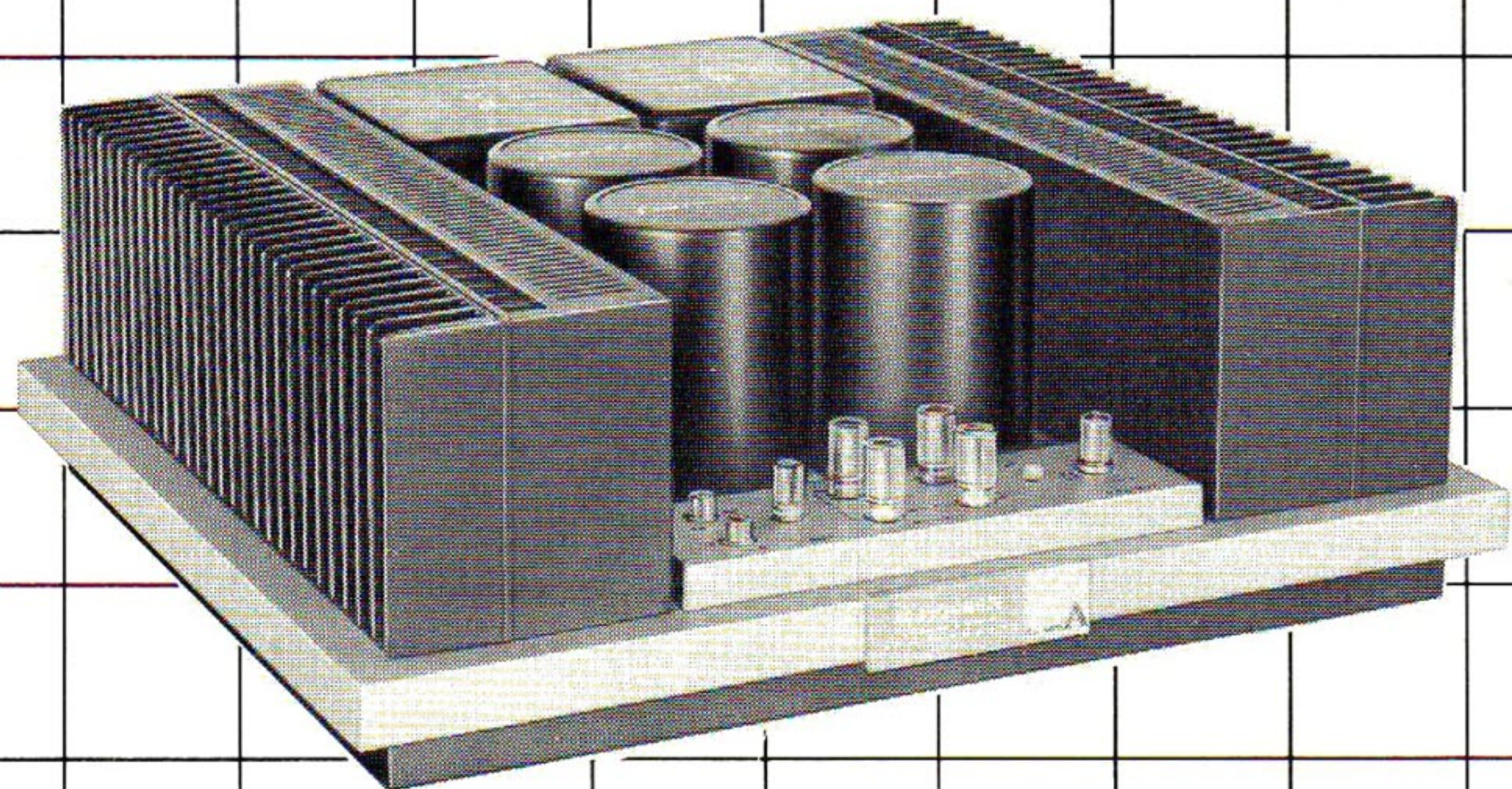


STEREO POWER AMPLIFIER

M-22

OPERATING INSTRUCTIONS

N
KL
KU



IMPORTANT NOTICE

The serial number for this equipment is located on the bottom plate. Please write this serial number on your enclosed warranty card and keep in a secure area. This is for your security.

 **PIONEER®**

**WARNING: TO PREVENT FIRE OR SHOCK HAZARD,
DO NOT EXPOSE THIS APPLIANCE TO RAIN OR
MOISTURE.**

INSTALLATION PRECAUTIONS

The M-22 weighs a full 22kg and so be sure to install it in a location which can support heavy weights. Also, take care when transporting the M-22 from one place to another and when otherwise handling it.

Bear in mind that the M-22 is a Class-A power amplifier and so it does generate a great deal of heat. Do not therefore place another component immediately above or below it, and do not put it on a narrow shelf or rack. Be sure to leave at least a 10cm gap around the M-22. Never place the model on a thick carpet or cushion since these objects prevent the heat from escaping.

NOTE:

The temperature of the radiator rises when the M-22 is being used. If the connecting cords or the power cord are allowed to come into contact with the heat sink, their vinyl outer coating may melt. Make sure that the equipment is connected properly.

CONTENTS

Features	2
Configuration of the Stereo System	3
Connections	4
Connection Diagram	5
Operations	6
Combinations with the M-22	6
Characteristics Charts	7
Specifications	8

FEATURES

Class-A Power Amplifier Cuts Down Distortion to the Minimum over a Wide Frequency Band

The M-22's first stage employs a dual transistor differential amplifier and the plentiful negative feedback from its output guarantees superb stability — whether with AC or DC power — even if there are fluctuations in the ambient conditions. The next stage is a differential amplifier with a current mirror circuit. This is a winning combination which features a high power line voltage efficiency and full power and linearity as a pre-driver.

The power stage consists of a Class-A pure complementary parallel push-pull circuit featuring a two-stage Darlington connection. This ensures that the distortion is kept to the absolute minimum over a wide frequency range. All these features add up to what you would expect from a Class-A power amplifier: a reproduced sound which is inimitably clear and full-range power due to the excellent damping factor. In other words, the M-22 packs quite a punch.

Twin Transformer Power Supply with Perfect Stability

The M-22 is symmetrically designed with a mono-amplifier on each side.

The heavyweight class power supply employs large-capacity (33,000 μ F) electrolytic capacitors (2 for each channel) in the transformers. These transformers are large, and have not only excellent regulation but also plenty of reserve. Together with the stable output, the power supply ensures a superior channel separation and a reproduction which is both clear and full of latent energy. There is a surge-killer circuit to keep the inrush current from the power transformers and the high current which charges the electrolytic capacitors to the bare minimum. Another function is to prevent excessive current reaching the circuitry.

