

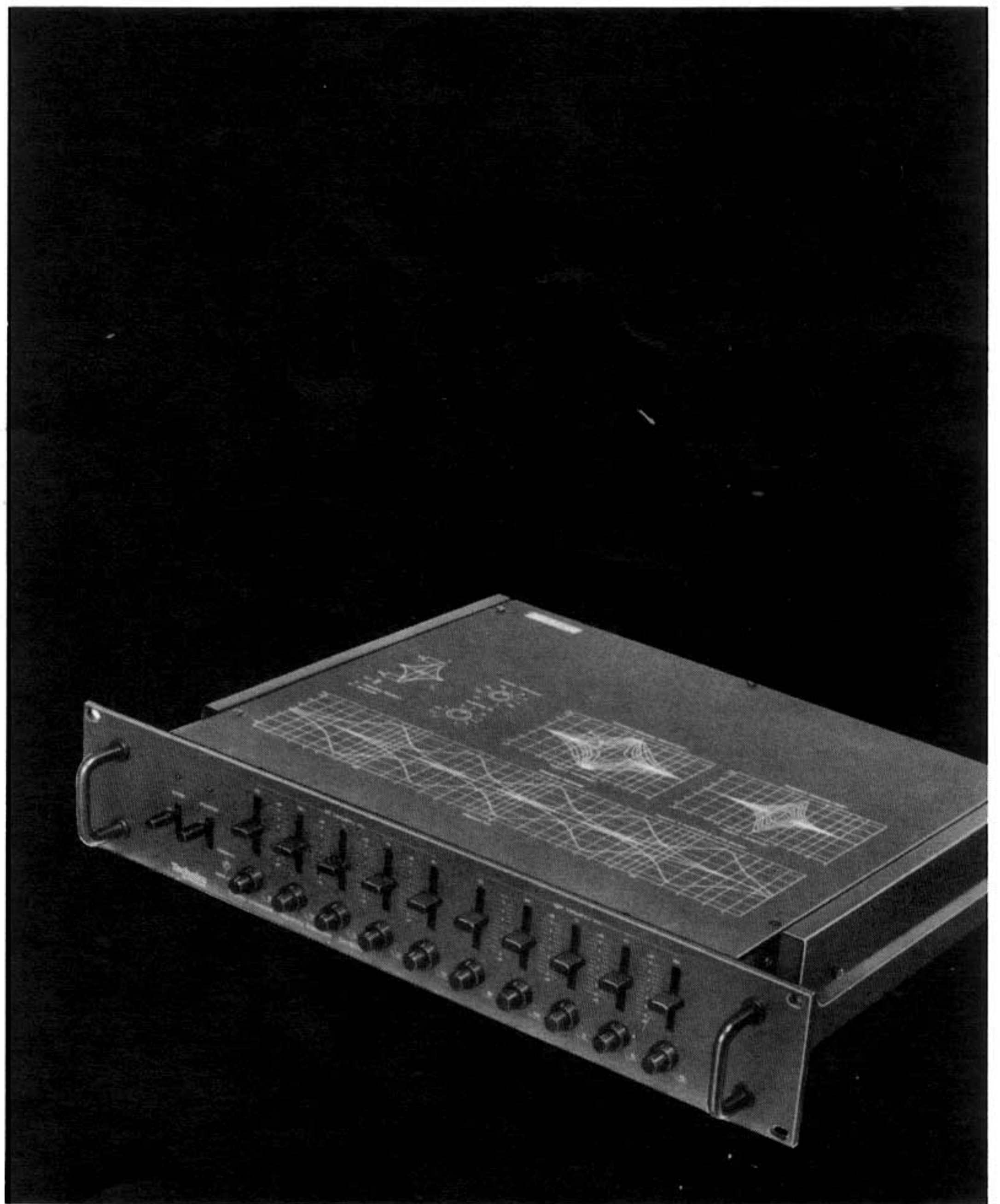
Technics

by Panasonic

Stereo Universal Frequency
Equalizer

SH-9010

OPERATING INSTRUCTIONS



Before operating this unit, please read these instructions completely.

Dear Stereo Fan

Thank you for selecting the "Technics by Panasonic" SH-9010 Stereo universal frequency equalizer.

The model SH-9010 is the result of the combined efforts of "Technics by Panasonic" engineers who have devoted many long years of research to improving the efficiency and sound reproduction of audio equipment.

Only the highest quality products have been used for even the smallest components, and each unit is designed so as to assure maximum reliability and high quality performance.

In order to assure that you will receive maximum benefit from the many features of this unit, we urge you to carefully read and follow the operating instructions in this booklet.

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MAINTENANCE

WARNING CONCERNING REMOVAL OF COVERS

NOTE: This unit should be serviced by qualified technicians only.

No service information is provided for customers.

PRODUCT SERVICE

Should your "Technics by Panasonic" product ever require servicing, refer to the Directory of Authorized Service Centers or your franchised "Technics by Panasonic" dealer for detailed instructions.

LOCATION OF SERIAL NUMBER

You will find the serial number located at the bottom of the unit.

HELPFUL HINTS

1. Keep this unit away from electrical noise-generating devices such as motors and fluorescent lamps.
2. The set should not be exposed to direct sunlight, and should be kept free from dust, moisture and vibration.
3. The cabinet of this unit should be given the same care which you would give any piece of fine furniture. The front panel should be cleaned with a soft cloth moistened with a mild soap-and-water solution. NEVER USE A SOLUTION CONTAINING BENZOL OR PETROLEUM.

The model number of this product may be found on the back of the unit; and the serial number, on the label affixed to the bottom of the unit.

You should note the model and serial numbers of this unit in the space provided and retain this insertion as a permanent record of your purchase to aid in identification in the event of theft.

MODEL NUMBER _____ SERIAL NUMBER _____

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

STAR FEATURES

This unit is a universal frequency equalizer which can be used for correction of the frequency response of sound from microphones, a phono cartridge, a tape recorder, an amplifier or from speakers, or for correction of the overall tone quality of sound from a complete audio system.

The frequency response can be controlled throughout the range of 20 Hz to 48 kHz, divided into 5 bands:

20 Hz~**60** Hz~180 Hz, 80 Hz~**240** Hz~720 Hz, 333 Hz~**1** kHz~3 kHz, 1.33 kHz~**4** kHz~12 kHz, 5.33 kHz~**16** kHz~48 kHz. (Numbers in bold type are center frequencies.) Each band uses an active filter consisting of only a capacitor and a resistor, thus making it possible to control each band individually.

■ Newly developed active filter, composed of capacitor and resistor only, used for each individual band

The double-integrated band-pass filters used in this unit are—unlike the conventional type consisting of coil and resistor—a new type which use no coils, resulting in a much better signal-to-noise ratio and improved overall performance.

