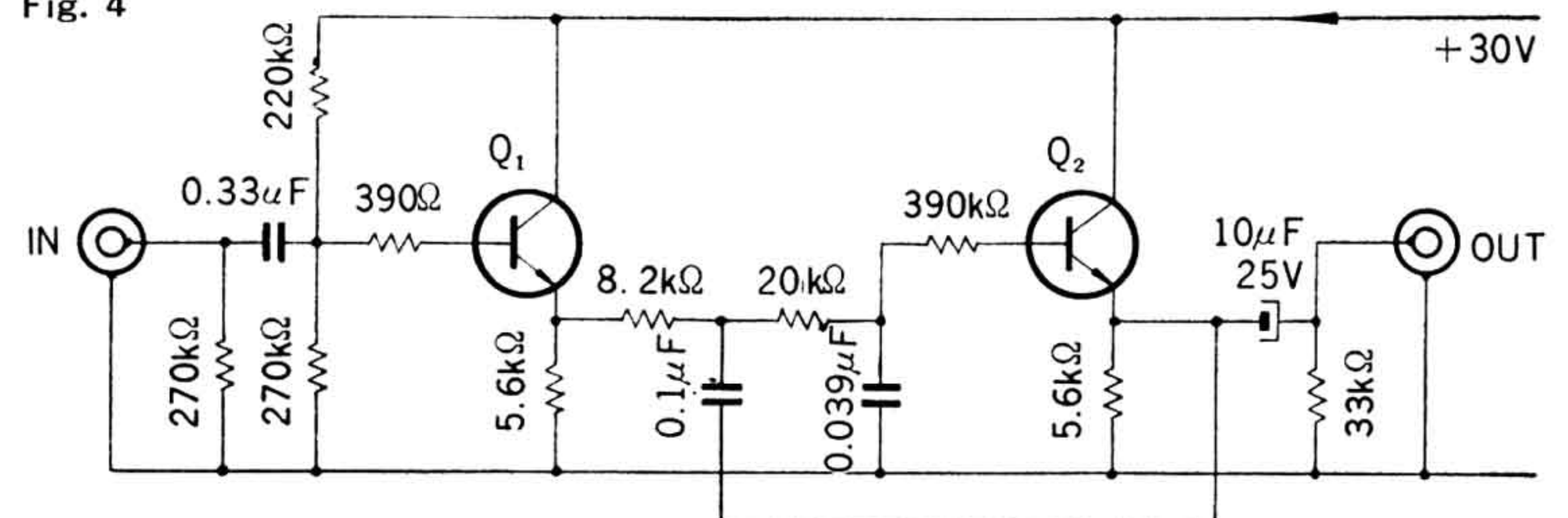


Fig. 4

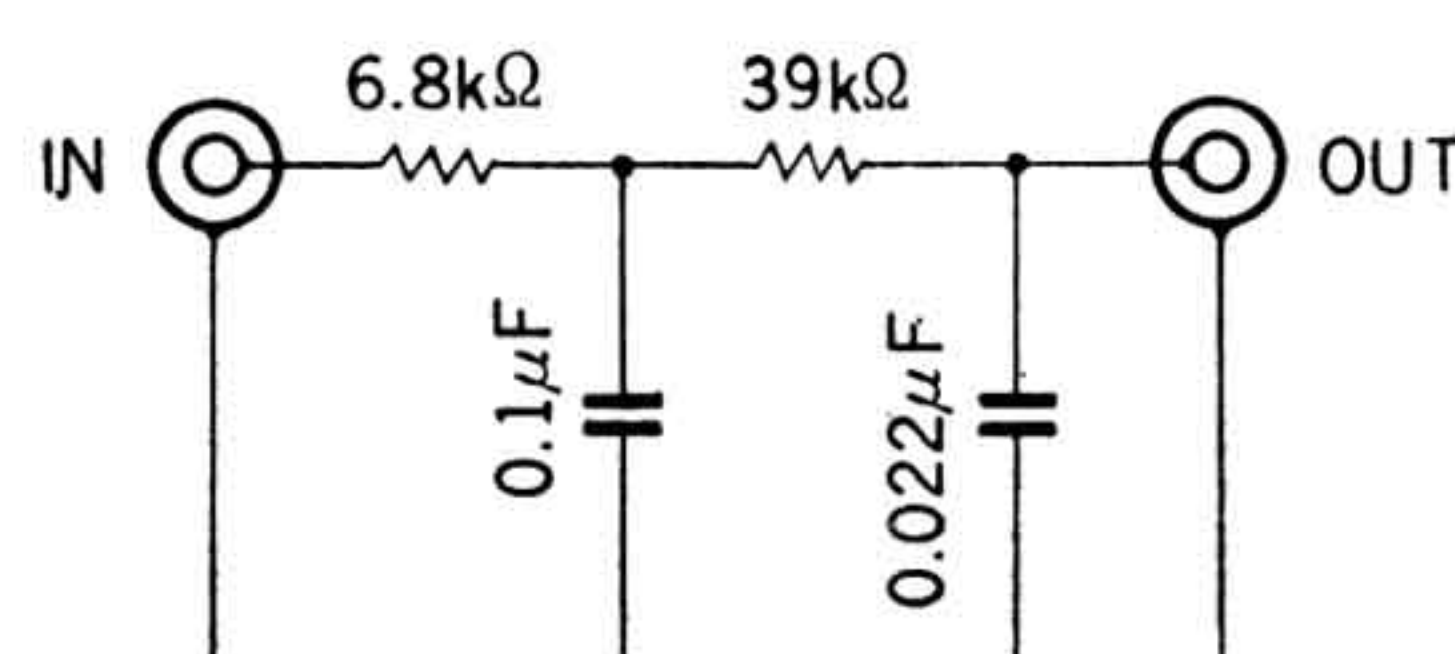


Fig. 5

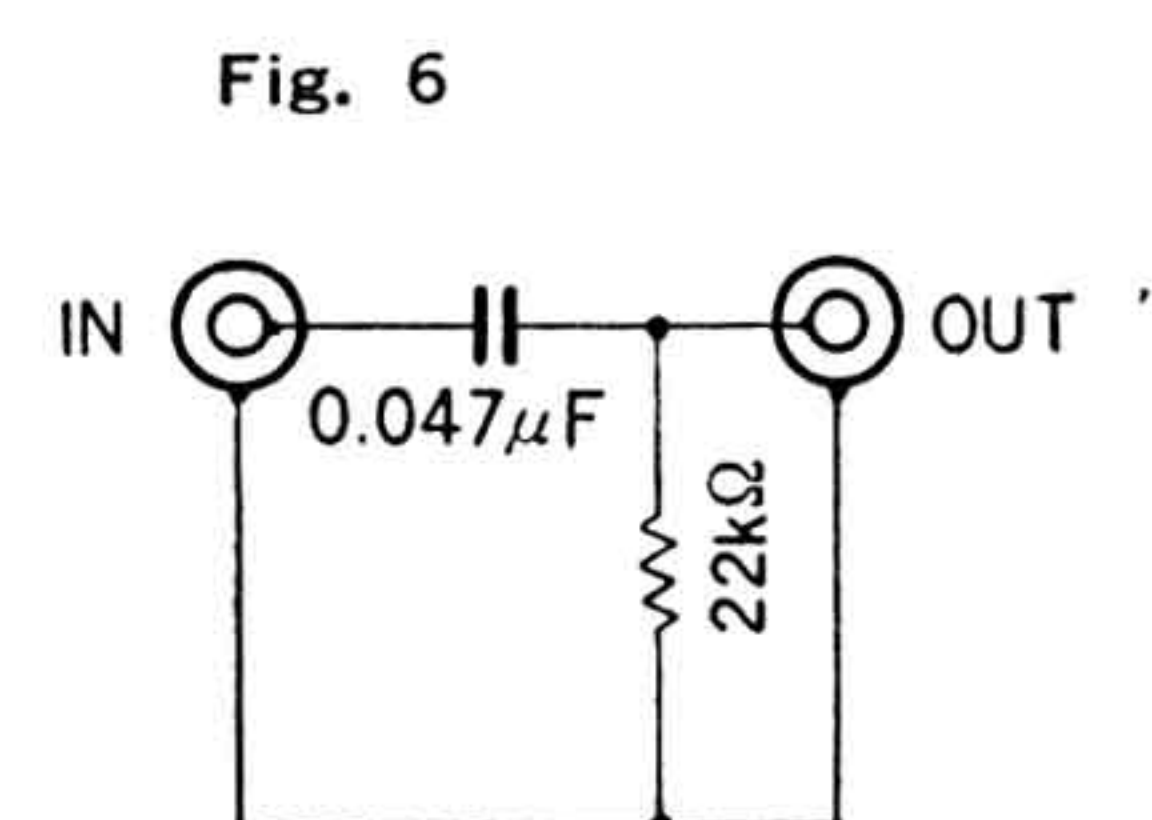


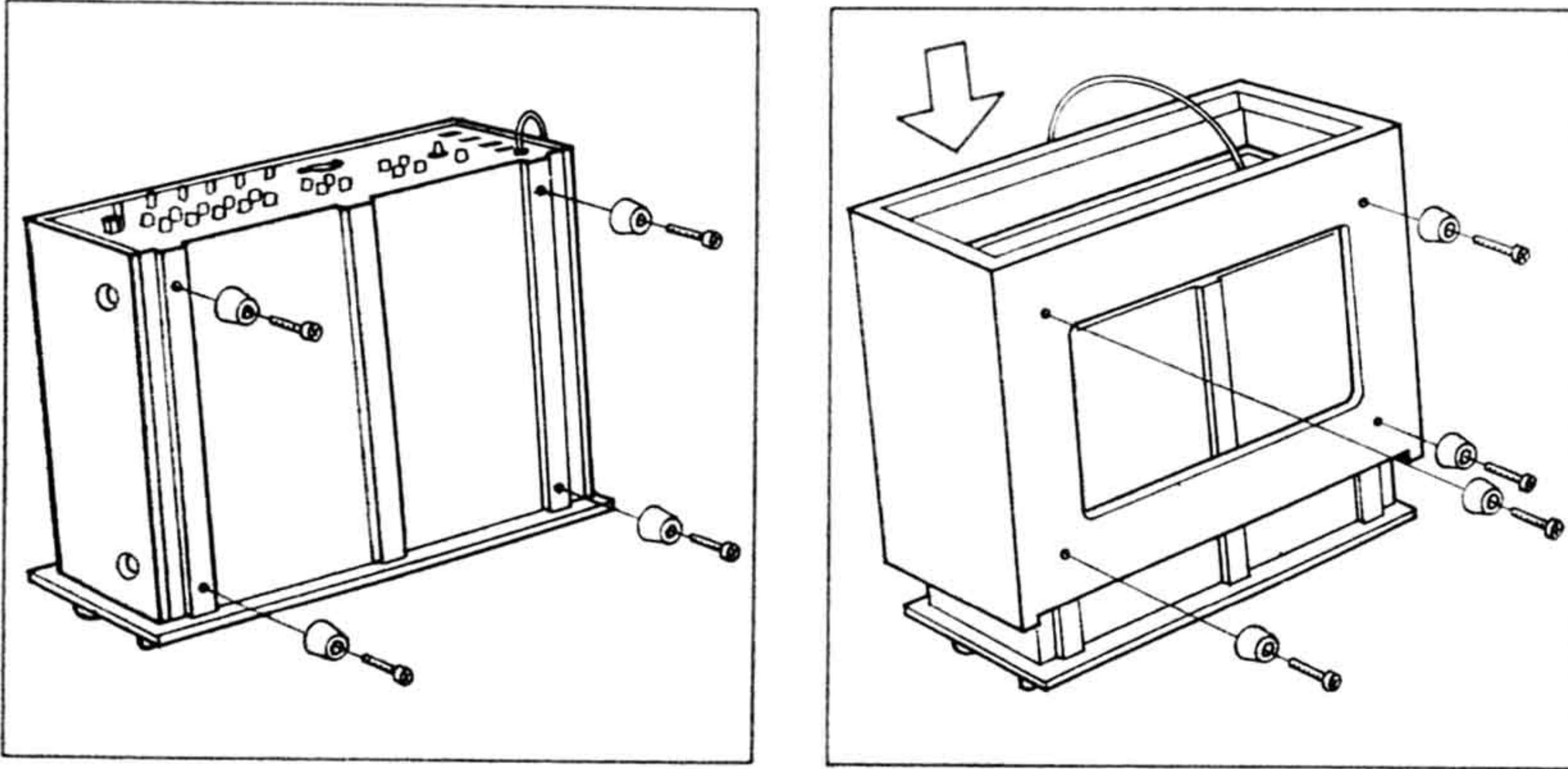
Fig. 6

CUSTOM MOUNTING

The complete line of SONY Stereo High Fidelity Components are styled with the same simple but elegant lines so that complete systems can be assembled with a truly unitized appearance. This preamplifier and the SONY FM Stereo Tuner are the same size, and both fit into a handsome walnut cabinet Model TAC-1, that is available as an optional accessory.

To install the TA-2000 in the TAC-1 case

1. Remove the four rubber feet from the bottom of the TA-2000 and slide the TA-2000 into the cabinet.
2. Fasten the TA-2000 chassis in place with the four long screws supplied with the TAC-1. The screws pass through the rubber feet, the bottom of the TAC-1 and into the TA-2000 as shown below.