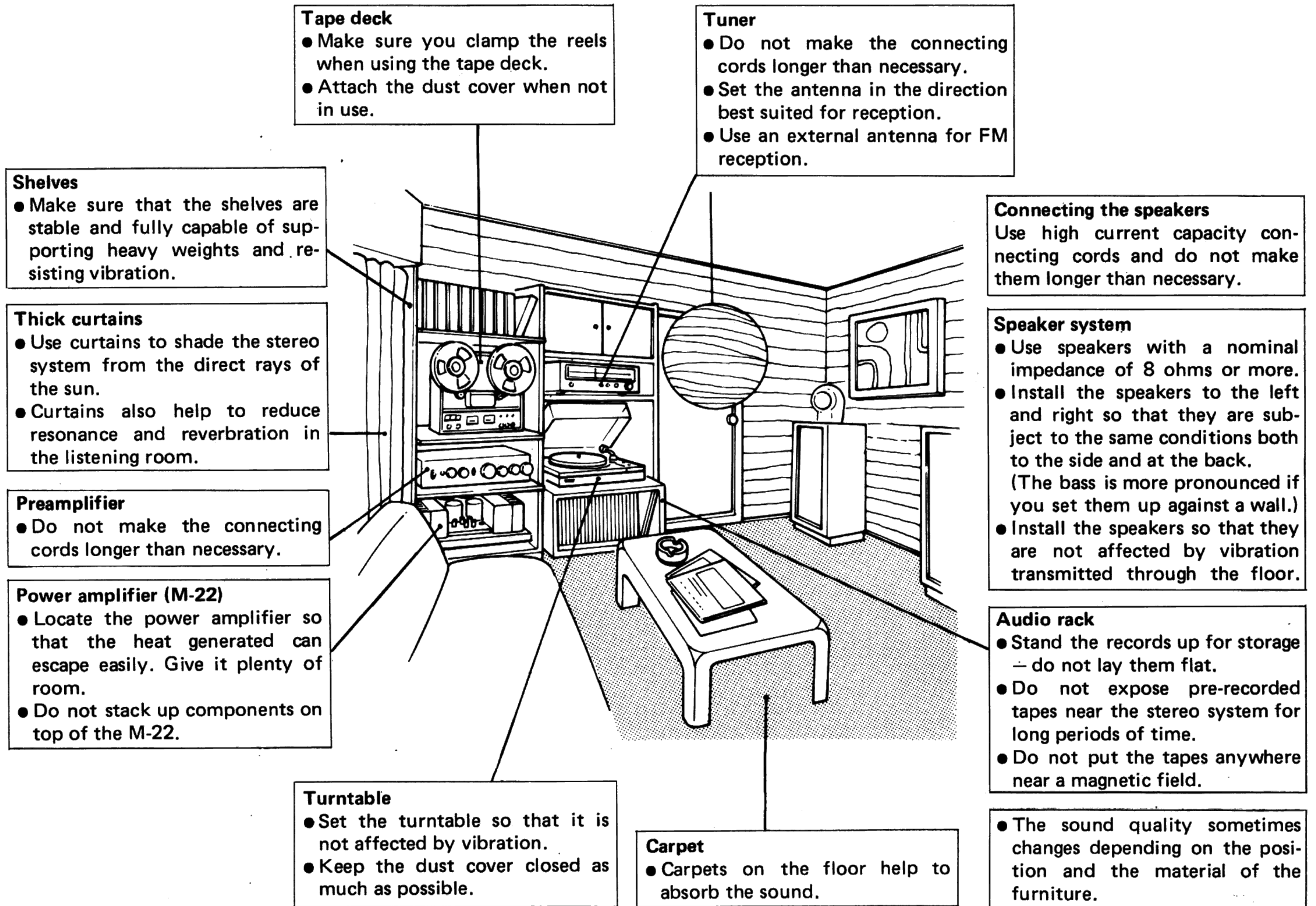
Highly Dependable Protective Circuitry

The M-22 is equipped with protective circuitry designed to protect the power transistors and the speakers from unforeseen accidents caused by the generation of DC voltage or shortcircuiting and overloading of the speaker connectors. This circuitry can be counted on to perform muting when the power switch is flipped between ON and OFF, to cut off the speaker circuitry and also to check heat generation. It cuts off the power transistor current when the level of heat radiated by the M-22 becomes abnormally high, and so the M-22 never gets dangerously overheated.

Carefully Selected High-Quality Parts

Each and every part which makes up the M-22 is singled out for its quality so that only the best is finally chosen. Among the parts employed are high-capacity electrolytic capacitors with a low current capacity loss, large-sized power transformers with outstanding regulation, relays featuring improved contact resistance thanks to gold-plated contacts, and printed circuit boards of paper epoxy resin with a high insulation resistance.

CONFIGURATION OF THE STEREO SYSTEM



Do not install your M-22 in the locations listed in the table below.

Locations to be avoided	Possible trouble
1 Locations exposed to direct rays of the sun, or close to heating appliances or any heat-generating products.	1 External heat downgrades the performance of the circuit parts and prohibits stable operation.
2 Locations close to sources of alcohol, insecticides and other inflammables.	2 These items corrode the outer panel. There is also the danger that these items may ignite.
3 Poorly ventilated locations.	3 These locations prevent the M-22's heat from escaping and contribute to downgrading its performance.
4 Locations with a high moisture or humidity level.	4 These locations cause a deterioration in the input/output connection contacts as well as internal corrosion. In particular, moisture and humidity downgrade the insulation and there is a danger of current leakage and heat generation in the circuit parts.
5 Locations with a great deal of dust or dirt.	5 Accumulated dust and dirt help prevent the heat from escaping. Furthermore, if moisture or humidity is added, this can cause defects in the insulation.
6 Locations susceptible to vibration, or locations set at an incline and therefore unstable.	6 The M-22 is a heavy component and so any instability caused by an earthquake or the like can be dangerous and adversely affect the precision parts.

NOTE: The temperature of the heat sink rises when the M-22 is being used. Do not therefore touch it.

CONNECTIONS

PREAMPLIFIER

As shown in Fig. 1, use the accessory connecting cords to connect the stereo preamplifier's output terminals to the M-22's input terminals. The terminal which is closer to you is for the R (right) channel, and the connector furthest away is for the L (left) channel.