■ Continuous variation of resonance frequency and resonance peak "Q"

Because the resonance frequency and the resonance peak "Q" of other frequency equalizers cannot be varied, it is not possible to get a consistent resonance peak characteristic when correcting the peaks and dips of the frequency response of, for example, a cartridge or speaker system, and the results are not therefore fully satisfactory for such frequency equalizers.

With this unit, the resonance frequency is continuously variable within a range of ± 1.6 octave, and the resonance peak "Q" is likewise continuously variable between 0.7 and 7. The result is truly revolutionary: it is now actually possible to set the frequency response to the desired value! For the first time it is has now become possible to completely control the frequency response—the ideal system! As equipment for professional use, it has an extremely wide range of useful applications: when cutting phonograph discs, when recording master tapes, and for correction of the entire frequency response of a concert hall—to name but a few of its uses.

The resonance frequency and resonance peak settings of this unit were, moreover, determined based on the results of measurements made during a great deal of analysis and actual trials.

■ Equalizer in/out switch

The effect of the equalizer circuitry can be easily checked by simply setting the equalizer in/out switch to its on or bypass position. The in/out position is shown by an indicator.

TECHNICAL SPECIFICATIONS

Output voltage and impedance:

Rated	1V/300 Ω (1 kHz)
Maximum	5V/300 Ω (1 kHz)
	(Band-level controls: 0 dB)

Total harmonic distortion: 0.02% (rated output)

Input sensitivity and impedance: 1V/47k Ω (1 kHz)

Frequency response (all band-level controls: 0 dB):

10 Hz~20 kHz,	+0 -0.2 dB
10 Hz~70 kHz,	+0 -3 dB

Gain: 0 ± 1 dB

S/N (IHF, A S = 1V): 90 dB

Band-level controls: +12 dB ~ -12 dB
(5 elements, continuously variable)

Center-frequency controls: From 1.6 octave above to 1.6 octave below the standard frequency
(5 elements, continuously variable)

Bandwidth controls [Q]: 0.7~7
(5 elements, continuously variable)

Center frequencies:
60 Hz (20 Hz~180 Hz)
240 Hz (80 Hz~720 Hz)
1 kHz (333 Hz~3 kHz)
4 kHz (1.3 kHz~12 kHz)
16 kHz (5.3 kHz~48 kHz)

GENERAL

Power consumption: 8W

Power supply: AC 60 Hz, 120V

Dimensions (W x H x D): 482 x 101 x 364 mm
19" x 3 $\frac{31}{32}$ " x 14 $\frac{11}{32}$ "

Weight: 6.0 kg, 13.2 lb.

ACCESSORIES

Connection cords (shielded cable)	2
Feet	4
Screws	4

STEREO SYSTEM COMPONENTS AND THEIR CONNECTIONS

Input terminals

Connect these terminals with the output terminals ("OUTPUT") of the pre-amplifier.

Output 1 terminals

Connect these terminals with the input terminals ("INPUT") of the power amplifier.

SH-9010

Output 2 terminals

For connection to a second power amplifier, etc.

Do not connect this unit to a power outlet until all other connections have been made. Keep the power switch in the "off" position.

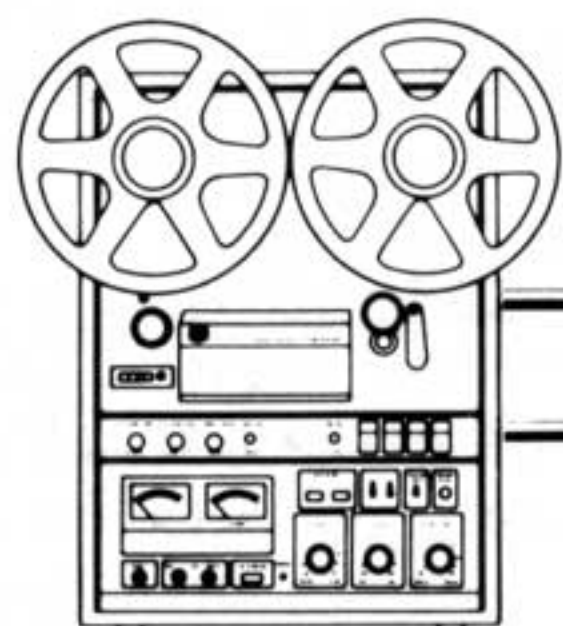
AC OUTLET "UNSWITCHED"

Any equipment connected to this outlet is always on regardless of the position of the power switch on the front panel. Capacity is 300W.

Shielded cable (included)

Shielded cable (included)

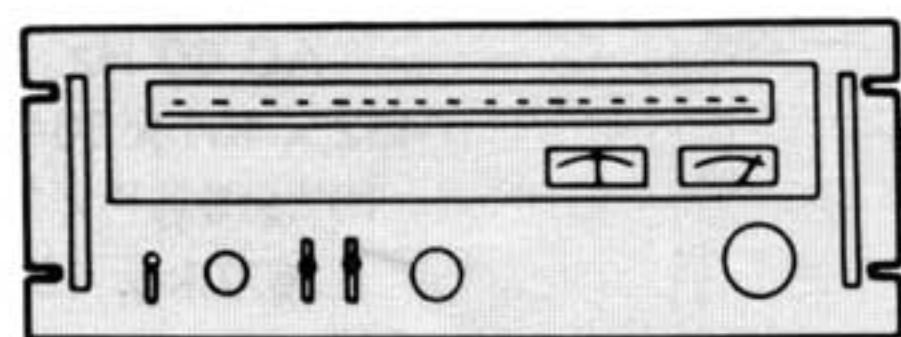
To AC outlet



Line output terminals ("LINE OUT")

Line input terminals ("LINE IN")

Tape deck (optional)



Stereo tuner (optional)

Ground terminal ("GND")

(R)(L)

(R)(L)

(R)(L)

Output terminals ("OUTPUT")

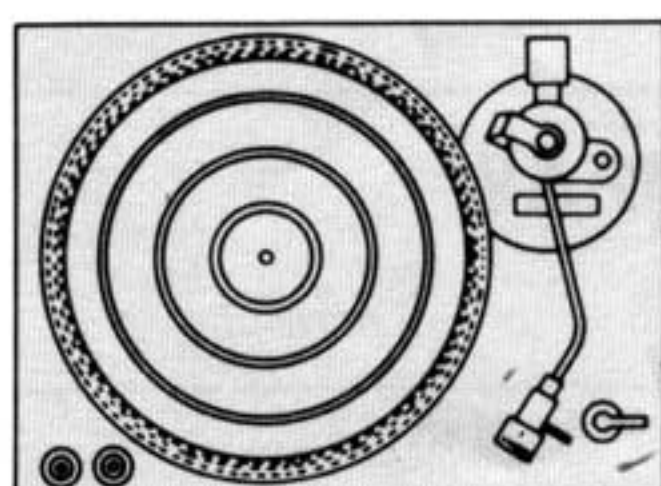
Pre-amplifier (optional)