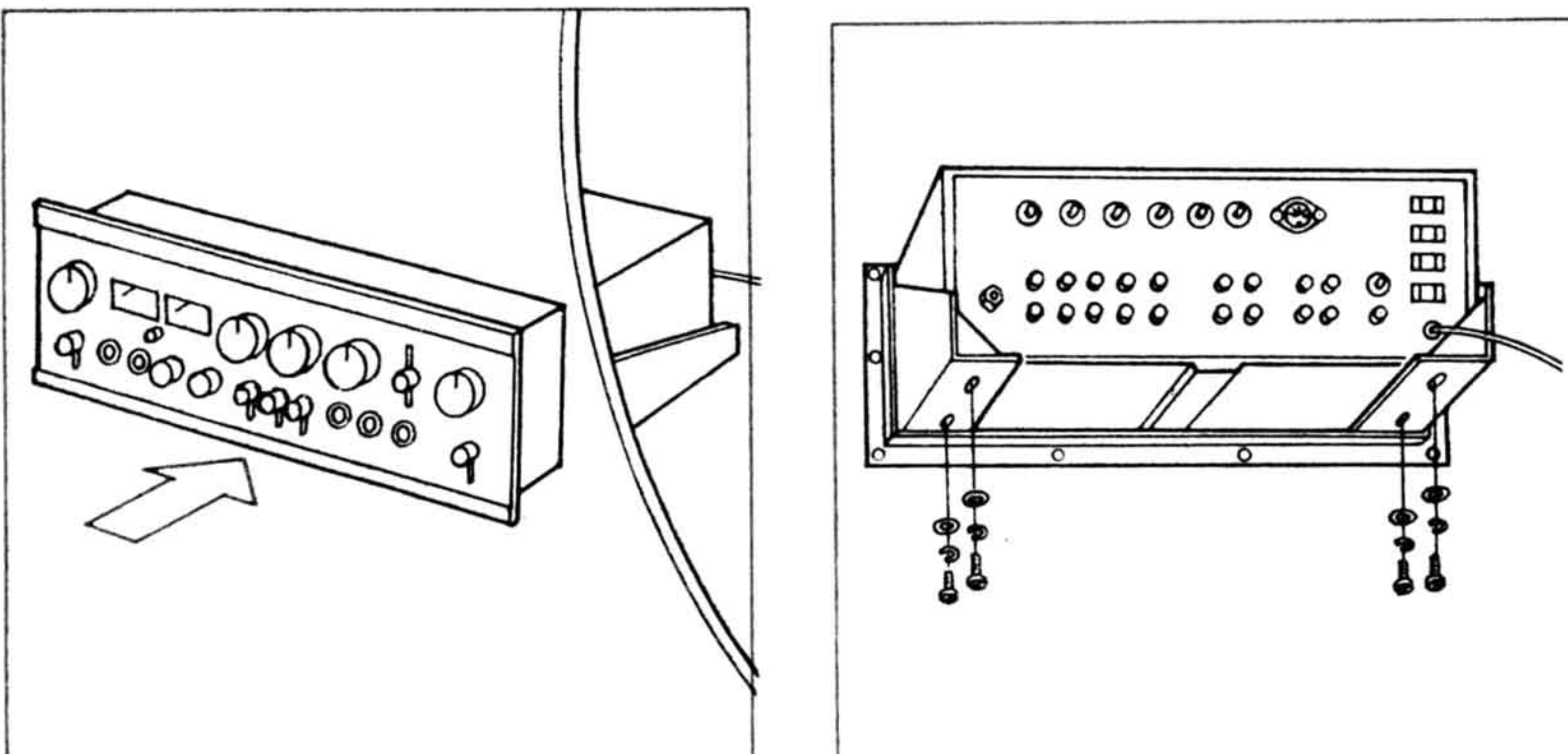
Panel or Cabinet Mounts

The SONY Mounting Bracket Model MB-5 is used to mount the TA-2000 into a panel or cabinet. The mounting bracket is available as an optional accessory.

1. Cut a rectangular hole in the panel to fit the opening on the front frame of the MB-5.
2. Assemble the bracket and fasten it to the back of the panel with the wooden screws supplied with the MB-5. Also install the flat head screws into the lip at the top of the frame opening.
3. Remove the four rubber feet from the bottom of the amplifier and slide the chassis into the bracket.
4. Fasten the amplifier to the bracket with the screws and washers (supplied with the MB-5), as shown below.

NOTE :

Take reasonable care in the installation so that the TA-2000 is protected from components which generate heat, such as power amplifier or vacuum tube components.



TECHNICAL DESCRIPTIONS

LOWEST POSSIBLE DISTORTION

Output signals are largely affected by the presence of IM distortion*¹ and harmonic distortion*² in the amplifier system. Generally, the percentage of harmonic distortion is used in judging the quality of the amplifier. However, the factor that gives greater annoyance to listeners is IM distortion. IM distortion develops as follows.

When two pure tones pass through a non linear amplifier system, one tone modulates the other. As a result, sum and difference frequencies are produced. These are the IM components that are most annoying in the reproduced sound.

The SONY TA-2000 is designed so that it has the lowest possible IM distortion. The silicon transistors employed in the TA-2000 have a high cutoff frequency and uniform gain characteristics through their operating range. Direct coupling is used; there are no transformers to introduce distortion or deterioration on frequency response. As the result, IM distortion has reached an unprecedented low. When an amplifier has low IM distortion, it follows that the amplifier will also have low harmonic distortion. The TA-2000 has a measured IM distortion of less than 0.05% when signals are applied at the TUNER, AUX-1, AUX-2 or TAPE INPUTS and output level is set to maximum. Intermodulation distortion is less than 0.07% when signals are applied to the low-level TAPE HEAD, PHONO-1, PHONO-2 (NORMAL) or MIC inputs and output is at the rated value.

*¹IM (Intermodulation) Distortion

If a pure 60 Hz sine wave and a pure 7,000 Hz sine wave are fed into an amplifier, pure 60 and 7,000 Hz signals plus a small amount of harmonic distortion are expected to come out. Along with these, however, some small amount of 7,060 Hz and 6,940 Hz signals are found. This presence of sum and difference tones is called IM (intermodulation) distortion and is expressed as a percentage of the total output power. IM distortion is not part of a normal overtone (harmonic) and produces greater annoyance to the human ear than harmonic distortion. Typical high quality amplifiers have 1% to 5% IM distortion.

*²Harmonic Distortion

If a pure 100 Hz sine wave is fed into an amplifier, a pure 100 Hz signal is expected at the output. However, along with the 100 Hz wave, small amounts of 200, 300, 400, 500, etc. Hz waves are found at the output terminals of the amplifier. Their presence is related to harmonic distortion. Harmonic distortion is expressed as the percentage of total output energy that appears at frequencies that are multiples of the pure input tone. Typical high-quality amplifiers have less than 1.0% total harmonic distortion in the range of 30 Hz~15 kHz.

IMPROVED TONE CONTROLS

An ordinary amplifier's tone controls do not change corner* frequencies but only boost and reduce signals above or below these fixed frequencies. Therefore, when adjusting tone, unnecessary highs or lows are simultaneously boosted. In the TA-2000, the 11-step BASS and TREBLE CONTROLS provide approximately 2 dB per step at 100 Hz and 10 kHz. Both boost and reduce actions are accomplished by changing corner frequencies.

A typical tone control circuit uses 8 capacitors for both bass and treble tone controls. In the TA-2000, 20 mica capacitors and 22 resistors are used for treble tone control circuit, and 20 'Mylar' capacitors including one with 0.33 μ F capacitance and 18 resistors are used for bass tone control circuit. These circuits provide very accurate bass and treble tone control performance. When setting the bass or treble control knobs to any position, the tolerance against the 'flat' position at 1 kHz remains within 1 dB. When switching the TONE CANCEL SWITCH between CANCEL and ON, while setting both tone controls to the FLAT position, the tolerance is less than 0.5 dB. These precisely designed tone controls allow tone adjustments as you desire, to meet the characteristics of the program source and the speakers, or the acoustics of your listening room.

*The frequencies at which the response is down 3 dB from maximum.

EXTENDED FREQUENCY RANGE

To amplify the audible range of frequencies with the lowest-possible distortion, a great amount of negative feedback should be applied. Further, frequency response should remain flat over a frequency range that is several times wider than the audible range.

The TA-2000 uses silicon transistors having high cutoff frequencies (f_T) to obtain extremely flat frequency response up to 30 kHz without the help of negative feedback. Then, 40 dB of negative feedback is applied to each circuit to establish a very flat frequency response in the range of 5 Hz to 100 kHz; the frequency response remains with +0 dB, -2 dB between 20 Hz~100 kHz.

HIGH LINEARITY

The signals provided by a high quality cartridge or any microphone should be faithfully amplified in the TA-2000. Cartridges now available on the market have outputs that vary from a low of 1 millivolt (5 cm/sec) to a high 15 millivolts (5 cm/sec). However, the cutting levels used today have become deeper; a disc of 30 cm/sec is available today. To meet such variations, the TA-2000 should accept signals from a low output cartridge (0.1 millivolts) to provide the rated output. Furthermore, when using high-output cartridges of 15 millivolts/5 cm/sec to play records of 30 cm/sec cutting depth, the TA-2000 must handle a 90 millivolt input. For a low level magnetic cartridge, the TA-2000 has a supplemented head amplifier unit (PHONO-2—LOW input) which has a maximum input sensitivity of 0.06 millivolts to provide rated output. The PHONO-1 and the PHONO-2 (NORMAL) inputs serve for high level cartridges. These inputs have a maximum sensitivity of 1.2 millivolts and accept a maximum input 100 millivolts without distortion.

IMPROVED SIGNAL-TO-NOISE RATIO

A high S/N (signal-to-noise) ratio usually accompanies low sensitivity. However, a S/N ratio of better than 70 dB is observed in the TA-2000 when 1.2 millivolts is applied to the PHONO-1 or -2 (NORMAL) inputs. Even if the TA-2000 receives an extremely low input (0.06 millivolts), the supplemented head amplifier unit produces a S/N ratio of 50 dB. This improved S/N ratio is the result of the newly-developed amplifier circuit coupling, SONY silicon transistors having low noise figures, high linearity in h_{FE} (current amplification ratio), high f_T (cutoff frequency), and specially selected low-noise capacitors and resistors.

WIDE DYNAMIC RANGE

Since the sound-level variation from *ppp* to *fff* of an ordinary orchestra extends to 70 dB, it is necessary to provide a reproducing amplifier with a dynamic range of greater than 70 dB.

The upper limit of dynamic range is restricted by linearity and the lower limit is limited to the noise level.

Having superior linearity and S/N ratio, the TA-2000 assures wide dynamic range of greater than 80 dB.

STABLE AND INSTANTANEOUS INPUT PROGRAM SELECTION

The use of the quick-access selector lever allows instantaneous and noiseless selection of either TUNER, PHONO-1 or any one of the five input programs; MIC, TAPE HEAD, PHONO-2, AUX-1, AUX-2 that are preset by the FUNCTION SELECTOR KNOB. TAPE INPUT is selected by the MONITOR switch.

FRONT PANEL CONNECTORS

AUX-2 and LINE OUT connectors are provided at the front panel to make convenient connections for occasionally used sound sources, tape recorders or power amplifiers. The HEADPHONE and LINE OUT connectors also allow you to enjoy programs with or without playing main sound system.

ADJUSTABLE INPUT SENSITIVITY

Normally connected inputs have semi-fixed level adjustment screws so that readjustments of the volume control are not required when switching the FUNCTION SELECTOR between different level input programs.

PRECISELY ADJUSTED VU METERS

Two VU meters on the TA-2000 are adjusted precisely and calibrated to read 0 VU at rated output. These meters are a great help in stereo-balance adjustments or output level checks. In addition, the linearity and flat frequency response of the meters allow you to make precise checks of the frequency response or channel separation of your cartridge or tape head.