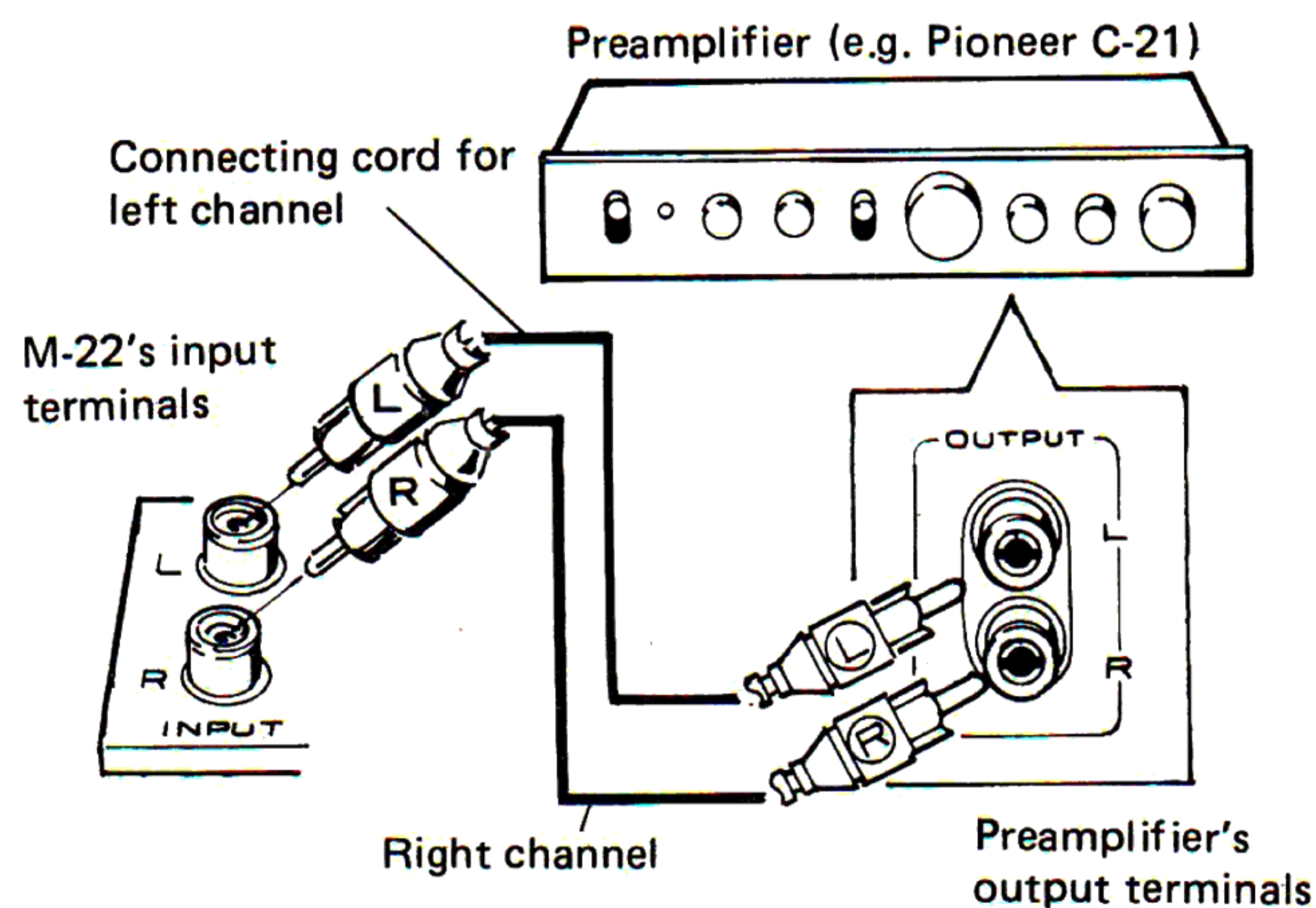


Fig. 1 — Connecting the M-22 to the preamplifier

SPEAKER SYSTEM

As shown in Fig. 2, connect the R (right) channel speaker to the M-22's R speaker output terminals, and the L (left) channel speaker to the M-22's L speaker output terminals. Both speakers are clearly marked with plus and minus polarities (red and white, respectively). The M-22's speaker output terminals are similarly marked. Make sure that you connect like poles (plus to plus, minus to minus).

NOTES:

- Use speakers with a nominal impedance of 8 ohms or over. If they have a lower impedance, the M-22 will not be able to display its capabilities as a Class-A power amplifier to the full.
- Use connecting cords with a high current capacity. Make sure that they are quite secure. If you use cords with a low current capacity, or if the connections are not performed properly, the reproduced sound will be impaired, heat may be generated and there may be short-circuiting.

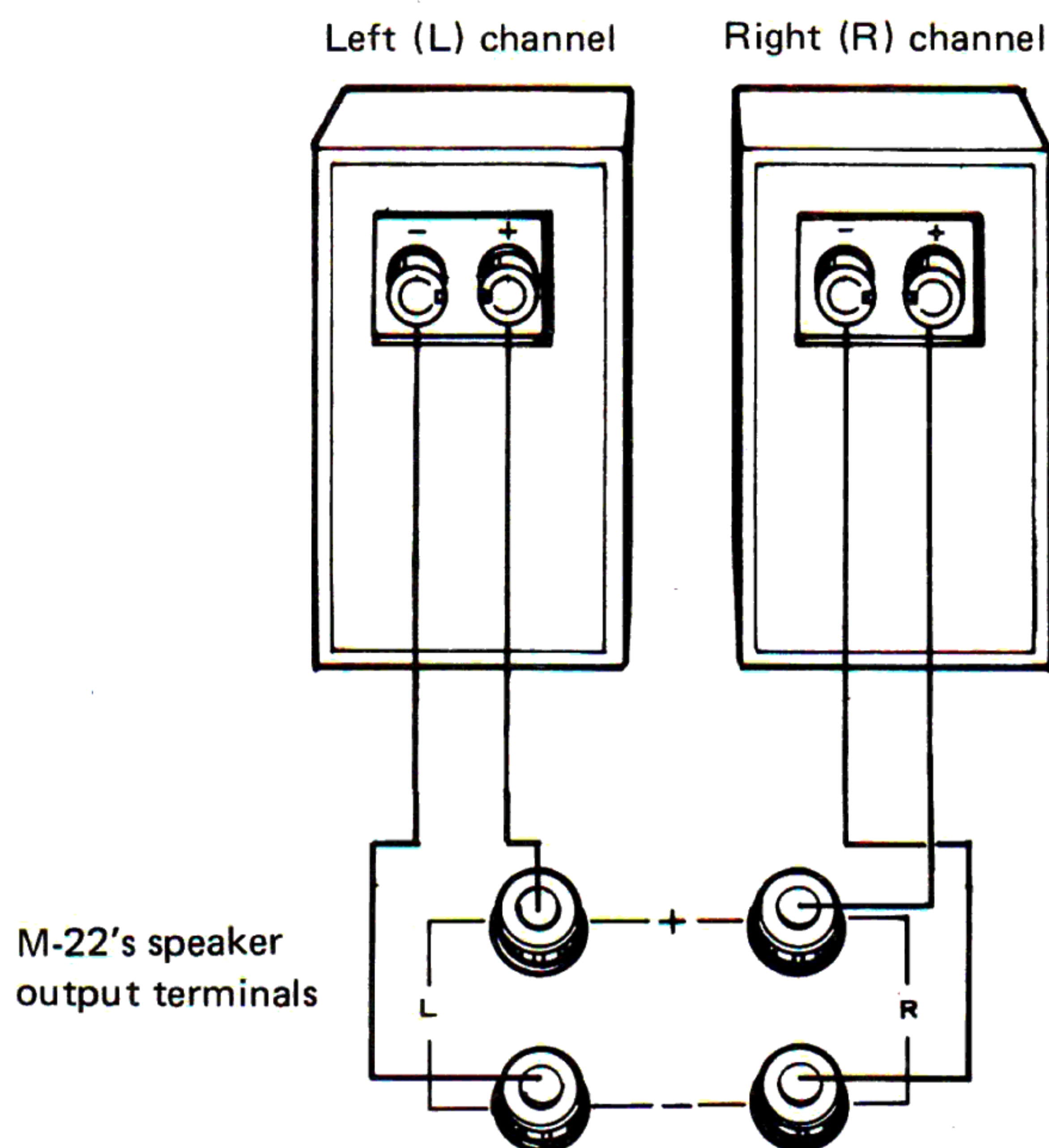


Fig. 2 — Connecting the M-22 to the speaker system

CONNECTION EXAMPLES

Fig. 3 shows two methods of making the connections. Make sure that the plus and minus connecting cords do not come into contact with each other, and also that exposed connecting cords are not allowed to touch a conductor like the M-22's panel.