Tuner input terminals ("TUNER")

Playback terminals ("PLAYBACK")

Phono input terminals ("PHONO")

Recording terminals ("REC OUT")



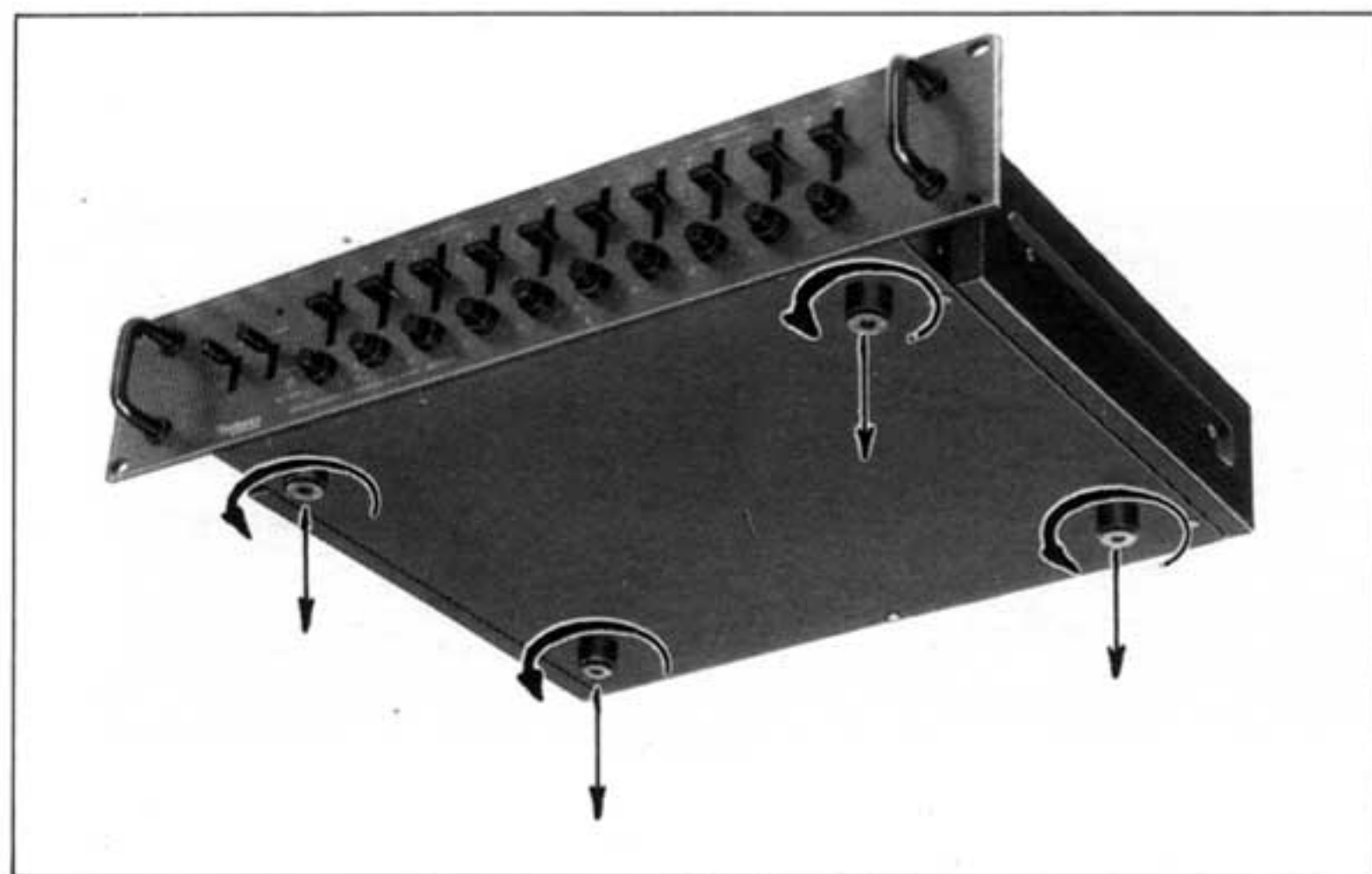
Record player (optional)

ATTACHMENT OF FEET (INCLUDED)

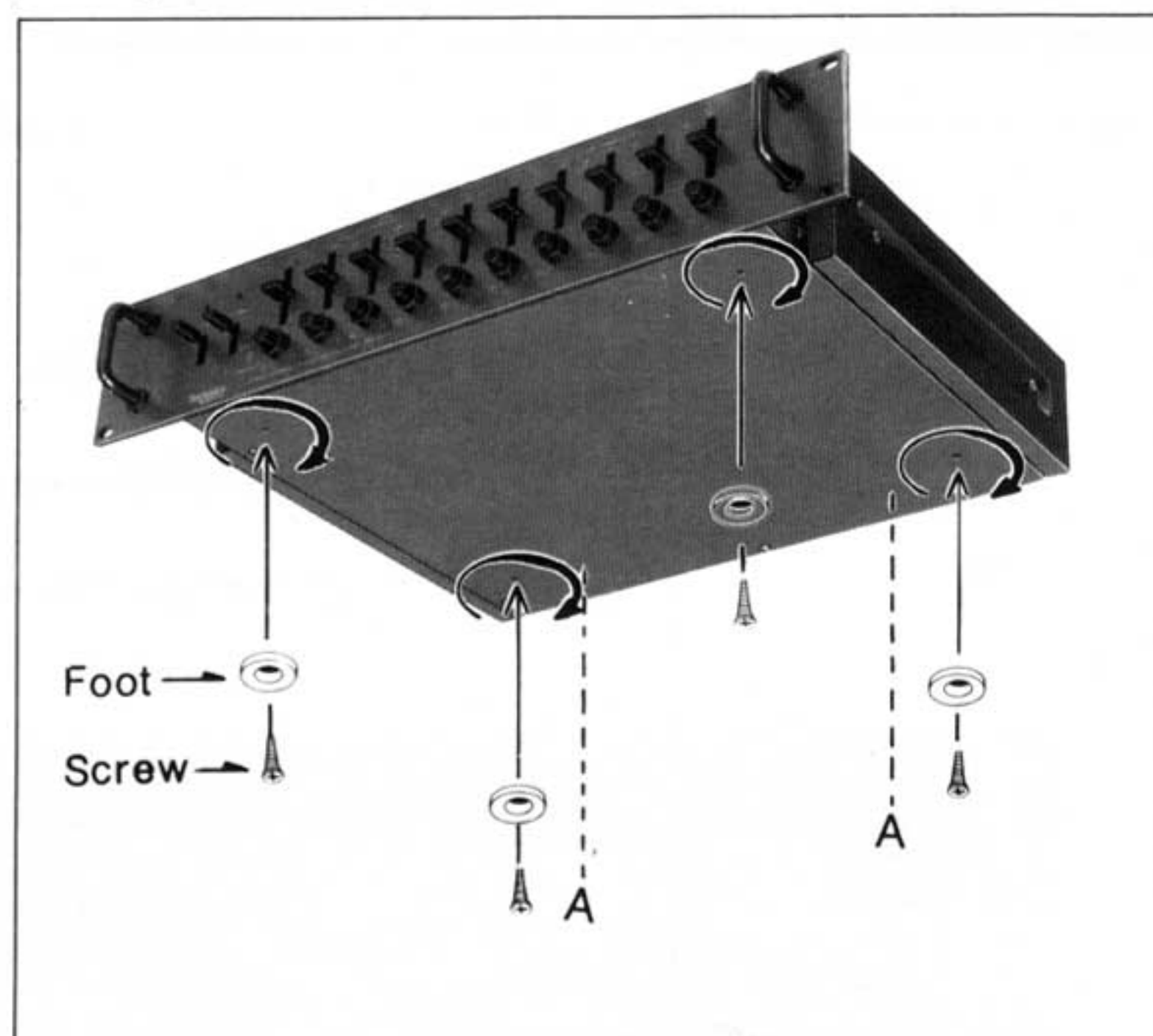
This unit has an extra set of 4 feet which, if installed, lower the height by 5 mm, to 96 mm. These feet are especially useful if other audio components in this series (models SU-9070, SE-9060, ST-9030 and SH-9020) are stacked one on top of another.