TECHNICAL SPECIFICATIONS

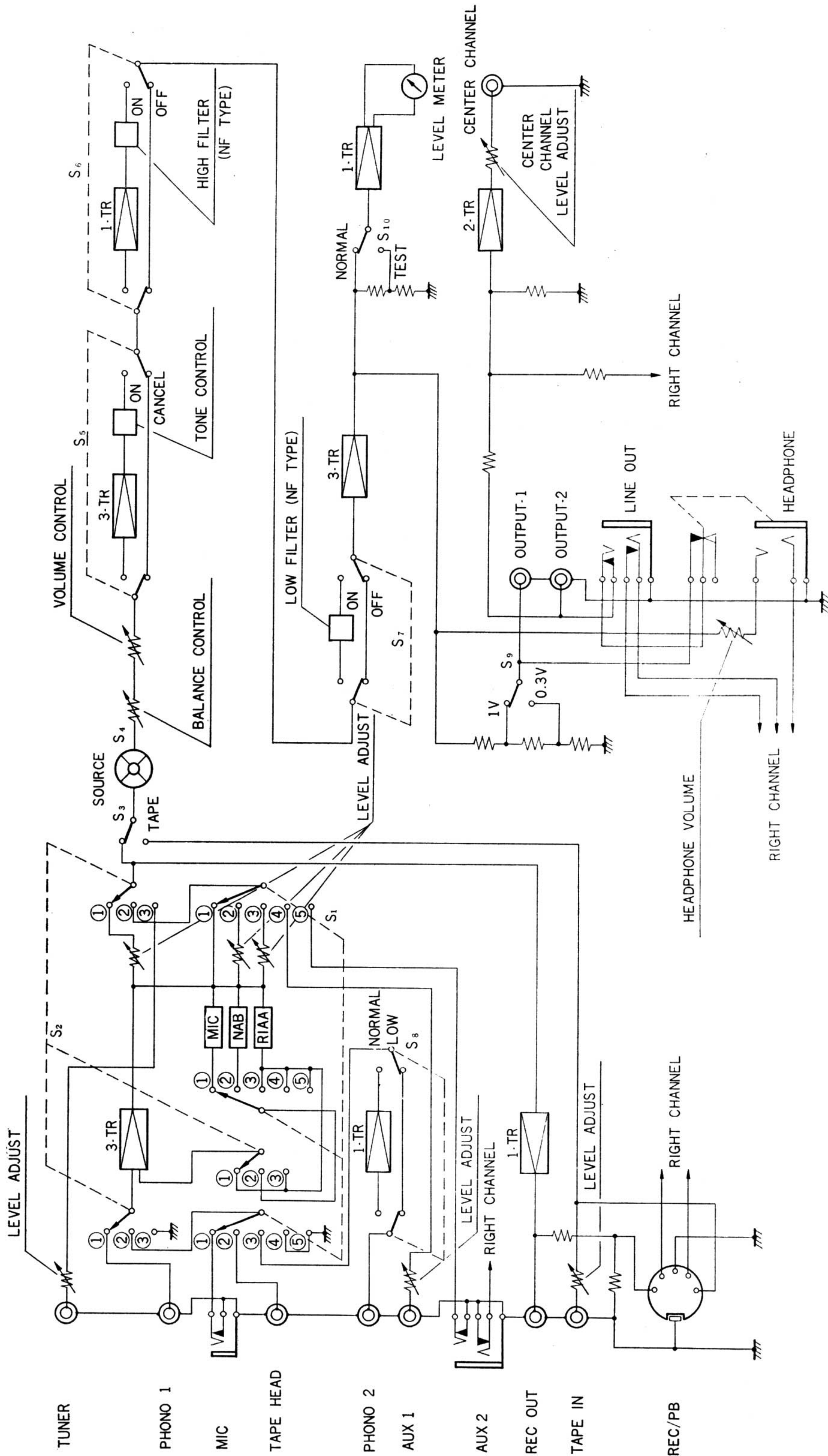
Circuit system :	All silicon transistor stereo preamplifier, 31 transistors, 9 diodes
Input sensitivity and impedance : (with rated output)	TAPE HEAD 1.2 millivolts maximum (adjustable by semi-fixed resistor) 500 K ohms PHONO-1 1.2 millivolts maximum (adjustable by semi-fixed resistor) 47 K ohms PHONO-2 (NORMAL) 1.2 millivolts maximum (adjustable by semi-fixed resistor), 47 K ohms (LOW) 0.06 millivolts maximum (adjustable by semi-fixed resistor), 200 ohms TUNER 120 millivolts (adjustable by semi-fixed resistor), 100 K ohms AUX-1 120 millivolts (adjustable by semi-fixed resistor), 100 K ohms AUX-2 120 millivolts, 100 K ohms TAPE IN 120 millivolts maximum (adjustable by semi-fixed resistor) 100 K ohms REC/PB (input) 120 millivolts, 100 K ohms MIC 1.2 millivolts, 500 K ohms
Maximum input capability : (undistorted)	PHONO-1, PHONO-2 (NORMAL), TAPE HEAD, MIC 100 millivolts (at 1 kHz) PHONO-2 (LOW) 5 millivolts (at 1 kHz)
Output voltage and impedance :	REC OUT 120 millivolts, 1.5 K ohms (maximum 10 volts) PREAMP OUT, LINE OUT (switchable by slide switch) 1 volt, 10 K ohms (maximum 2.5 volts) 0.3 volt, 4 K ohms (maximum 0.75 volt) CENTER OUT (adjustable by slide switch and semi-fixed resistor) 1.5 volt, 7.5 K ohms (maximum 5 volts) 0.45 volt, 7.5 K ohms (maximum 1.5 volts) HEADPHONE OUT (adjustable by HEADPHONE LEVEL CONTROL) 3 volts, 1.5 K ohms (maximum 10 volts) REC/PB (output) 120 millivolts, 80 K ohms (maximum 1 volt)
Voltage amplification :	TUNER, AUX-1, AUX-2, TAPE To PREAMP OUT, LINE OUT 18.5 dB (8.4 to 1) (with PREAMP OUT level adjust switch at 1 V position) 8 dB (2.5 to 1) (0.3 V position) To CENTER OUT 22 dB (12.6 to 1) (1 V position) 11.5 dB (3.8 to 1) (0.3 V position) To REC OUT 0 dB (1 to 1) To REC/PB -20 dB (1/10 to 1) TAPE HEAD, PHONO-1, PHONO-2 (NORMAL), MIC To PREAMP OUT, LINE OUT 58.5 dB (840 to 1) (1 V position) 48 dB (250 to 1) (0.3 V position) To CENTER OUT 62 dB (1260 to 1) (1 V position) 51.5 dB (380 to 1) (0.3 V position) To REC OUT 40 dB (100 to 1) To REC/PB 20 dB (10 to 1) PHONO-2 (LOW) To PREAMP OUT, LINE OUT 84.5 dB (16800 to 1) (1 V position) 74 dB (5000 to 1) (0.3 V position) To CENTER OUT 88 dB (25000 to 1) (1 V position) 77.5 dB (7500 to 1) (0.3 V position) To REC OUT 66 dB (2000 to 1) To REC/PB 46 dB (200 to 1)
Harmonic distortion : (at 1 kHz)	TUNER, AUX-1, AUX-2, TAPE IN Less than 0.03% at rated output TAPE HEAD, PHONO-1, PHONO-2 (NORMAL), MIC Less than 0.05% at rated output (measured with an input signal 38 dB higher than maximum sensitivity applied to the input; TAPE HEAD, PHONO-1, PHONO-2 (NORMAL), MIC)

IM distortion :	(60 Hz : 7 kHz = 4 : 1);	TUNER, AUX-1, AUX-2, TAPE IN Less than 0.05% at rated output TAPE HEAD, PHONO-1, PHONO-2 (NORMAL), MIC Less than 0.07% at rated output (measured with an input signal of 38 dB higher than maximum sensitivity applied to the input; TAPE HEAD, PHONO-1, PHONO-2 (NORMAL), MIC)
Frequency response :		TUNER, AUX-1, AUX-2, TAPE IN 20 Hz~100 kHz $\begin{matrix} +0 \text{ dB,} \\ -2 \text{ dB} \end{matrix}$ PHONO-1, PHONO-2 RIAA equalization curve, tolerance within ± 0.5 dB TAPE HEAD NAB equalization curve, tolerance within ± 0.5 dB (adjustable $\begin{matrix} +4 \text{ dB,} \\ -2 \text{ dB} \end{matrix}$ at 10 kHz, by semi-fixed resistor) MIC 20 Hz~30 kHz $\begin{matrix} +0 \text{ dB} \\ -2 \end{matrix}$
S/N ratio :	(short-circuited)	TUNER, AUX-1, AUX-2, TAPE IN (input level 200 millivolts) more than 90 dB (weighting network 'A') PHONO-1, PHONO-2 (NORMAL) (input level 3 millivolts) more than 70 dB (weighting network 'A') PHONO-2 (LOW) (input level 0.1 millivolt) more than 50 dB (weighting network 'B') TAPE HEAD (input level 1.5 millivolts) more than 65 dB (weighting network 'B') MIC (input level 1.5 millivolts) more than 65 dB (weighting network 'B')
		The test conditions are based on IHF standards; input level adjustment screws at maximum position, rated output, tone cancel switch set to the CANCEL position, 50 Hz and 9 kHz filters set to the OFF positions, balance control set to the center position.
Tone controls :		BASS 100 Hz ± 10 dB (11 steps by 2 dB each) TREBLE 10 kHz ± 10 dB (11 steps by 2 dB each)
Filters :		HIGH FILTER 12 dB/oct above 9 kHz LOW FILTER 12 dB/oct below 50 Hz
AC outlets :		Switched.....3 Unswitched1 Total 500 watts maximum
Power requirements :		AC 100, 117, 220 or 240 volts (adjustable) 50 Hz/60 Hz
Power consumption :		10 watts
Dimensions :		15-3/4 (w) \times 5-3/4 (h) \times 12-1/4 (d)"
Weight :		19 lb 14 oz
Accessories :	(supplied)	Shorting plug 6 Phono plug 4 Connecting cord RK-56 2 RK-81 2 (with binaural plug) Polishing cloth 1

Design and specifications subject to change without notice.

Hz (hertz): cycles per second

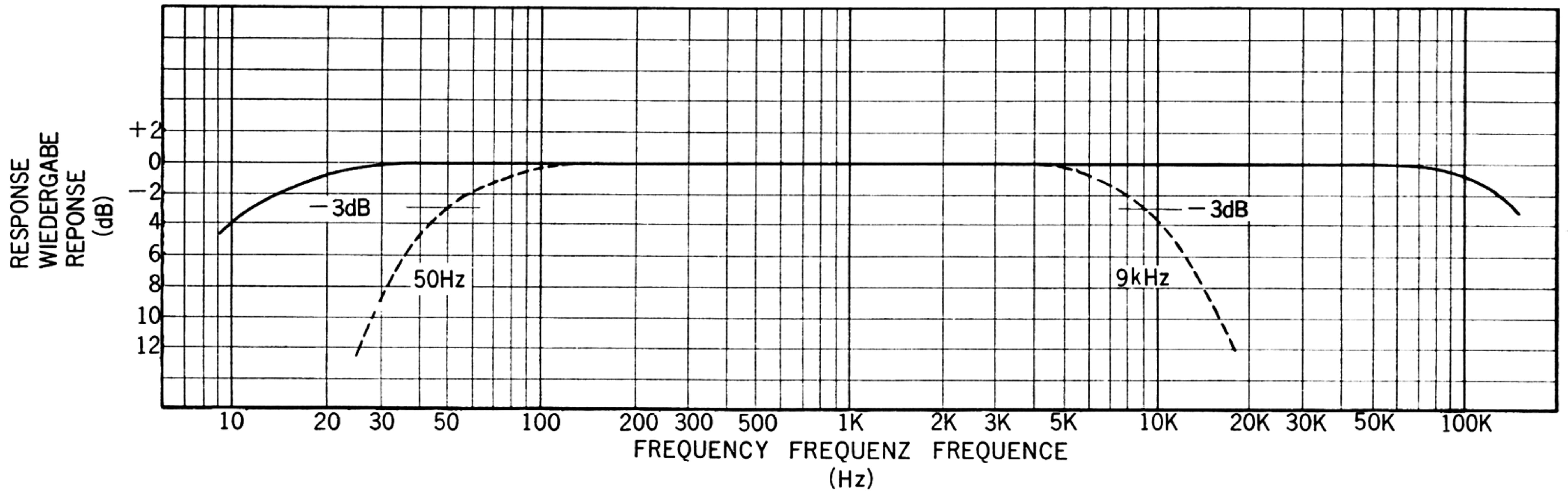
BLOCK DIAGRAM



- S₁:** FUNCTION SELECTOR KNOB
 ① MIC
 ② TAPE HEAD
 ③ PHONO-2
 ④ AUX-1
 ⑤ AUX-2
- S₂:** FUNCTION SELECTOR LEVER
 ① PHONO-1
 ② Preset position of FUNCTION SELECTOR KNOB
 ③ TUNER
- S₃:** MONITOR SWITCH
- S₄:** MODE SELECTOR
S₅: TONE CANCEL SWITCH
S₆: 9 kHz HIGH FILTER SWITCH
S₇: 50 Hz LOW FILTER SWITCH
- S₈:** PHONO-2 LEVEL SWITCH
S₉: PREAMP OUT LEVEL SWITCH
S₁₀: LEVEL METER SWITCH

OPERATING CURVES/ TECHNISCHE DIAGRAMME/ COURBES DE FONCTIONNEMENT

FREQUENCY RESPONSE CURVES / FREQUENZUMFANG / COURBES DE REPONSE DE FREQUENCE



INPUT SIGNAL: TUNER INPUT
OUTPUT SIGNAL: PREAMP OUT
(LEVEL SWITCH 1V POSITION)

— TONE CANCEL SWITCH CANCEL position,
LOW FILTER OFF position, HIGH FILTER
OFF position
- - - TONE CANCEL SWITCH CANCEL position,
LOW FILTER ON position HIGH FILTER
ON position