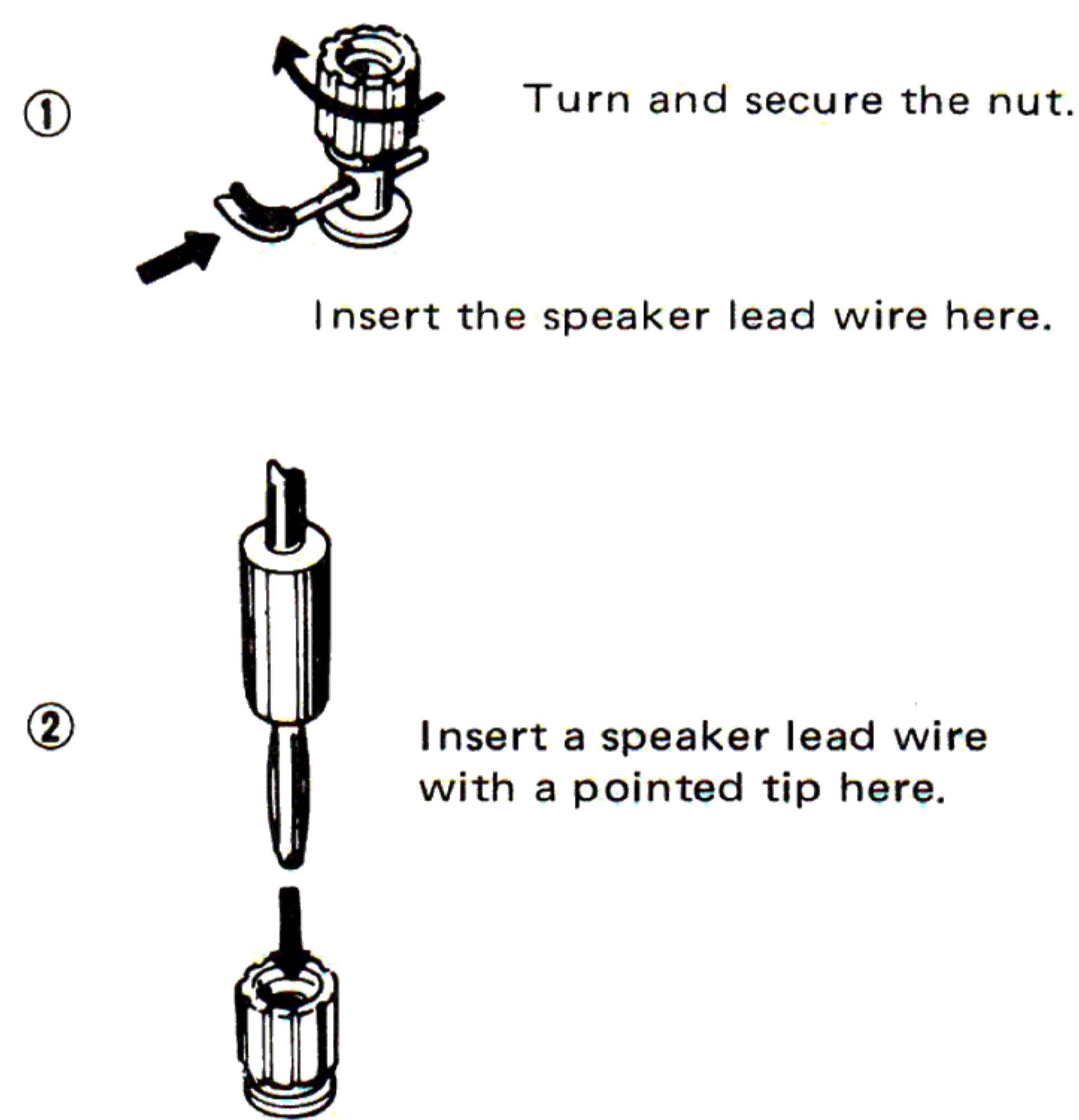
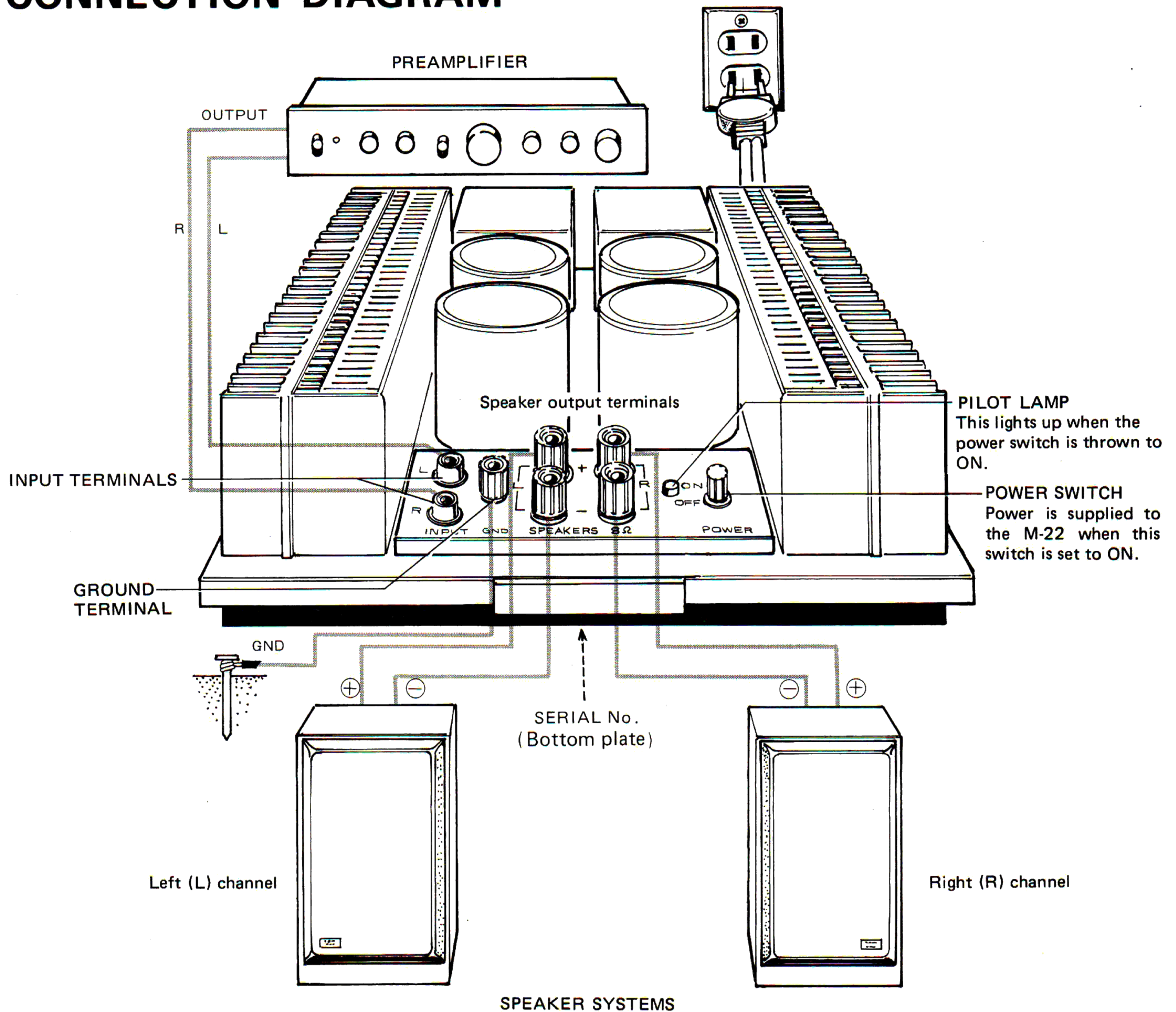