■ Attachment

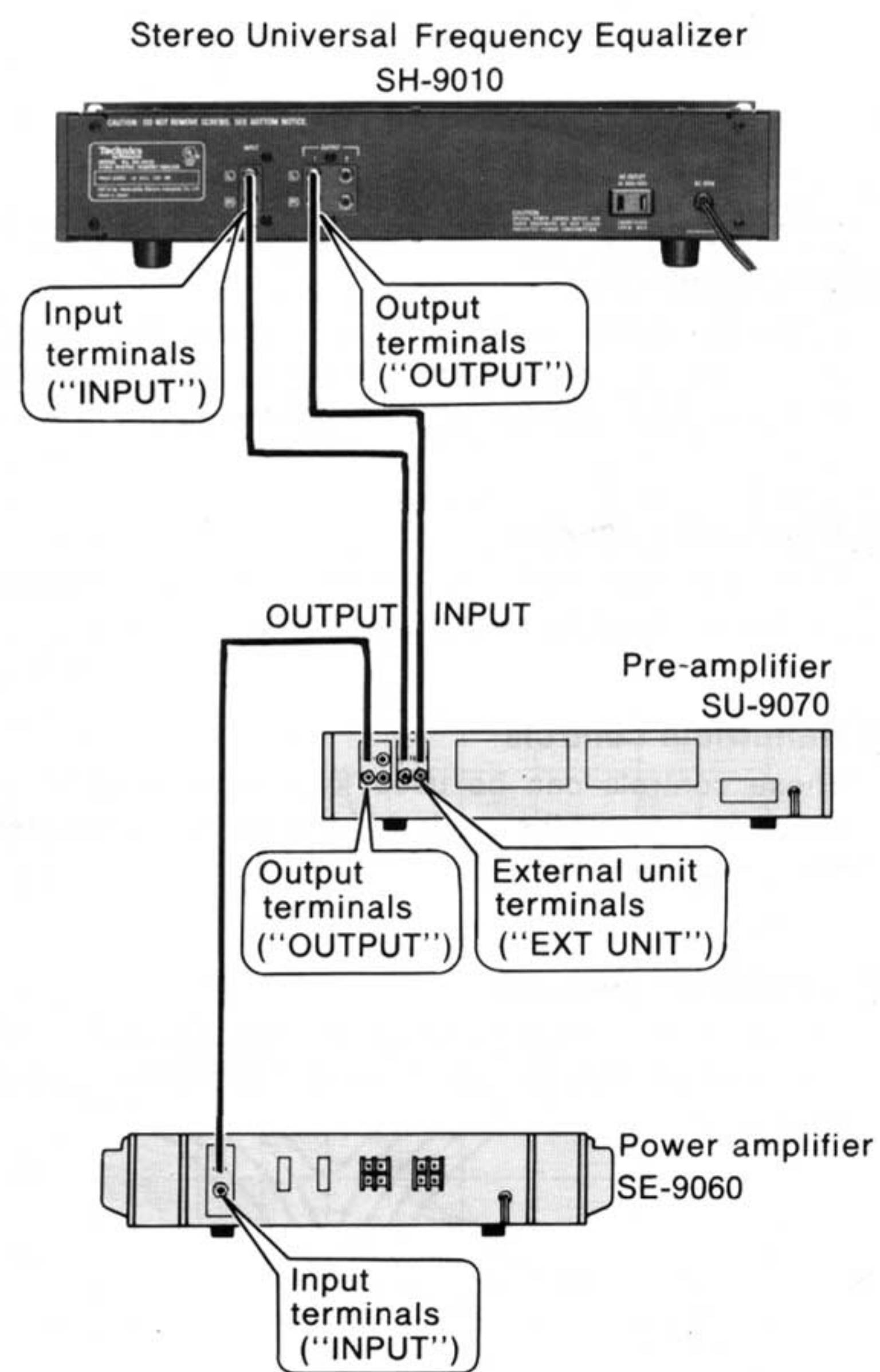
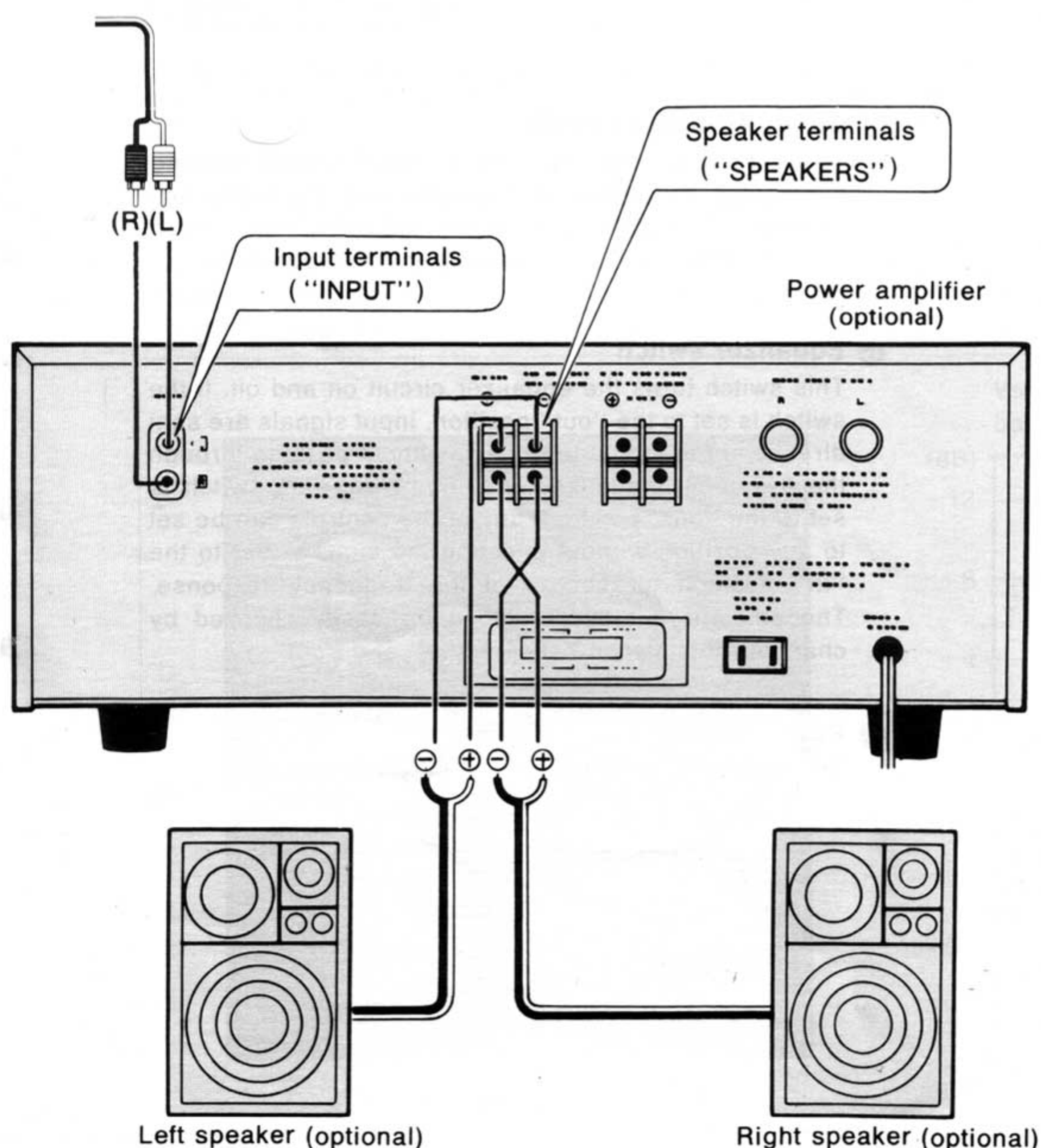
- 1 Remove the feet already attached to the bottom of the unit.