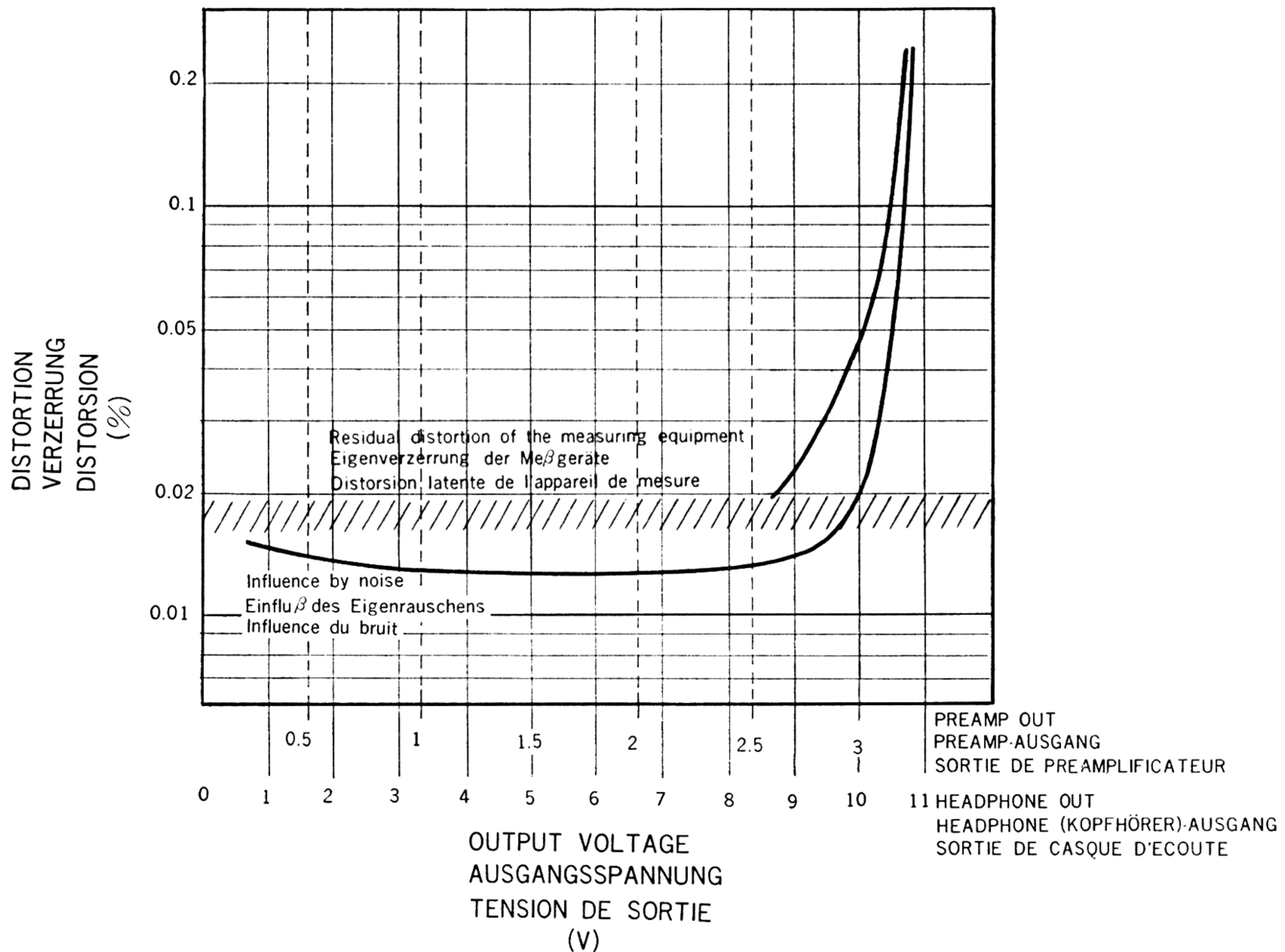
EINGANGSSIGNAL: TUNER-EINGANG
AUSGANGSSIGNAL: VORVERST-AUSGANG
(PEGELSCHALTER STELLUNG 1V)

— TONBLENDENABSCHALTUNG STELLUNG
CANCEL, RUMPELFILTER STELLUNG OFF,
RAUSCHFILTER STELLUNG OFF
- - - TONBLENDENABSCHALTUNG STELLUNG
CANCEL, RUMPELFILTER STELLUNG ON
(EIN), RAUSCHFILTER STELLUNG ON
(EIN)

SIGNAL D'ENTREE: ENTREE DE TUNER (radio)
SIGNAL DE SORTIE: SORTIE DE PREAMPLI-
FICATEUR (Commutateur de niveau à la
position 1V)

— COMMUTATEUR DE TONALITE NEUTRE à
la position CANCEL (neutre)
FILTRE DE PASSAGE BASSES FREQUEN-
CES à la position OFF (arrêt)
FILTRE DE PASSAGE HAUTES FREQUEN-
CES à la position OFF (arrêt)
- - - COMMUTATEUR DE TONALITE NEUTRE à
la position CANCEL (neutre)
FILTRE DE PASSAGE BASSES FREQUEN-
CES à la position ON (marche)
FILTRE DE PASSAGE HAUTES FREQUEN-
CES à la position ON (marche)

DISTORTION CURVES / VERZERRUNG / COURBES DE DISTORSION

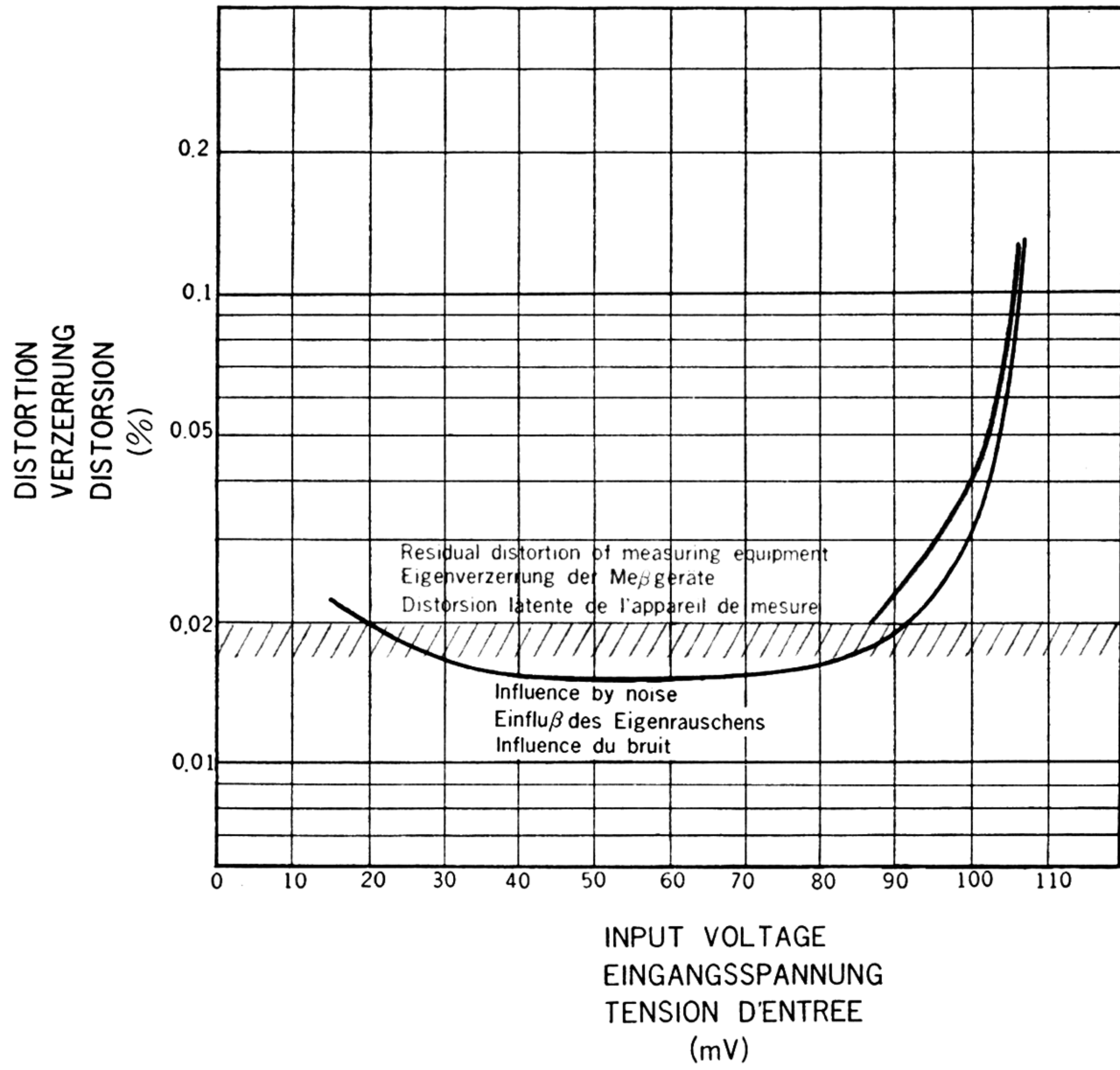


INPUT SIGNAL: TUNER INPUT (VARIA-
BLE)
OUTPUT SIGNAL: PREAMP OUT &
HEADPHONE OUT
MEASURED AT MAXIMUM POSITION ON
VOLUME CONTROL
— HARMONIC DISTORTION 20 Hz~20 kHz
- - - IM DISTORTION
60 Hz : 7 kHz = 4 : 1

EINGANGSSIGNAL: TUNER-EINGANG
(VARIABLE)
AUSGANGSSIGNAL: VORVERST-AUSGANG
& KOPFHÖRERAUSGANG
GEMESSEN MIT LAUTSTÄRKEREGLER IN
MAXIMALSTELLUNG
— KLIRRFAKTOR 20 Hz~20 kHz
- - - IM-VERZERRUNG
60 Hz : 7 kHz = 4 : 1

SIGNAL D'ENTREE: ENTREE DE TUNER
(variable)
SIGNAL DE SORTIE: SORTIE DE PRE-
AMPLIFICATEUR & SORTIE DE CASQUE
MESUREE A LA POSITION MAXIMUM DU
REGLAGE DE VOLUME DU SON
— DISTORSION HARMONIQUE 20 Hz~20 kHz
- - - DISTORSION IM (intramodulation)
60 Hz : 7 kHz = 4 : 1

**PHONO INPUTS MAXIMUM INPUT CAPABILITY
 MAXIMALE AUFNAHMEFÄHIGKEIT DER PLATTENSPIELEREINGÄNGE
 CAPACITE D'ENTREE MAXIMUM DES ENTRES DE PHONO**

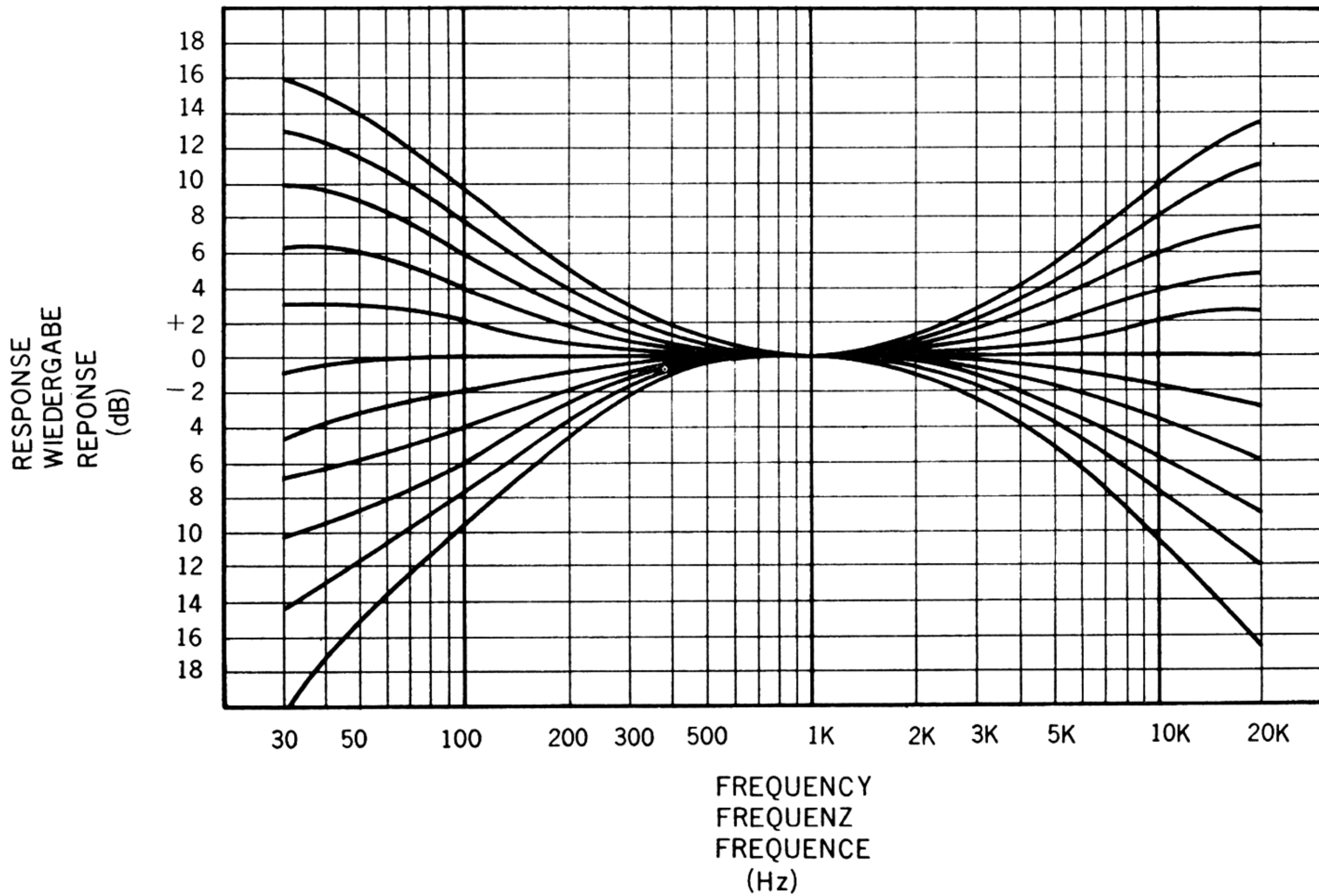


MEASURED WHEN VOLUME CONTROL IS ADJUSTED SO THAT THE CONSTANT RATED OUTPUT IS OBTAINED.
 — HARMONIC DISTORTION 1 kHz
 - - - IM DISTORTION
 60 Hz : 7 kHz = 4 : 1