Fig. 3 — Ways of connecting the speaker connecting cords

CONNECTION DIAGRAM



PROTECTIVE CIRCUITRY

- There will be no sound from the speakers for between three and eight seconds after the M-22's power switch has been thrown. This is because the supply of power actuates the muting circuit which is designed to eliminate noise, and also the protective circuitry which is designed to safeguard the speakers from being damaged in the rare case that DC components enter into the output.
- If the sound suddenly stops coming from the speakers during operation, this may mean a speaker connection short-circuit or an overload (less than 4 ohms). In such cases, the protective

circuitry is automatically actuated, the speaker connections are cut off, and the transistors and speakers are protected from any damage. Track down the source of the trouble. Once the trouble is corrected, the protective circuitry will be automatically released, and the M-22 will return to its normal state of operation. The protective circuitry is also actuated if you carelessly place some object on top of the M-22 so that the amplifier generates an abnormally large amount of heat. In such cases, throw the power switch to the OFF position, and track down the source of the trouble before returning the switch to the ON position.

OPERATION

BEFORE OPERATION

Before throwing the M-22's power switch, check the following:

- The M-22's power cord should be connected to an AC outlet with a power capacity of 300W or more.
- The speakers should have a nominal impedance of 8 ohms or more.
- The speaker connecting cords should have a high current capacity.
- Nothing should be placed on the M-22 that will interfere with its heat dissipation. There should also be adequate ventilation.
- The output voltage of the preamplifier connected to the M-22 should correspond to the M-22's input sensitivity (1V/50 kilohms).

SETTING THE PREAMPLIFIER & THE M-22

1. Set the preamplifier's volume control to its lowest position.
2. If the preamplifier has a tape monitor switch, set it to SOURCE (or OFF). Set this switch to ON, however, for tape playback.
3. Switch on the power to the preamplifier and the component (tuner, turntable or tape deck, etc.) you are using for the program source.
4. Throw the M-22's power switch to ON.
There will be no sound from the speakers for a short time after the power switch is set to ON. This does not indicate a breakdown, but it means that the built-in muting circuit has been actuated.
5. Adjust the sound level with the preamplifier's volume control.

COMBINATIONS WITH THE M-22

MULTIPLE AMPLIFIER SYSTEM

Fig. 4 shows a configuration based on two stereo power amplifiers which are used to drive a pre-amplifier, crossover network and four special speaker systems, all of which are separate buys. The main advantage of the multiple amplifier system is that it reduces the intermodulation distortion. It does this by dividing the audible frequency range and amplifying each of the separate frequencies with special stereo amplifiers. The audible frequency range can be split into two or three, in which case the resulting systems are known as 2-way or 3-way multiple amplifier systems.