- 2 Attach the other set of feet (included) by using the screws (also included). Use the same holes as for the original feet.

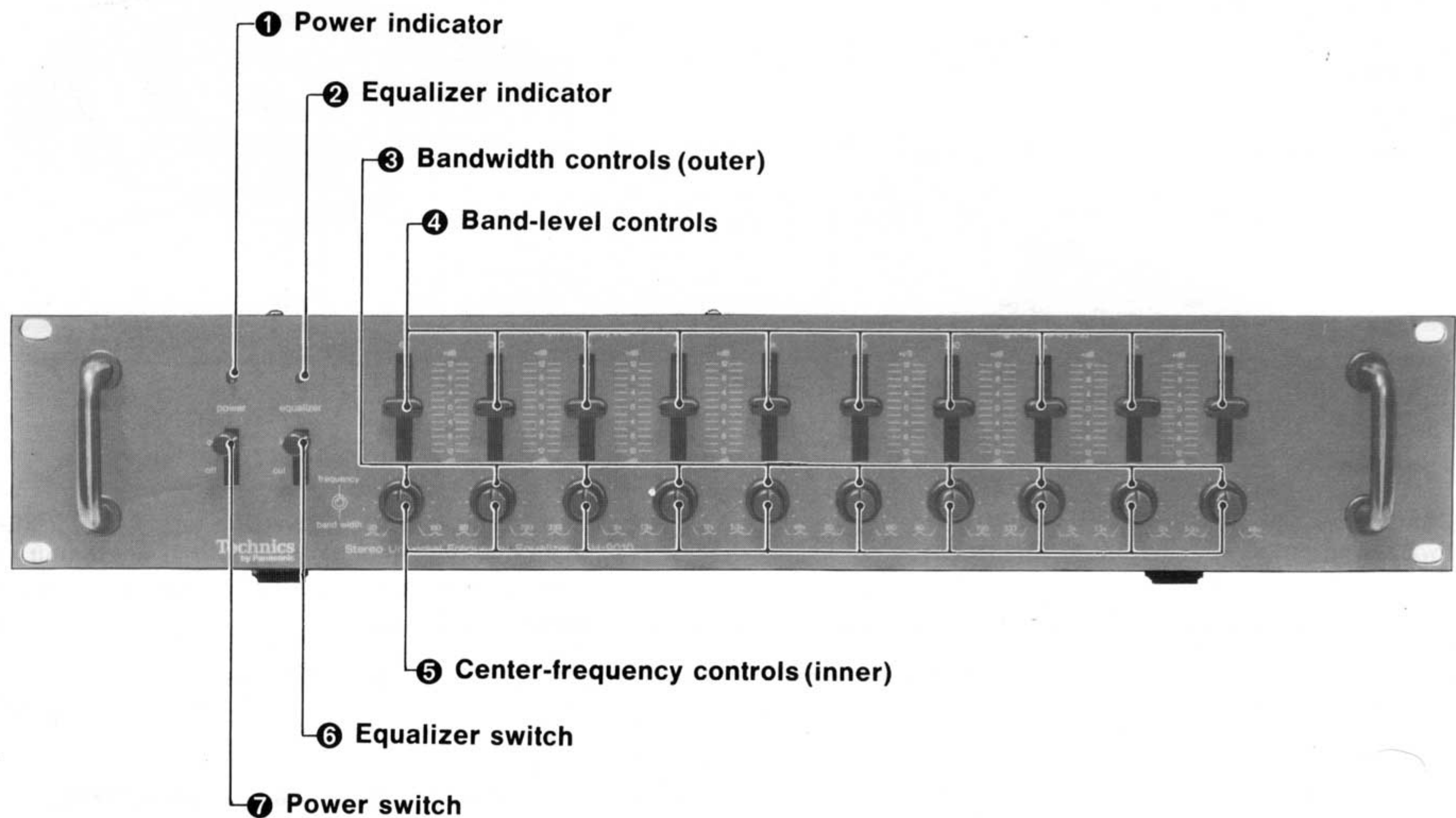


* If this unit is used stacked on top of model SE-9060, note that the 2 feet toward the rear of the unit should be attached to the 2 holes indicated "A" in the illustration.