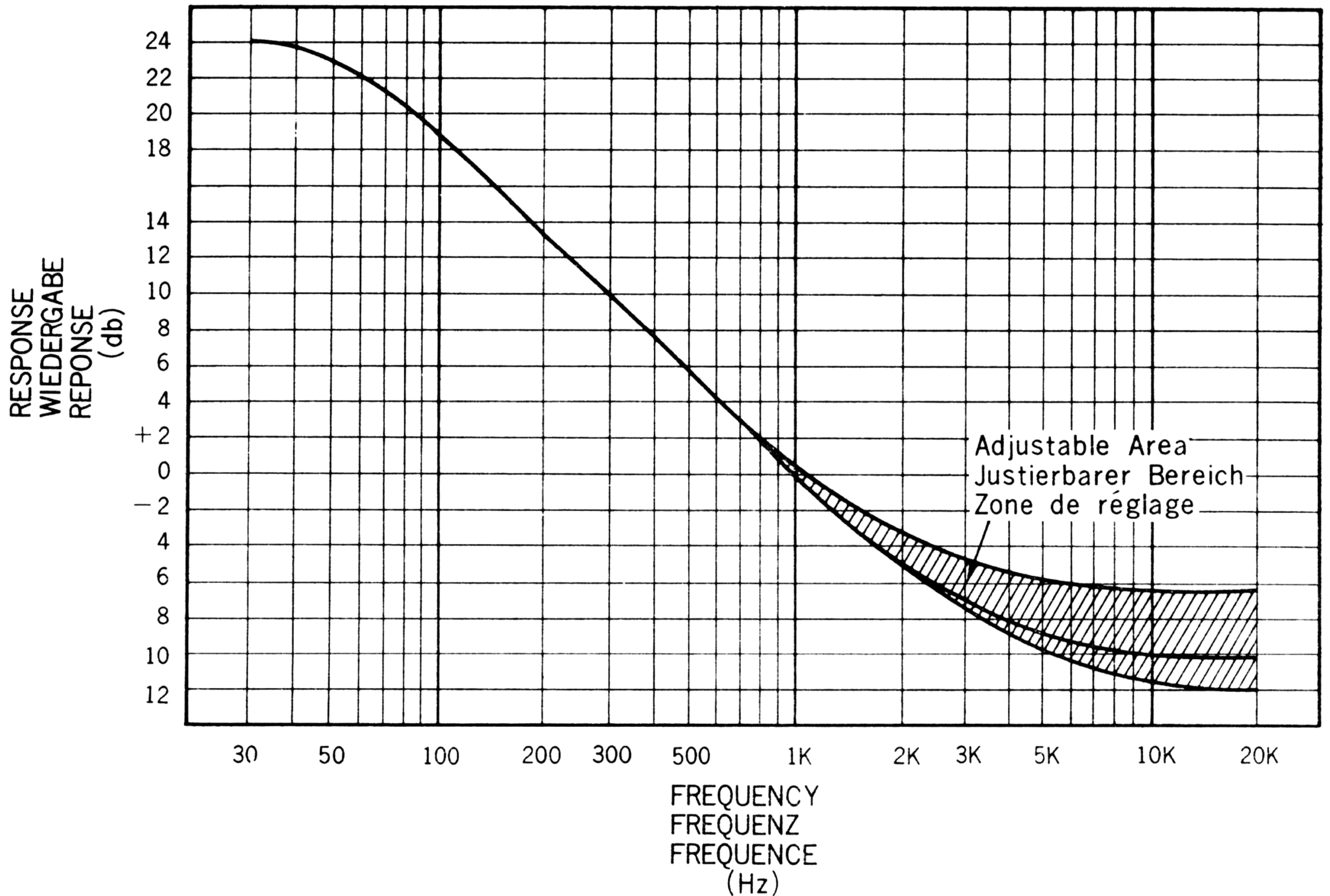
GEMESSEN MIT LAUTSTÄRKEREGLER IN DER STELLUNG, DASS NENNAUSGANGS LEISTUNG ERZIELT WIRD.
 — KLIRRFAKTOR 1 kHz
 - - - IM-VERZERRUNG
 60 Hz : 7 kHz = 4 : 1

MESUREE LORSQUE LE VOLUME DU SON EST REGLE DE TELLE FAÇON QU'IL Y AIT UN TAUX DE DEBIT CONSTANT.
 — DISTORSION HARMONIQUE 1 kHz
 - - - DISTORSION IM (intramodulation)
 60 Hz : 7 kHz = 4 : 1

**TONE CONTROL FREQUENCY RESPONSE
 WIRKUNG DER TONBLENDEN
 REPONSE DE FREQUENCE DE REGLAGE DE TONALITE**



TAPE HEAD EQUALIZER CURVES
ABGLEICHKURVEN FÜR TONBANDKOPF
COURBES D'EGALISATION DE TETE DE MAGNETOPHONE

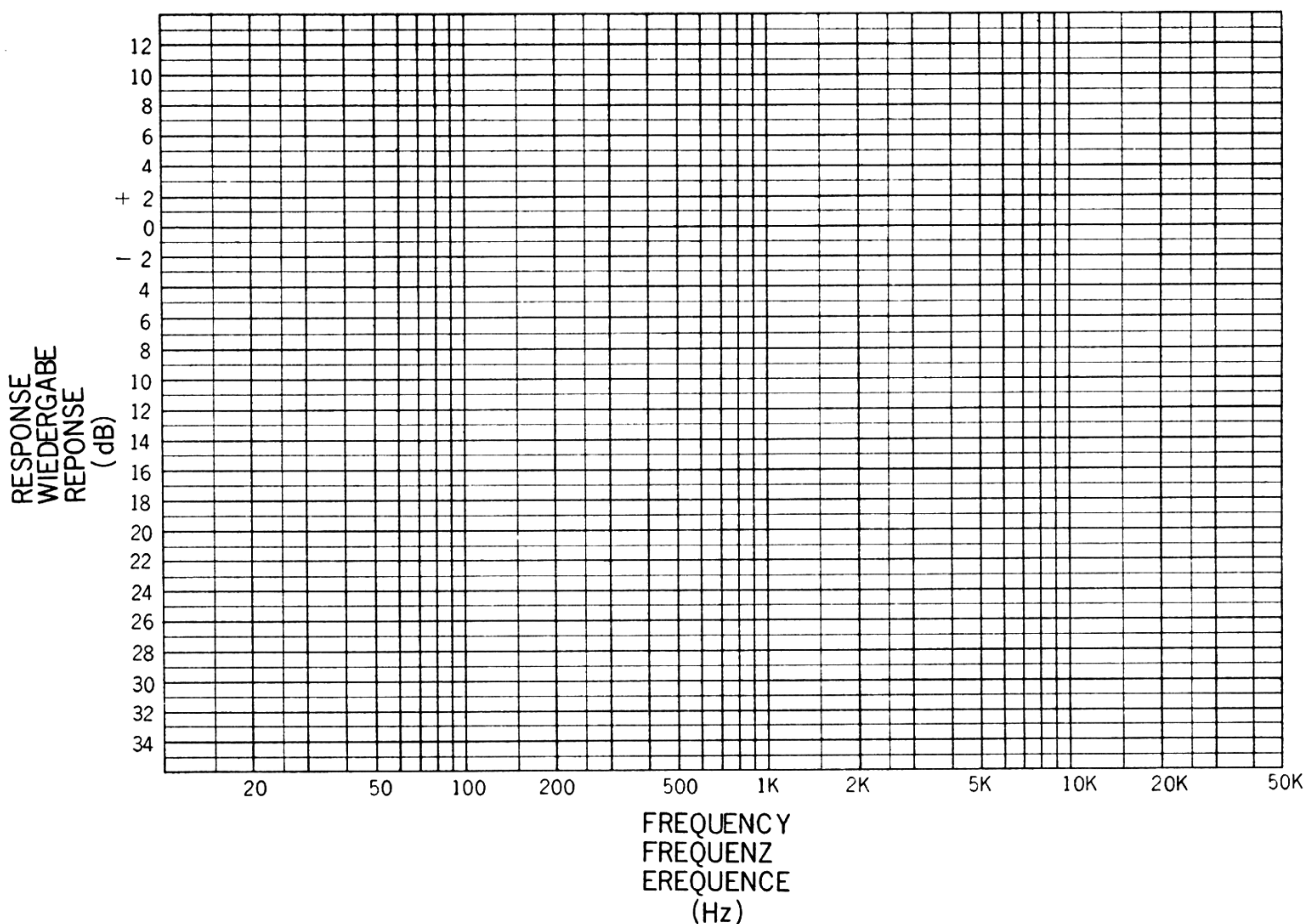
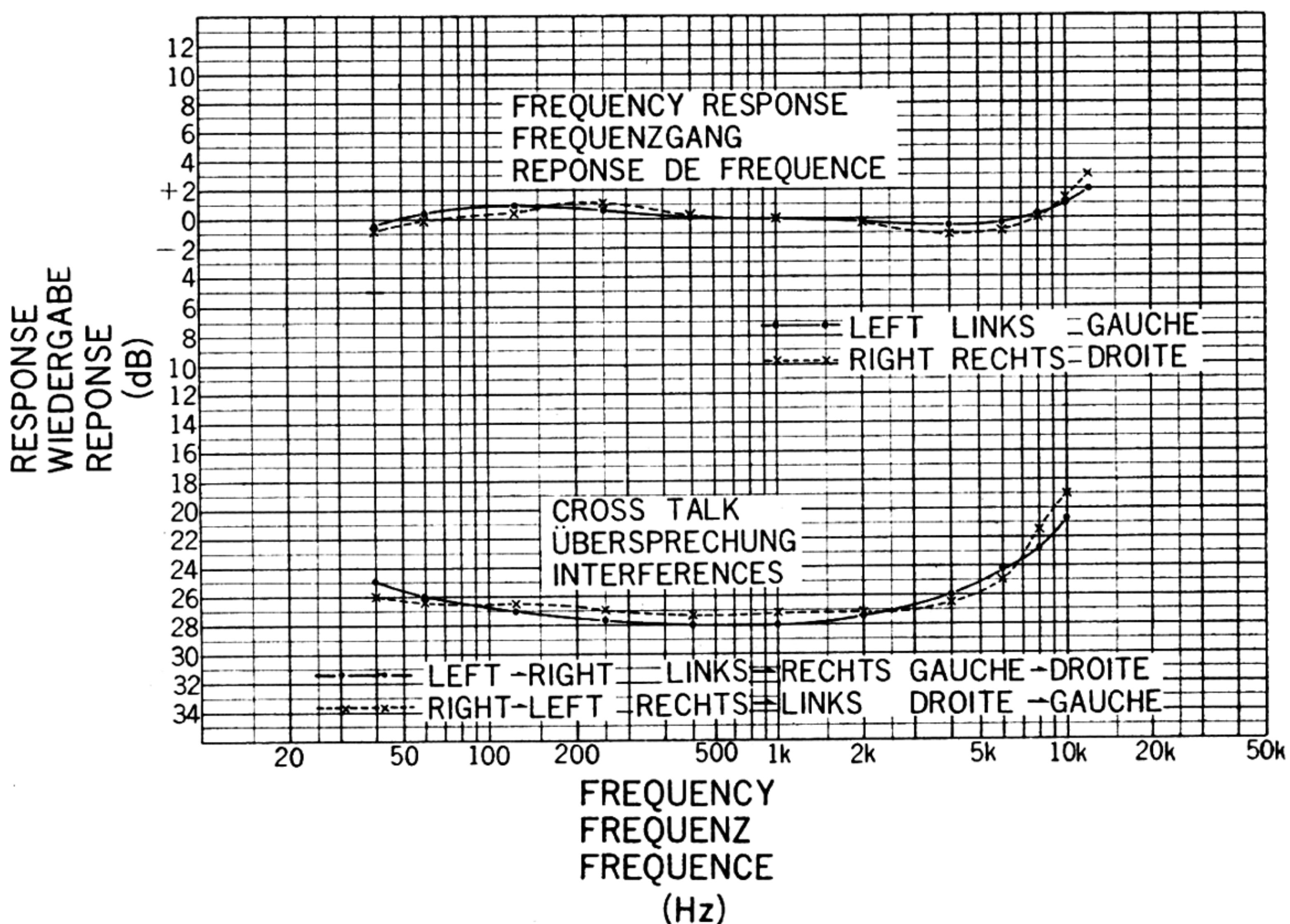