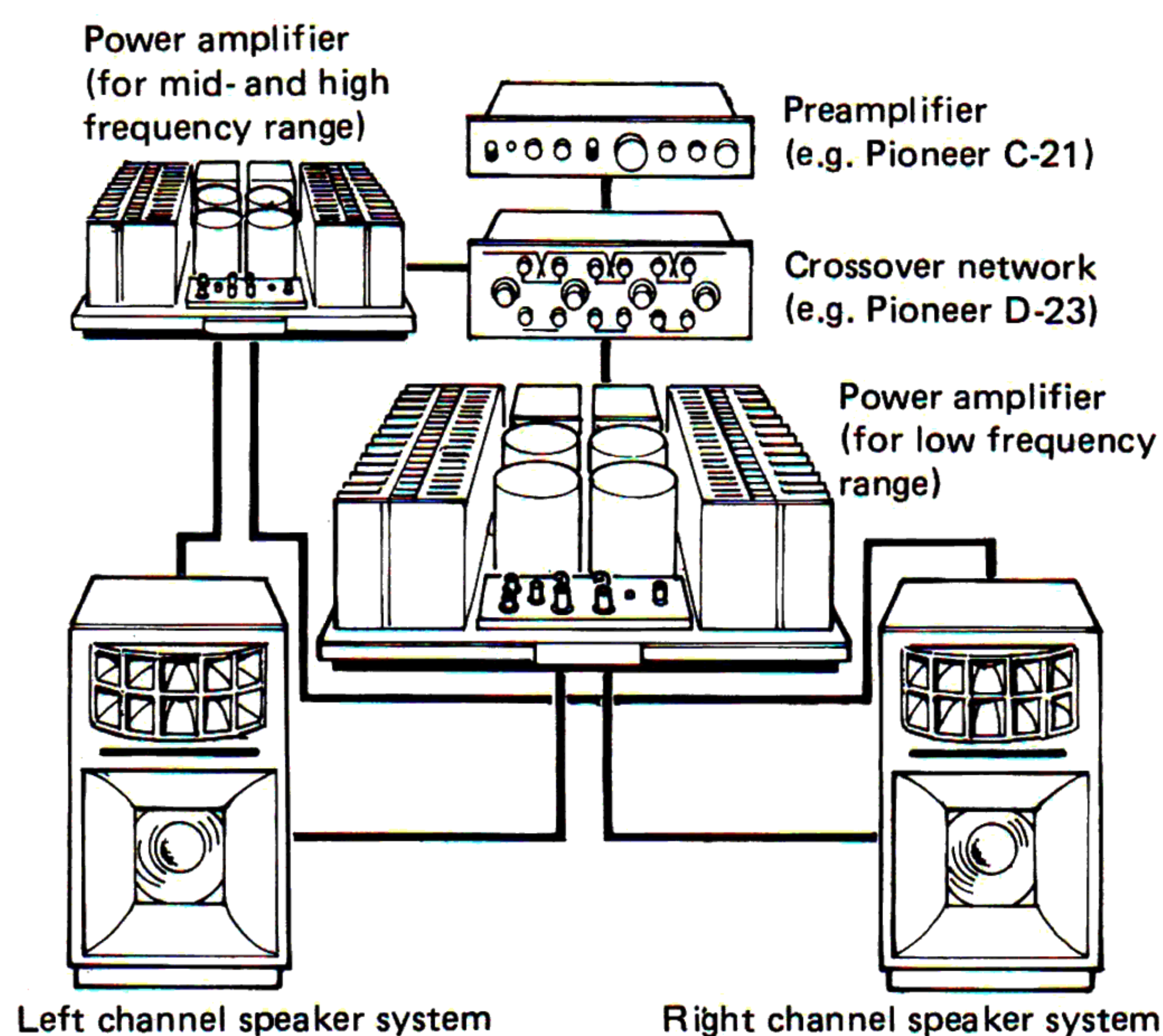
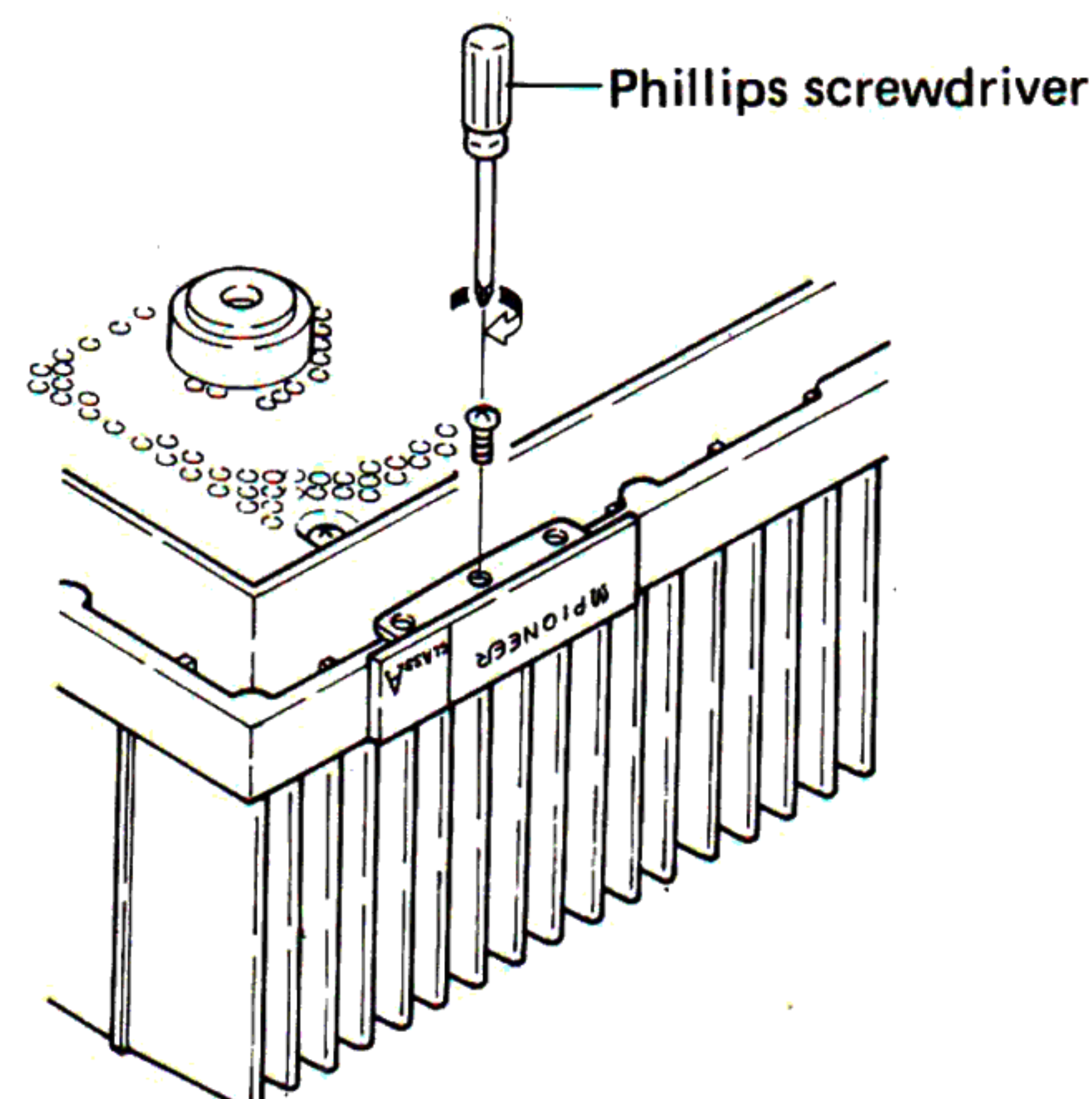


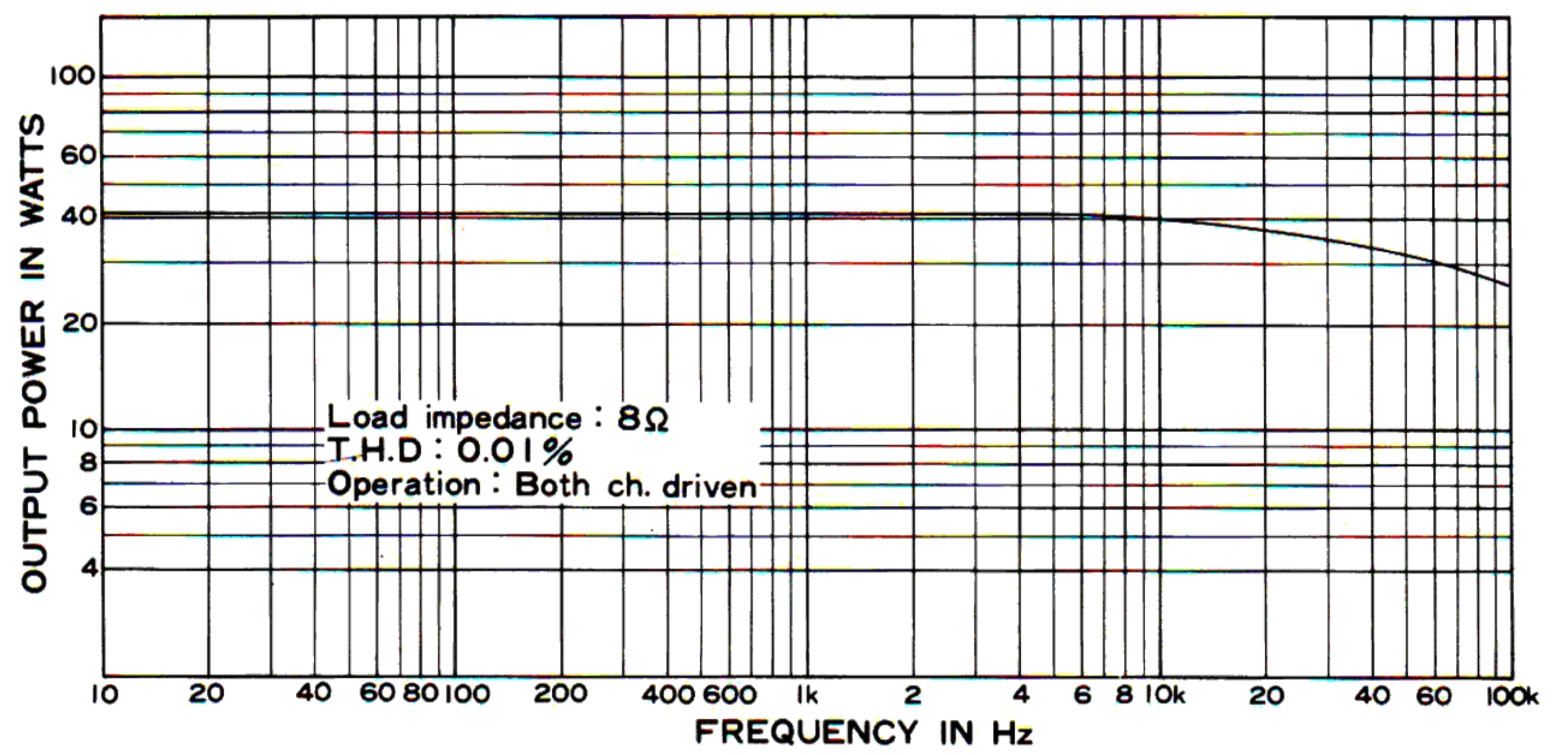
Fig. 4 — Two-way multiple amplifier system