For connection of this unit with the Technics stereo pre-amplifier model SU-9070 and with the Technics stereo power amplifier SE-9060:

CONTROLS AND THEIR FUNCTIONS



① Power indicator

When the power switch ⑦ is turned on, this indicator illuminates to indicate that the unit is in operation. This indicator remains illuminated during operation.

② Equalizer indicator

This indicator will illuminate when the equalizer switch ⑥ is set to the "in" position.

③ Bandwidth controls

These controls can be used for continuously varying the sharpness of the peak and the dip of the frequency response.

④ Band-level controls

These controls can be used for continuously varying the level of each frequency response from +12 dB to -12 dB.

⑤ Center-frequency controls

These controls can be used for continuously varying the center frequency of the peak and dip frequency response 1.6 octave upward and 1.6 octave downward with respect to the indicated standard frequency.

⑥ Equalizer switch

This switch turns the equalizer circuit on and off. If the switch is set to the "out" position, input signals are sent directly to the output terminals, without passing through the frequency equalizer circuitry. When this switch is set to the "in" position, any of the controls can be set to any position without effecting the signals. Set to the "in" position for control of the frequency response. The efficiency of this unit can be easily checked by changing this switch between "in" and "out".

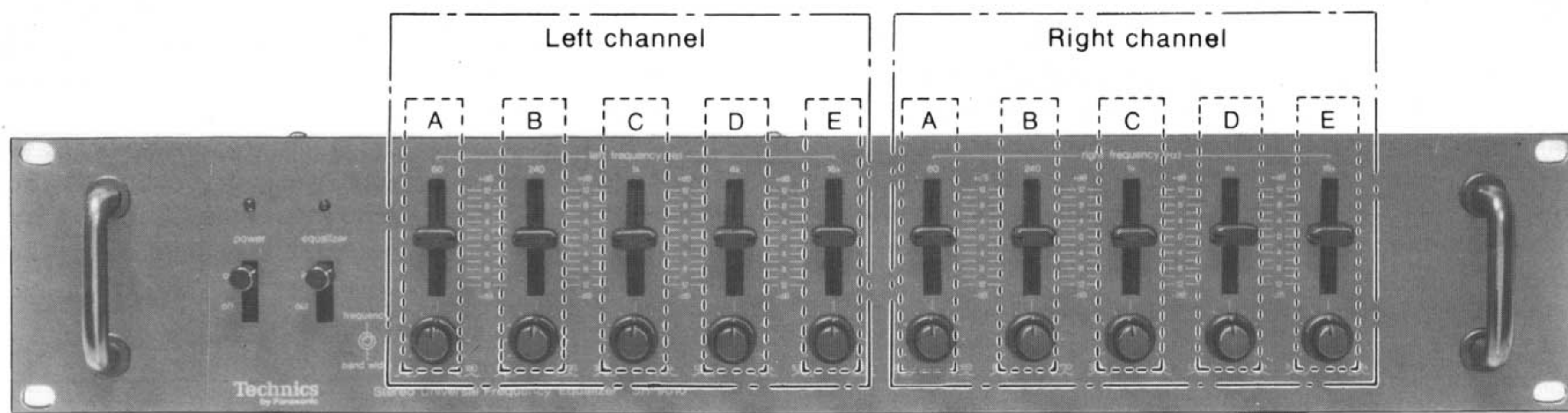
⑦ Power switch

This switch is used to turn the power on and off.

CONTROL OF THE FREQUENCY RESPONSE

The frequency response can be adjusted to the desired point, within a maximum range of from 20 Hz to 48 kHz (the level can be varied within an adjustment range of ± 12 dB) by using the 10 band-level controls, the 10 center-frequency controls, and the 10 band width controls (5 each for the left and the right).

- The 5 controls of each on the left are for adjustment of the left channel frequency response, and the 5 on the right are for the right channel.
- The 5 controls on the left and on the right are to be used for adjustment within the frequency range shown below. (Each control has an adjustment range of ± 12 dB.)



A Block: 20 Hz~180 Hz B Block: 80 Hz~720 Hz C Block: 333 Hz~3 kHz D Block: 1.3 kHz~12 kHz E Block: 5.3 kHz~48 kHz

The function of each control is explained below. Although the frequency range differs for each division, the actual operation of the controls for all 5 divisions is the same.

Band-level controls

These controls can be used for continuously varying the level of each frequency response from +12 dB to -12 dB.

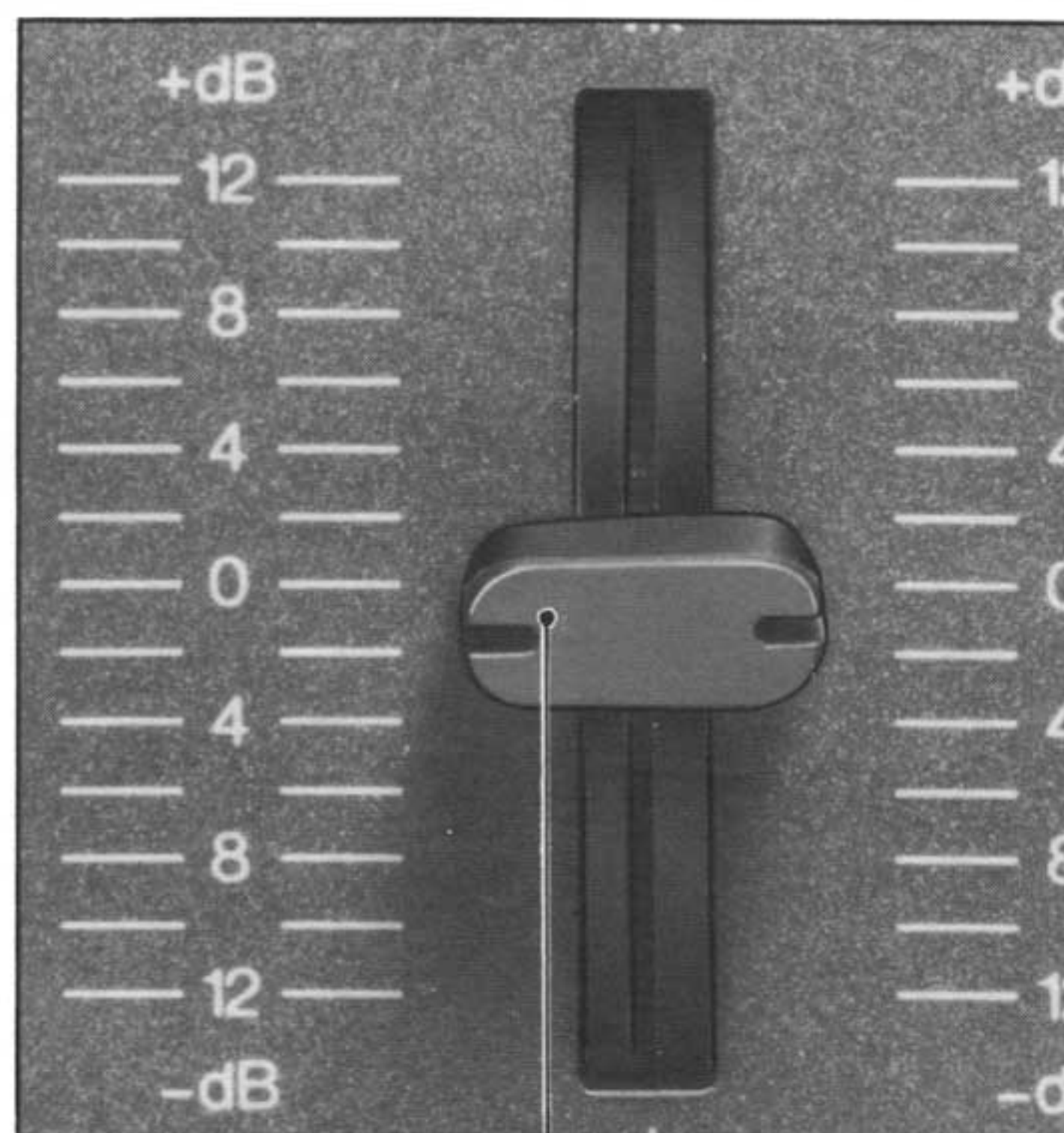
With the frequency response "flat" at the "0" position:

- The frequency response will have a "peak" when the controls are moved in the direction toward the "+dB" position, and will reach a maximum peak of +12 dB at the "12" position.

- The frequency response will have a "dip" when the controls are moved in the direction toward the "-dB" position, and will reach a maximum dip of -12 dB at the "12" position.

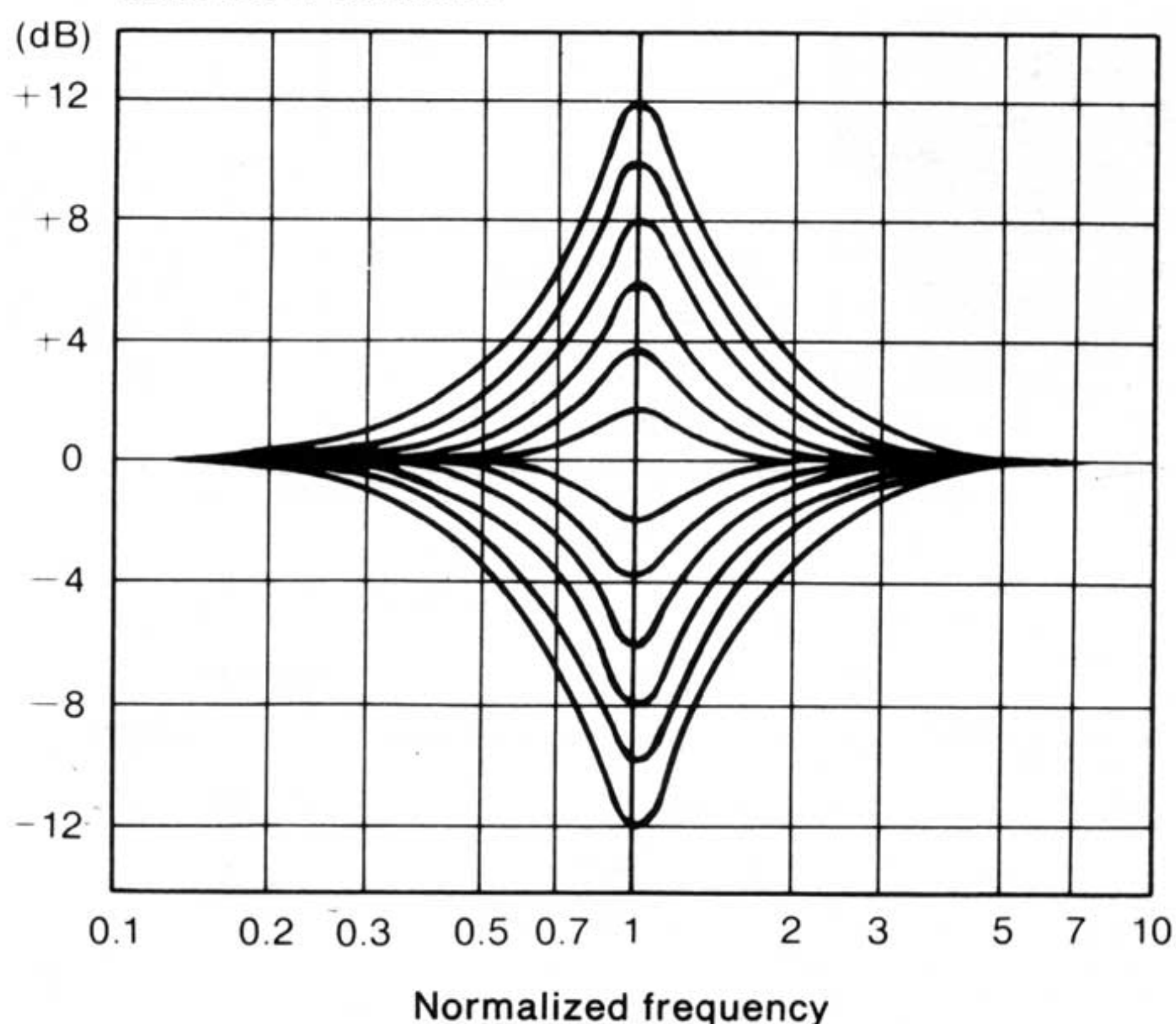
The figure shows the changes in the frequency response when the band-level controls are used.

Each of the 5 left and 5 right controls can be used to vary the frequency response with the same characteristic curve.



Band-level control

Variations of the frequency response, as caused by the band-level controls.



CONTROL OF THE FREQUENCY RESPONSE

(continued)

Center-frequency controls

These controls can be used for continuously varying the center frequency of the peak and dip frequency response 1.6 octave upward and 1.6 octave downward with respect to the indicated standard frequency.

This range of variation (1.6 octave upward and downward) is a range of from 1/3 to 3 times the standard frequency. (The standard frequencies, indicated on the front panel, are: 60 Hz, 240 Hz, 1 kHz, 4 kHz and 16 kHz.) When the index mark of the control is at the center, the center frequencies are the standard frequencies shown on the front panel.