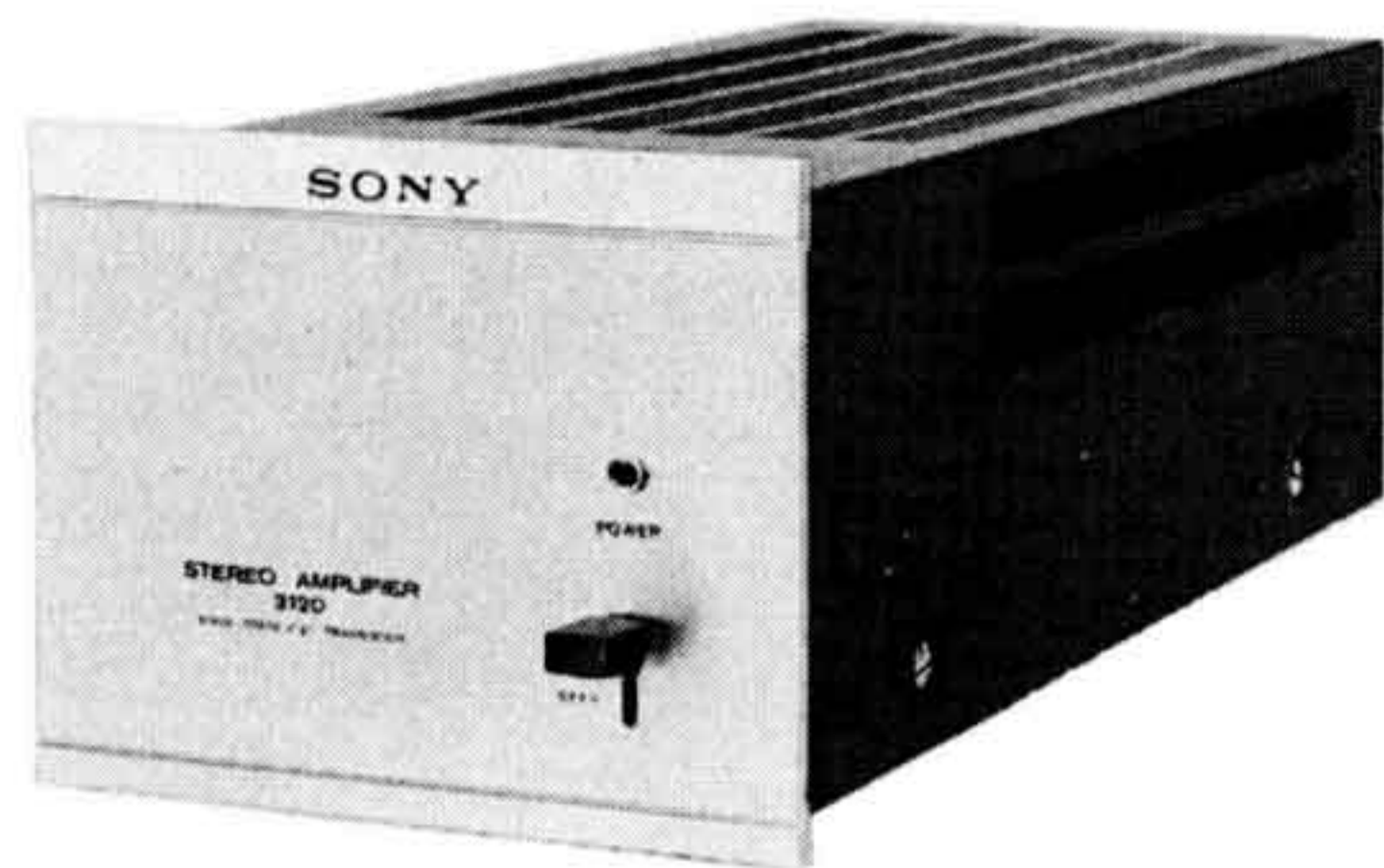
TEST CURVES / PRÜFUNGSDIAGRAMME / COURBES D'ESSAI

Use the following graph papers for measuring frequency response, channel separation of your cartridge, and for frequency response of the tape head.

Verwenden Sie die folgenden Prüfungsdiagramme zur Messung des Frequenzgangs und der Kanaltrennung Ihres Tonabnehmers, und zum Frequenzgang des Tonbandkopfes.

Utiliser du papier quadrillé pour graphique suivant pour mesurer la réponse de fréquence et la séparation des canaux de votre cartouche ainsi que la réponse de fréquence de la tête de magnéto-
phone.





TA-3120

Stereo Power Amplifier TA-3120

All silicon transistor stereo power amplifier model TA-3120 has the same characteristics of power amplifier stage of the TA-1120 so that it can be combined with the TA-1120 for multi-channel amplification system.

Circuit system: Quasi-complementary symmetry circuit, 21 transistors, 21 diodes

Power outputs: 120 watts both channels (IHF dynamic power, 8 ohms)

50 watts per channel (rated output, 8 ohms)

Harmonic distortion: Less than 0.05% at rated output (at 1 kHz)

Less than 0.1% at rated output (at 20~15 kHz)

IM distortion: Less than 0.2% at rated output (60 Hz : 7 kHz = 4 : 1)

Frequency response: 5 kHz~200 kHz ± 0 dB at rated output

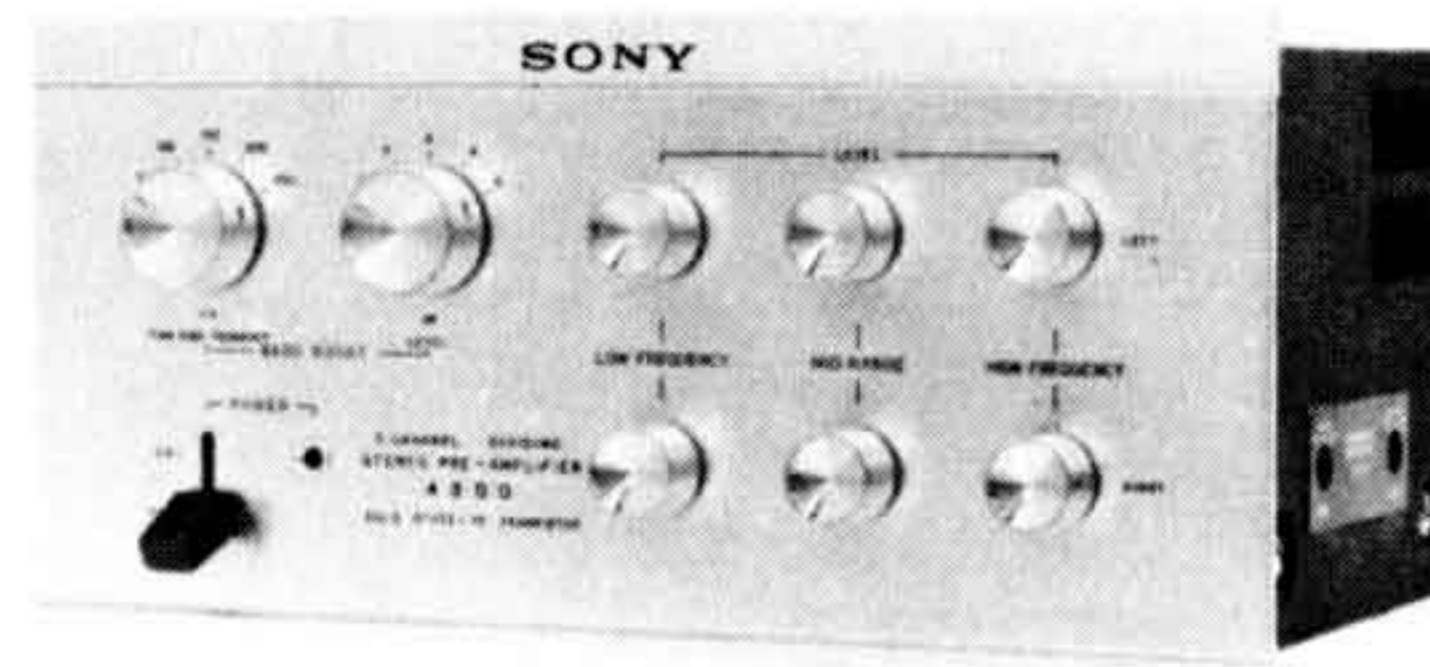
Sensitivity: 1 volt at 50 watt output

Input impedance: Higher than 100 K ohms

S/N ratio: 110 dB (IHF, closed circuit)

Damping factor: Better than 180 (8 ohms)

Dimensions: 180(w) x 145(h) x 455(d) mm (7-1/8 x 5-3/4 x 17-1/2")



TA-4300

Stereo-Ausgangsverstärker TA-3120

Dieser Stereo-Ausgangsverstärker ist ganz mit Siliziumtransistoren bestückt und besitzt die gleichen Daten wie der Ausgangsverstärker des TA-1120, so daß er mit dem TA-1120, zu einer mehrkanaligen Verstärkeranlage kombiniert werden kann.

Schaltung: Quasi komplementäre symmetrische Schaltung

21 Transistoren, 21 Dioden

Ausgangsleistung: Insgesamt 120 Watt IHF-Musikleistung bei 8 Ohm

50 Watt pro Kanal Nennleistung bei 8 Ohm

Harmonische Verzerrung: Unter 0,05 bei Nennausgangsleistung (bei 1 kHz)

Unter 0,1% bei Nennausgangsleistung (bei 20~15 kHz)

IM-Verzerrung (60 Hz : 7 kHz = 4 : 1) Unter 0,2% bei Nennausgangsleistung

Frequenzbereich: 5 Hz~200 kHz ± 0 dB -2 dB bei Nennausgangsleistung.

Sensitivität: 1 Volt bei 50 Watt Ausgang

Eingangsimpedanz: Über 100 K-Ohm

Signal-Rausch-Verhältnis: 110 dB (nach IHF, geschlossener Kreis)

Dämpfungsfaktor: Über 180 (bei 8 Ohm)

Abmessungen:

180 mm (breit) x 145 mm (hoch) x 455 mm (tief)



PS-2000

Amplificateur de puissance stéréo TA-3120

L'amplificateur de puissance stéréo modèle TA-3120, entièrement transistorisé (transistors au silicium) possède les mêmes caractéristiques que le stade d'amplification de puissance du TA-1120, et ainsi peut être combiné avec ce dernier pour un système d'amplification à canaux multiples.

Circuit: Symétrique quasi-complémentaire 21 transistors, 21 diodes

Puissance de sortie: 120 watts pour les deux canaux (puissance musicale IHF, 8 ohms)

50 watts par canal (débit fixé, 8 ohms)

Distorsion harmonique: Inférieure à 0,05% au débit fixé (à 1 kHz)

Inférieure à 0,1% au débit fixé (à 20~15 kHz)

Distorsion IM: Inférieure à 0,2% au débit fixé (60 Hz : 7 kHz = 4 : 1)

Réponse de fréquence: 5 kHz~200 kHz ± 0 dB au débit fixé

Sensibilité: 1 volt à sortie de 50 watts

Impédance d'entrée: Supérieure à 100 K ohms

Rapport Signal/Bruit: 110 dB (IHF, circuit fermé)

Facteur de pleurage: Plus de 180 (8 ohms)

Dimensions: 180 (large) x 145 (haut) x 455 (prof) mm

3-channel Dividing stereo Preamplifier TA-4300

Precisely engineered 3-channel dividing stereo preamplifier having convenient crossover frequency selector for low and mid ranges and high ranges.

System: NF-type Filter

Crossover frequencies:

Low: 150, 250, 400, 600 Hz

High: 3, 4, 5, 6.5 kHz

Distortion: (Level control at maximum)

Less than 0.1% at 3 volt output (for signals within the passband)

Less than 0.1% at 2.1 volt output (at the crossover frequencies)

S/N ratio: 80 dB (1 volt input, closed circuit)

Transistors: 19 pcs.

Dreikanal-Stereovorverstärker TA-4300

Mit hoher Präzision konstruierter, dreikanaliger Stereovorverstärker mit Wählschalter für Überkreuzfrequenzen ("Gabelung") zwischen tiefen und mittleren bzw. mittleren und hohen Tonbereichen.

Bauart: NF-Filter

Überkreuzfrequenzen ("Gabelung"):

Tief-150, 250, 400, oder 600 Hz

Hoch-3, 4, 5 oder 6.5 kHz

Verzerrung: (Ausgangsregler in Stellung Maximum) Unter 0,1% bei 3 Volt Ausgang (für Frequenzen innerhalb des Passbereiches)

Unter 0,1% bei 2,1 Volt Ausgang (an den Überkreuzpunkten (Gabelungspunkten))

Signal-Rausch-Verhältnis: 80 dB (1 Volt Eingang, geschlossener Kreis)

Transistoren: 19 Stück

Pré-amplificateur stéréo à 3 canaux divisés TA-4300

Pré-amplificateur stéréo à trois canaux divisés, d'une construction de précision possédant un sélecteur de fréquences commode pour les gammes basse et moyenne fréquence, et les gammes moyenne et haute fréquence.

Système: Filtre type NF

Fréquences: basse: 150, 250, 400, 600 Hz

haute: 3, 4, 5, 6,5 kHz

Distorsion: (Niveau de réglage au maximum) Inférieure à 0,1% à un débit de 3 volts (pour les signaux dans la bande passante)

Inférieure à 0,1% à un débit de 2,1 volts (pour les fréquences de passage)

Rapport Signal Bruit: 80 dB (débit de 1 volt, circuit fermé)

Transistors: 19

Stereo Turntable System PS-2000, PS-3000

The PS-2000 consists of the Servo Turntable TTS-3000, the Precision Tone Arm PUA-237, the Stereo Cartridge VC-8E and the Wooden Base TAC-2.

The PS-3000 consists of the Servo Turntable TTS-3000, the Precision Tone Arm PUA-286, the Stereo Cartridge VE-8E and the Wooden Base TAC-3.

Stereo-Plattenspieler PS-2000, PS-3000

Modell PS-2000 besteht aus Servo-Plattenteller TTS-3000, Präzisionstonarm PUA-237, Stereo-Tonabnehmer VC-8E und Holzschatulle TAC-2.

Modell PS-3000 besteht aus Servo-Plattenteller TTS-3000, Präzisionstonarm PUA-286, Stereo-Tonabnehmer VC-8E und Holzschatulle TAC-3.