The M-22's name-plate is designed so that it can be attached to face you, no matter in which direction the M-22 is pointing. All you have to do is to turn the M-22 upside down, and remove the screw fastening the name-plate with a Phillips screwdriver. Then, attach the plate to that side which you want to face you. Always remember that the M-22 is a heavy piece of equipment and so it should be handled with the greatest of care. Spread something under it when turning it upside down to prevent it from being marked.

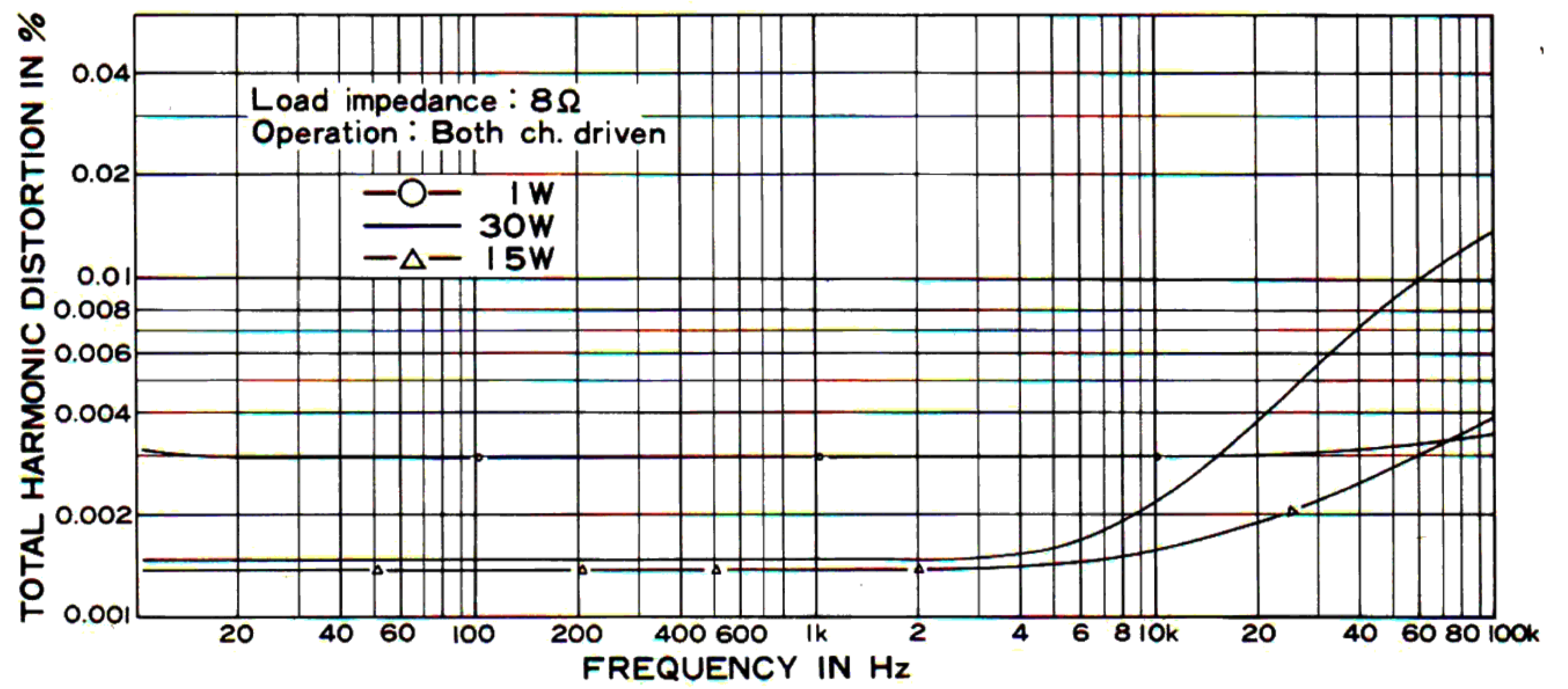


CHARACTERISTICS CHARTS

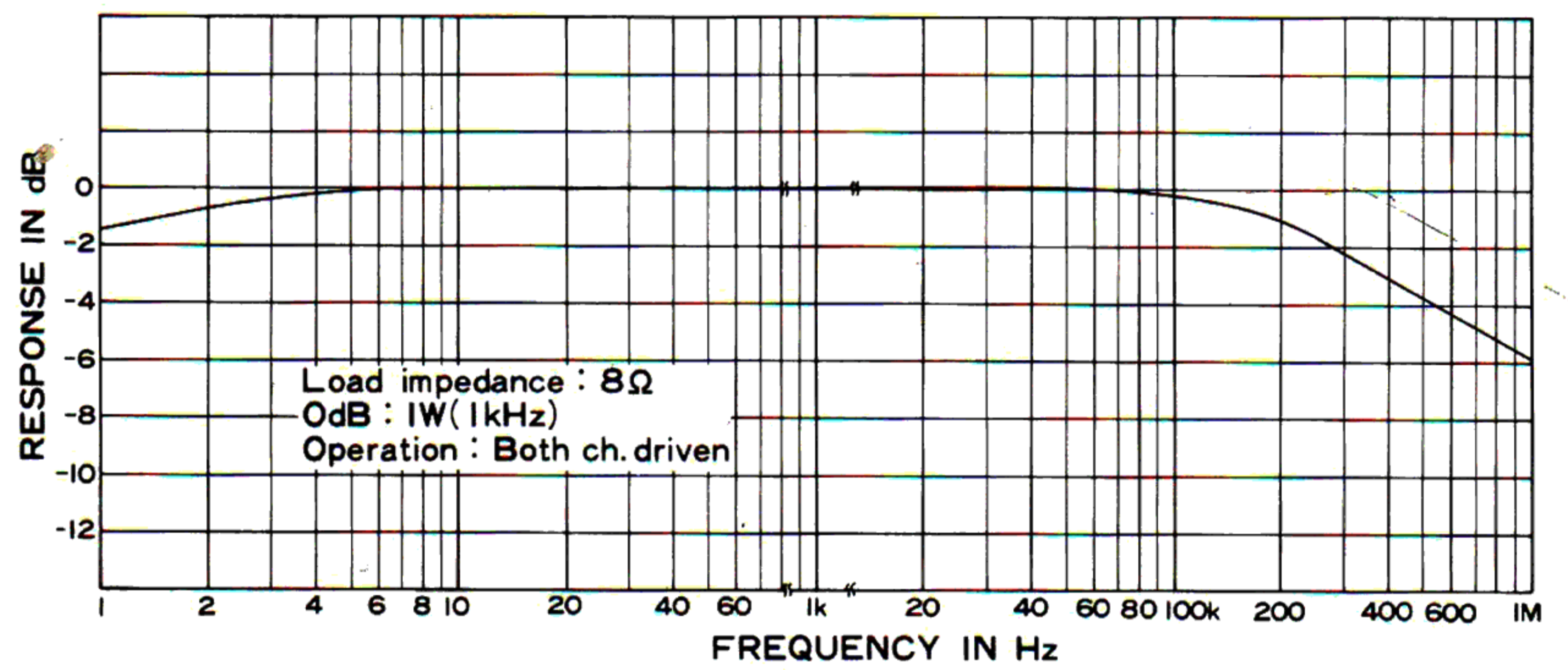
POWER BAND WIDTH



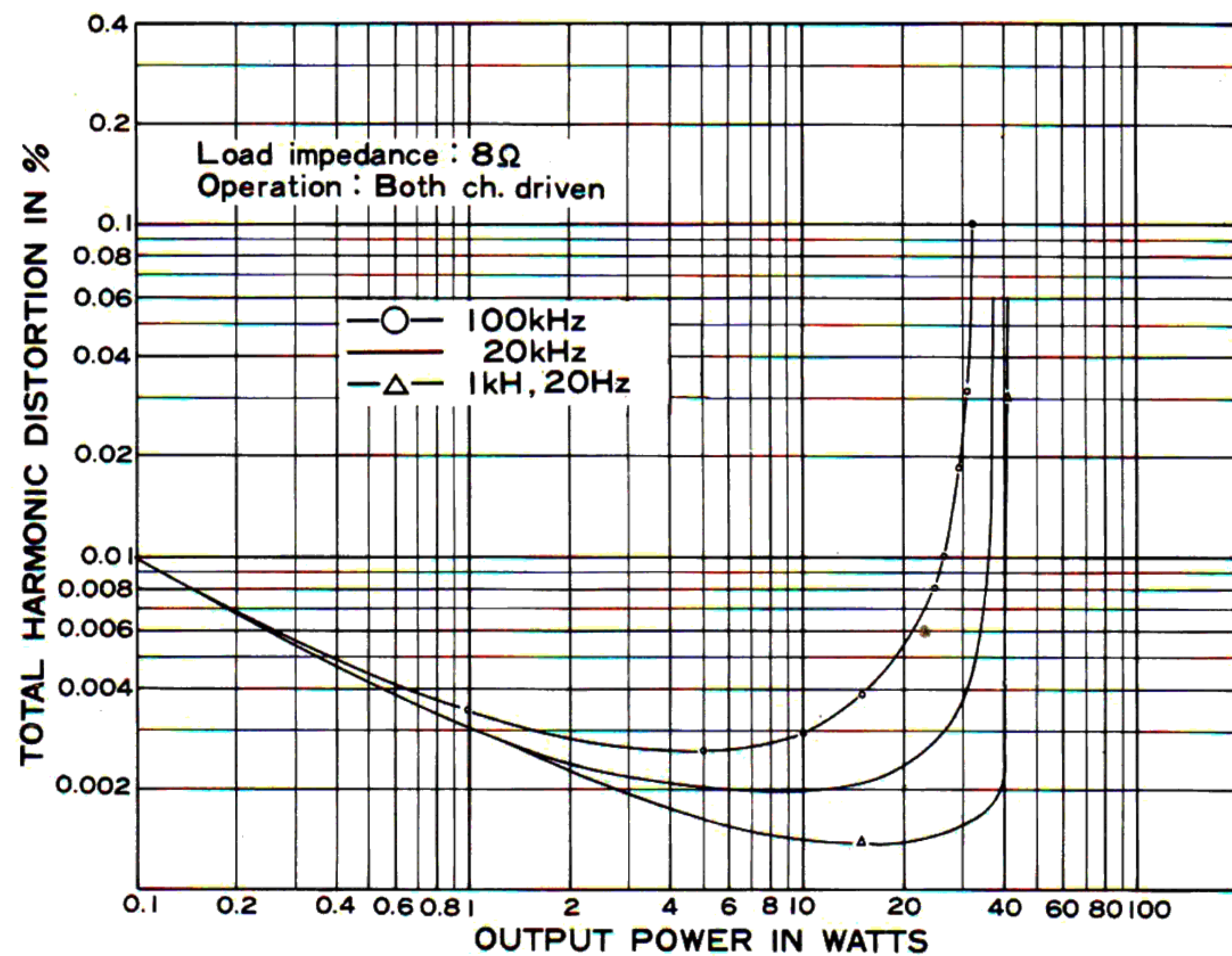
OUTPUT vs. TOTAL HARMONIC DISTORTION



FREQUENCY RESPONSE



FREQUENCY vs. TOTAL HARMONIC DISTORTION



SPECIFICATIONS

Semiconductors

Transistors	44
Diodes	66

Amplifier Section

Circuitry 2-stage Differential push-pull,
2-stage Darlington connection,
parallel push-pull, direct-coupled
OCL (Class-A operation, DC
Amplifier construction)

Continuous power output of 30 watts* per channel
min. RMS, at 8 ohms from 10 Hertz to 30,000
Hertz with no more than 0.01% total harmonic
distortion.