Système tourne-disque stéréo PS-2000, PS-3000

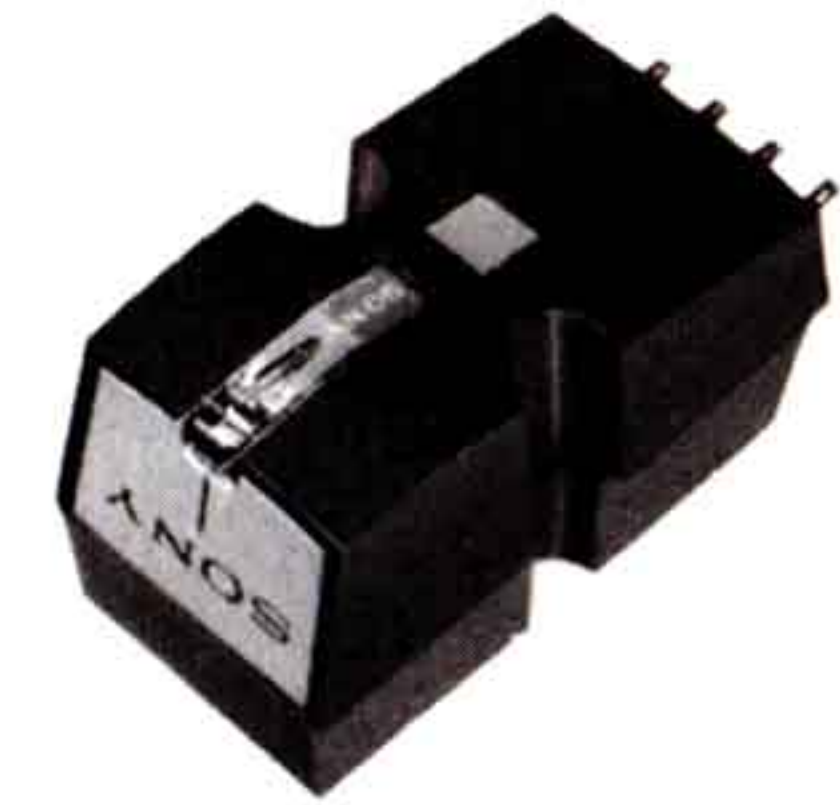
Le PS-2000 comprend un servo-tourne-disque TTS-3000, un bras de précision PUA-237, une cartouche stéréo VC-8E, et un bâti de bois TAC-2.



TTS-3000



PUA-237



VC-8E



TC-355

Servo Turntable TTS-3000

The exclusive servo motor system provides stable operation.

Speed: 33-1/3, 45 rpm
 Wow & flutter: Less than 0.05%
 S/N ratio: More than 60 dB (NAB standrd)
 Dimensions: 370(w)×130(h)×380(d)mm
 (14-9/16×5-1/8×15")

Servo-Plattenteller TTS-3000

Durch das Antriebssystem mit Servomotor wird höchste Gleichlaufgenauigkeit erzielt.

Geschwindigkeiten: 33-1/3 & 45 UpM
 Gleichlaufschwankungen: Unter 0,05%
 Signal-Raush-Verhältnis: über 60 dB (nach NAB-Norm)
 Abmessungen:
 370 mm (breit) × 130 mm (hoch) × 380 mm (tief)

Servo-tourne-disque stéréo TTS-3000

Un système de servo-moteur exclusif assure un fonctionnement stable.

Vitesse: 33-1/3, 45 tpm
 Bruit de grondement: Inférieur à 0,05%
 Rapport Signal/Bruit: Supérieur à 60 dB (normes NAB)
 Dimensions: 370 (large)×130 (haut)×380 (prof) mm

Precision Tone Arm PUA-237, PUA-286

Perfect inside force compensator and complete lateral balancer are incorporated.

	PUA-237	PUA-286
Length:	237 mm (9-11/32")	286 mm (11-1/4")
Tracking error:	1°44'	1°24'
Stylus pressure:	0~3 gr.	

Präzisionstonarm PUA-237, PUA-286

Mit perfektem Ausgleich der Innenzentrifugalkraft ("Anti-Skating") sowie Gegengewicht gegen Innenverwindung (lateral balance).

	PUA-237	PUA-286
Länge:	237 mm	286 mm
Abirrung:	1°44'	1°24'
Auflagegewicht:	0~3 gr	

Bras de précision PUA-237, PUA-286

Ayant incorporé un compensateur parfait de force interne et un balancier effectif de mouvement latéral.

	PUA-237	PUA-286
Longueur:	237 mm	286 mm
Erreur de piste:	1°44'	2°24'
Pression d'aiguille:	0~3 grs.	

Stereo Cartridge VC-8E

High compliance moving coil cartridge with an elliptical diamond stylus.

Frequency response: 10~25,000 Hz
 Output voltage: 4 mV±2 dB (1,000 Hz, 5 cm/sec)
 Load impedance: 40~100 K ohms
 Compliance: 30×10⁻⁶ cm/dyne
 Stylus tip radius: 0.2×0.8 mill elliptical, diamond
 Stylus pressure: 1~3 gr.

Stereo-Tonabnehmer VC-8E

Tonabnehmer mit beweglicher Spule und elliptischer Diamantnadel. Hohe Schwingungsfreiheit ("compliance")

Frequenzumfang: 10~25,000 Hz
 Ausgangsspannung: 4 mV±2 dB (bei 1000 Hz, 5 cm/Sek.)
 Belastung: 40~100 K-Ohm
 Dynamik: 30×10⁻⁶/dyn
 Radius der Nadelspitze: 0,2×0,8 mil elliptisch, Diamant.
 Auflagegewicht: 1~3 gr

Cartouche stéréo VC-8E

Cartouche à inductance amovible de grande souplesse d'utilisation avec une pointe (aiguille) elliptique de diamant.

Réponse de fréquence: 10~25.000 Hz
 Tension de sortie: 4 mV±2 dB (1.000 Hz, 5 cm/s)
 Impédance de charge: 4~100 K ohms
 Accommodation: 30×10⁻⁶ cm/dyne
 Rayon de pointe d'aiguille: elliptique 0,2×0,8 mil, diamant
 Pression d'aiguille: 1~3 grs.

Stereo Tape Recorder TC-255

2-head, 4-track solid state (all transistorized) stereo tape deck incorporates recording and playback preamplifier.

Stereo-Tonbandgerät TC-255

Volltransistorisiertes Stereo-Tonbandgerät, Vierspurverfahren, 2 Tonköpfe, mit Vorverstärker für Aufnahme und Wiedergabe.

Magnétophone stéréo TC-255

Le plateau de magnétophone stéréo à 2 têtes et 4 pistes, entièrement transistorisé, incorpore un pré-amplificateur d'enregistrement et d'écoute.

Stereo Tape Recorder TC-355

3-head, 4-track solid state (all transistorized) stereo tape deck incorporates separate recording and playback preamplifier.

Stereo-Tonbandgerät TC-355

Volltransistorisiertes Stereo-Tonbandgerät, Vierspurverfahren, 3 Tonköpfe, mit getrennten Vorverstärkern für Aufnahme und Wiedergabe.

Magnétophone stéréo TC-355

Le plateau de magnétophone stéréo à 3 têtes et 4 pistes, entièrement transistorisé, incorpore un pré-amplificateur séparé pour l'enregistrement et l'écoute.

DELUXE PREAMP SPORTS TWO METERS



THE EQUIPMENT: Sony TA-2000, a preamplifier-control unit. Dimensions: front panel, 15³/₄ by 5¹/₂ inches; chassis depth, 11 inches. Price: \$329.50. Manufacturer: Sony Corporation of America, 47-47 Van Dam St., Long Island City, N.Y. 11101. Optional walnut cabinet, \$24.50.

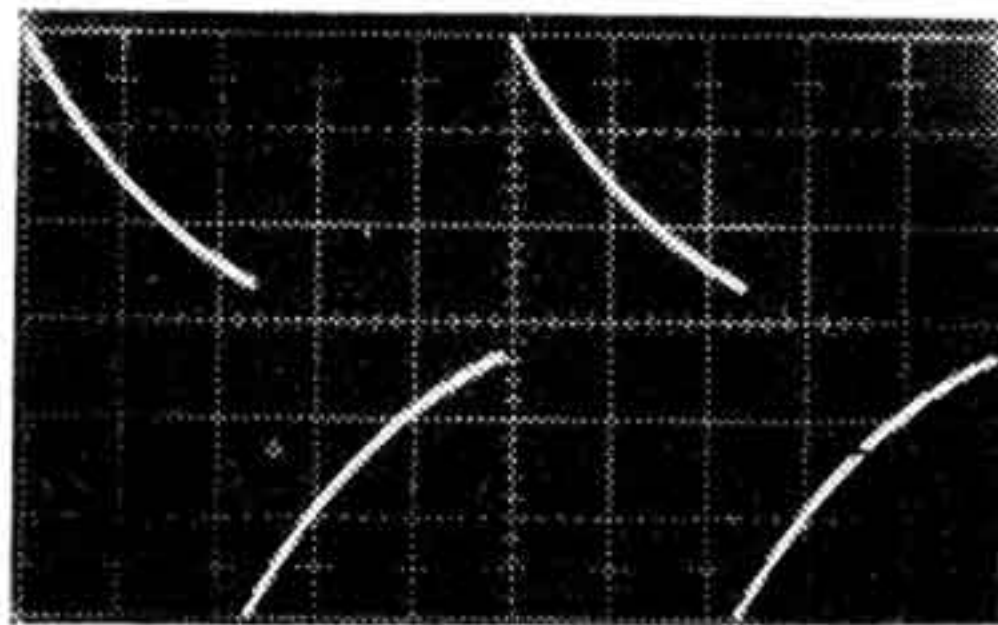
COMMENT: Very high performance, more than usual versatility, and high-quality construction characterize Sony's TA-2000, a separate preamp-control unit aimed at critical stereo listeners, hobbyists, and probably some professional users too. Its most obvious feature is the brace of VU meters on the front panel; these may be used to set channel balance of all signals, to measure frequency response and channel separation of phono pickups, to correct tape-head alignment when using a tape deck that lacks its own playback preamp, and to check on the frequency response of any tape deck.

The full roster of controls and features is impressive indeed. The top row of the front panel contains a volume control, the two meters, treble and bass tone controls, a mode selector, and a function selector. The tone controls, each of which operates on both channels simultaneously, are calibrated and stepped so that exact settings may be repeated for special purposes. In addition, a defeat switch enables you to cancel all tone control effects at once and return the system to flat response. The mode selector has positions for normal stereo, channel reversal, left only, right only, and balancing left and right channels.

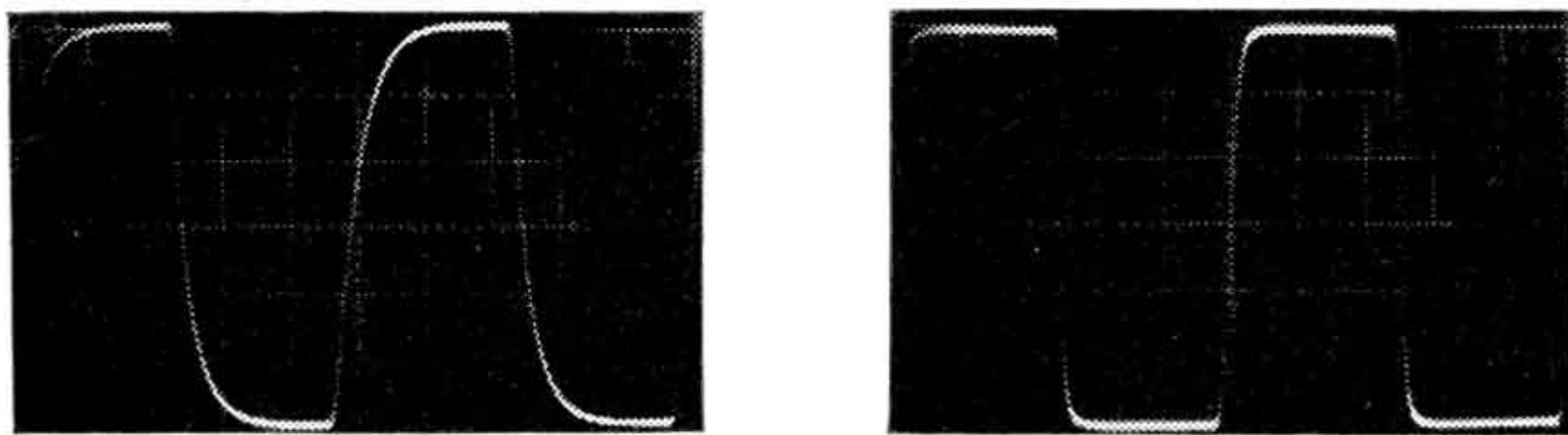
The function selector is divided between a lever switch and a knob.

Across the bottom of the front panel there's the power off/on switch, a line output jack, a headphone jack with its own level control, a channel-balance knob, low and high frequency filter switches, three phone-jack inputs for auxiliary signals and for left and right channel microphones, and a tape monitor switch.

The front panel signal jacks can be ignored (they all are duplicated at the rear), or used as a convenience in making quick or temporary hookups, or—to an extent—used together with some of the rear panel jacks for special applications, including the hookup of three tape recorders at once, or listening on headphones while piping stereo to two completely different amplifier/speaker setups, and so on. The rear inputs include: tape head, phono 1, phono 2, tuner, auxiliary 1, and tape (amp). Each of these stereo pairs has its own level adjustment; in addition, one phono jack has a level switch that lets you connect the lowest signal-output phono pickups (moving-coil types) directly without the need for an intervening booster. There's also a five-pin DIN socket for hooking up a tape recorder that uses the unitized type of signal cable, common on recorders built abroad. The rear panel also contains two sets of stereo signal outputs and a mixed-signal ("center channel") output. The stereo outputs may be adjusted for signal values of 0.3 and 1 volt (to suit the input needs of different power amplifiers); the mixed-channel output is regulated by its own variable level control. The AC line



Square-wave response to 50 Hz.