Total Harmonic Distortion at 10 Hertz to 30,000 Hertz

Continuous rated power output	0.01%
15 watts per channel power output, 8 ohms . . .	0.005%
1 watt per channel power output, 8 ohms	0.005%

Intermodulation Distortion (50 Hertz : 7,000 Hertz = 4 : 1)

Continuous rated power output	0.005%
15 watts per channel power output, 8 ohms . . .	0.003%
1 watt per channel power output, 8 ohms	0.003%

Frequency Response 2Hertz to 150,000Hertz ± 1 dB

Input (Sensitivity/Impedance)

INPUT 1V/50kilohms

Output

SPEAKER 8 ohms

Damping Factor (20Hertz to 20,000Hertz, 8 ohms) . . .

60

Hum and Noise (IHF, short-circuited, A network) . .

106dB

Miscellaneous

Power Requirements	120V 60Hz only
Power Consumption.	280 watts (UL)
Dimensions	420(W)x153(H)x370(D) mm
	16-9/16 x 6-1/32 x 14-9/16 in.
Weight	Without Package: 22kg (48 lb 7 oz)
	With Package: 24.7 kg (54 lb 6 oz)

Furnished Parts

Connection Cord with Pin plugs	1
Operating Instructions	1

NOTE:
Specifications and the design subject to possible modifica-
tion without notice due to improvements.

*Measured pursuant to Federal Trade Commission's Trade
Regulation rule on Power Output Claims for Amplifiers.

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