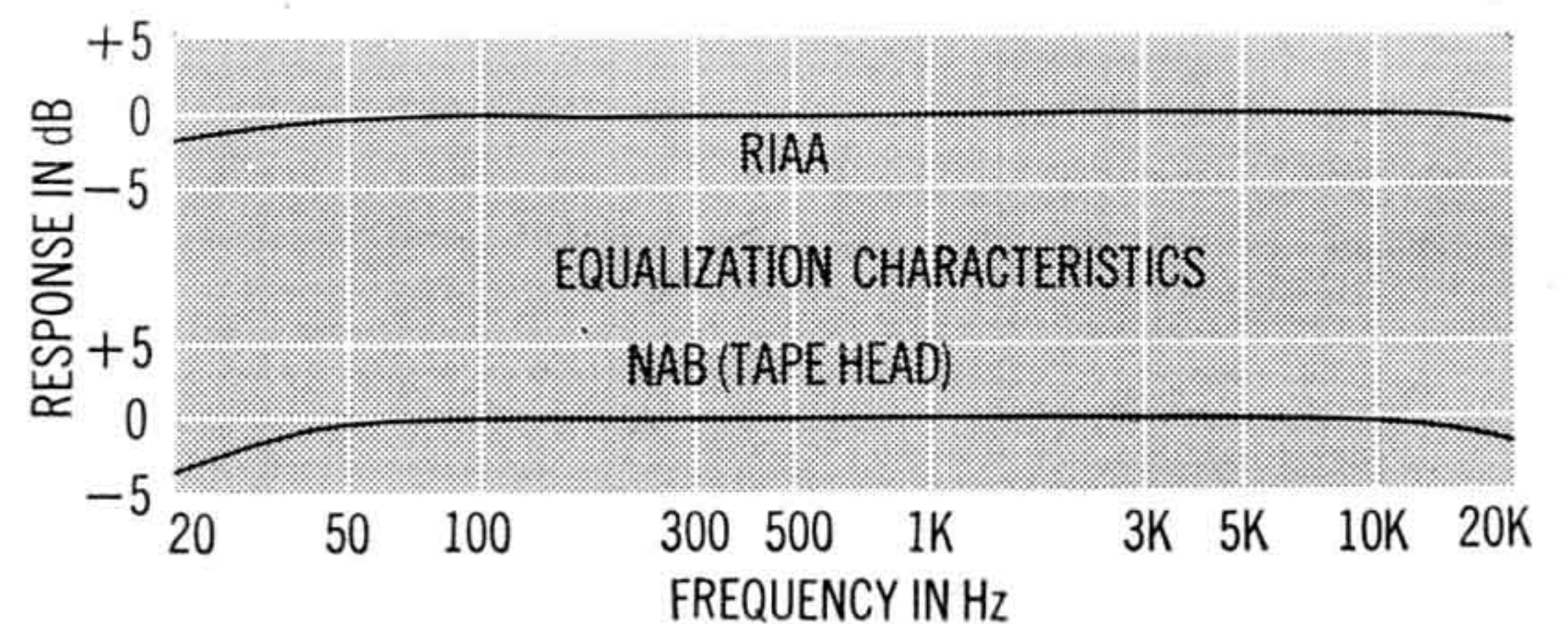
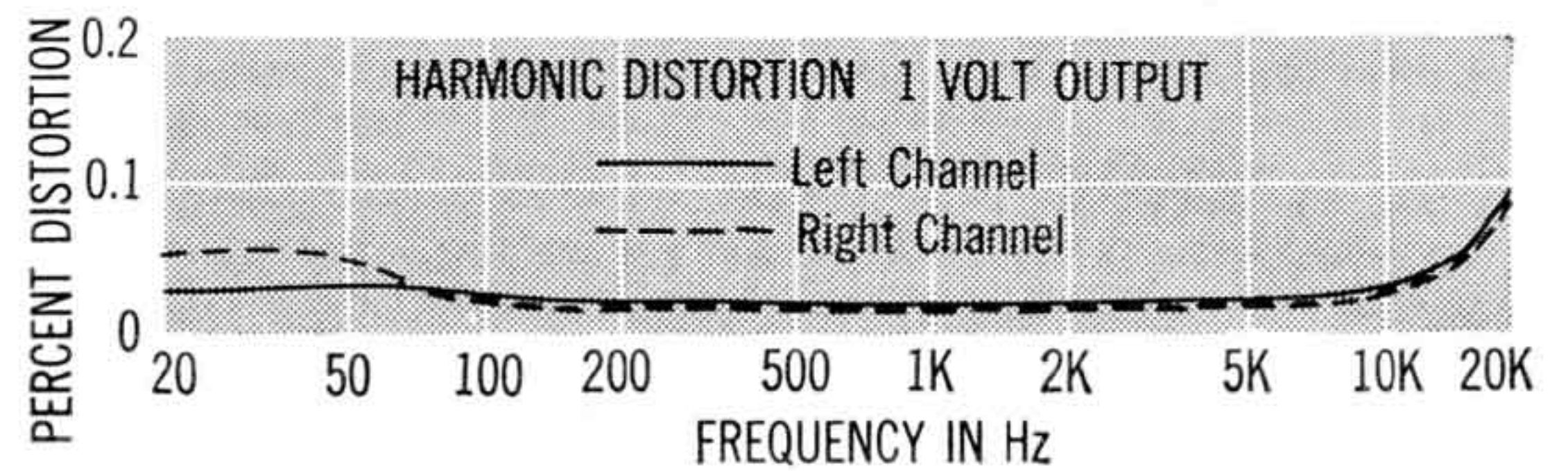
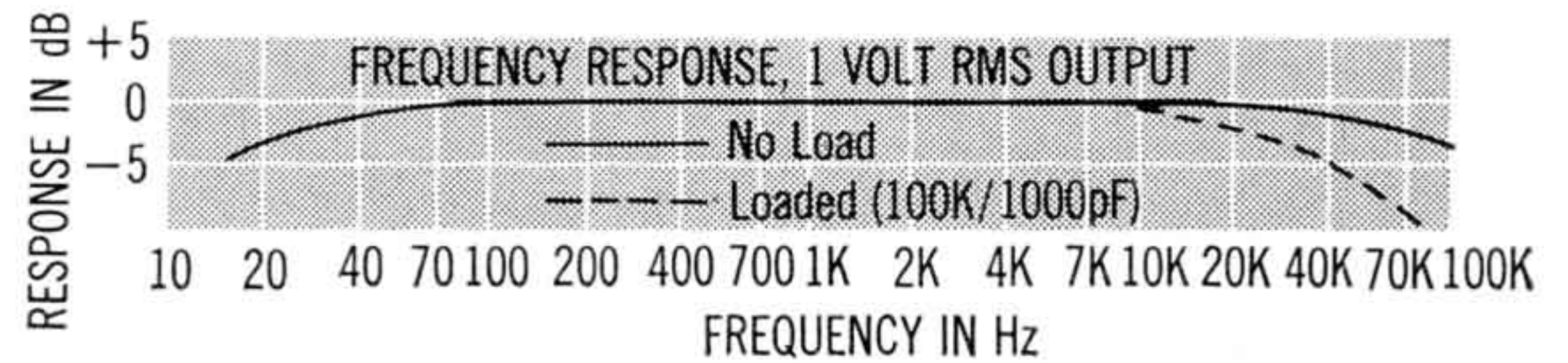
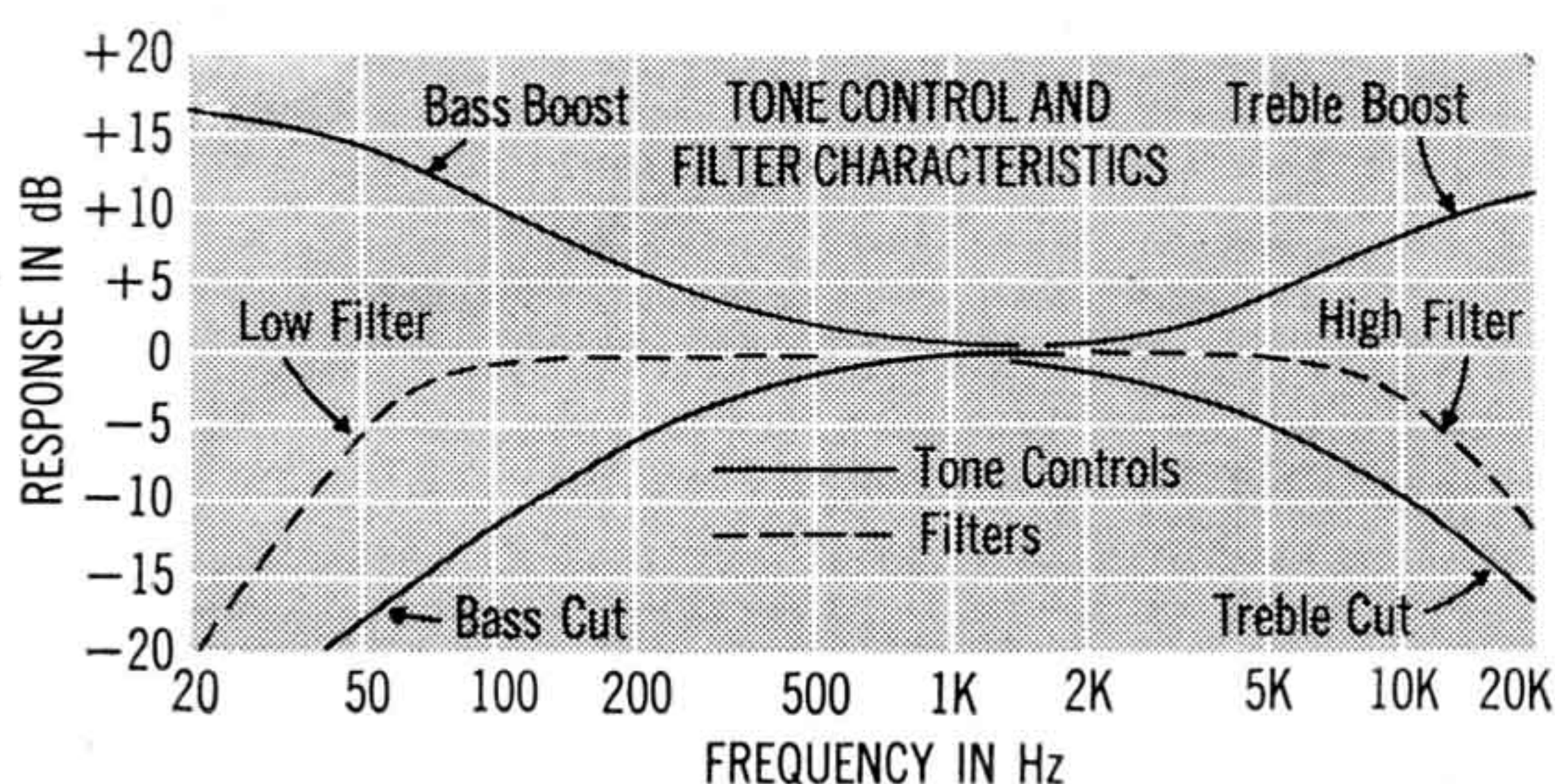
Square-wave response to 10 kHz with full IHF loading (100 K/1000 pF), left; without loading, right.

cord, four convenience outlets (three switched), and a grounding post complete the rear complement. Like all Sony components we've tested, the TA-2000 is extremely well built, showing evidence of high-grade parts, careful circuit layout, excellent shielding, and attention to details.

In CBS Lab tests, the TA-2000—under the maximum or “most strenuous” load used for preamp testing (the IHF load of 100 K, 1000 pF, which corresponds, roughly speaking, to about 36 feet of ordinary shielded signal cable)—furnished better than three times its rated output voltage at extremely low distortion. Frequency response at the very high end also varied somewhat with the degree of loading: under maximum load it still remained flat within plus zero, minus 3 dB from 20 Hz to beyond 20 kHz; under more normal loading conditions (corresponding, say, to up to twelve feet of audio cable between it and the power amp it is driving), the response was down only 3 dB out at 90 kHz. These, and other performance data are detailed in the accompanying graphs and chart. Note the very low distortion figures, and the excellent input sensitivities and signal-to-noise ratios. Equalization characteristics were virtually ruler-flat across the audio band; tone controls operated effectively; filter action was very good, showing fairly sharp cutoffs that could reduce a good deal of noise without degrading too much of the musical portion of a signal.

Incidentally, the headphone jack on the front panel is rated for 600 ohms or higher impedance headsets. We tried listening with low impedance headphones connected to this jack by turning the headphone level adjustment to maximum, and then using the master volume control to reach a comfortable listening level. It worked fine. If you try it, just remember not to turn the latter control up full—the signal meter needles will “peg”—that is, swing over suddenly to the extreme right.

CIRCLE 144 ON READER-SERVICE CARD



Sony TA-2000 Preamp

Lab Test Data

Performance characteristic

Measurement

Output (at 1 kHz into 100 K/1000 pF load)

l ch at clipping	3.11 volts at 0.06% THD
center ch at clipping	8.3 volts at 0.28% THD
r ch at clipping	3.18 volts at 0.05% THD
both chs simultaneously	
l ch at clipping	3.10 volts at 0.057% THD
r ch at clipping	3.15 volts at 0.046% THD

Harmonic distortion, 1-volt output

left ch: under 0.095%,
20 Hz to 20 kHz
right ch: under 0.086%,
20 Hz to 20 kHz

IM distortion, 1-volt output

0.05%

Frequency response, 1-watt level

with max load: +0, -3 dB,
20 Hz to 27 kHz
with min load: +0, -3 dB,
20 Hz to 90 kHz

RIAA equalization

+0, -2 dB, 20 Hz to 20 kHz

NAB equalization

+0, -2 dB, 27 Hz to 20 kHz

Input characteristics for 1-volt output

	Sensitivity	S/N ratio
Tape head	1.2 mV	58 dB
Phono 1	1.1 mV	63 dB
Phono 2 (normal)	1.1 mV	63 dB
Phono 2 (low)	0.17 mV	43 dB
Tuner	129.0 mV	80 dB
Aux 1	146.0 mV	80 dB
Aux 2	150.0 mV	80 dB
Tape in	132.0 mV	80 dB
Mike	1.1 mV	60 dB

SONY CORPORATION