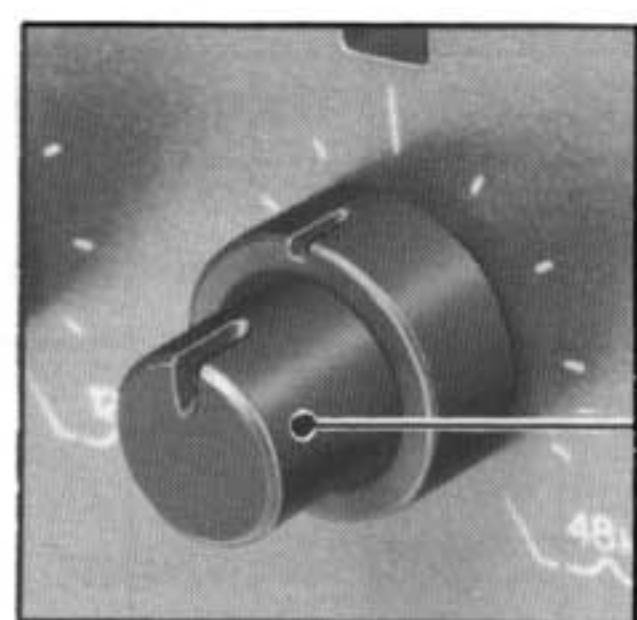
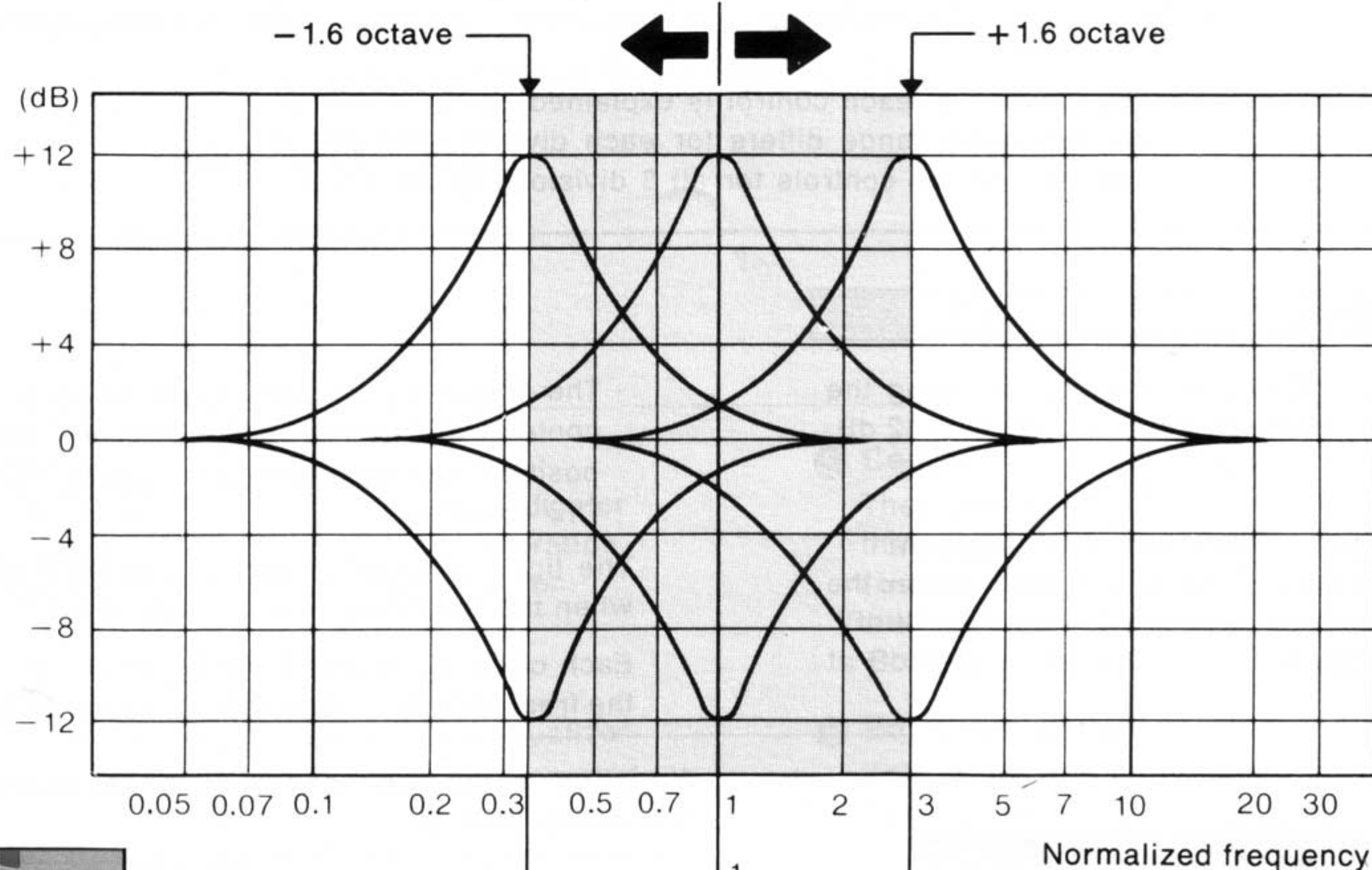
- When the control is turned to the left, the center frequency

becomes lower, and, when turned all the way to the left, the center frequency becomes 1/3 of the standard frequency.

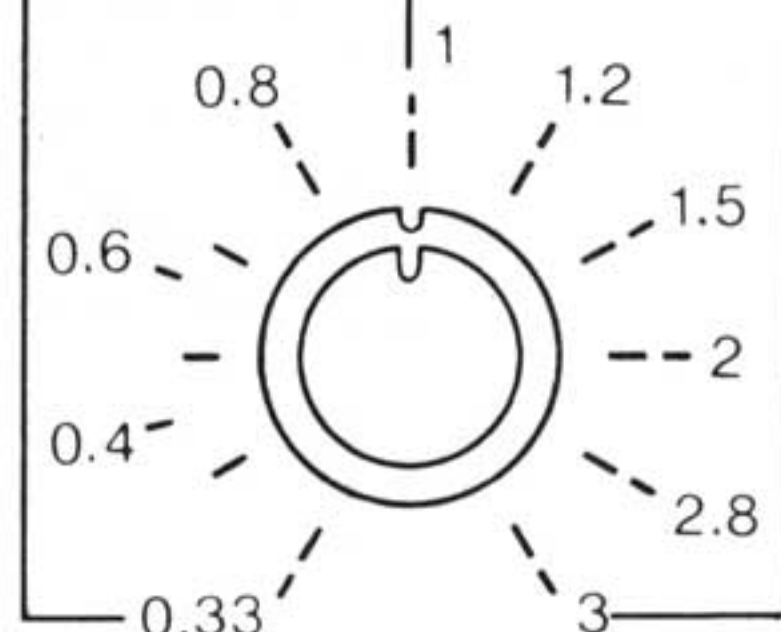
When the control is turned to the right, the center frequency becomes higher, and, when turned all the way to the right, the center frequency becomes 3 times the standard frequency.

The figure shows the frequency response curves which result from using the center-frequency controls. Each of the 5 left and 5 right controls can be used to vary the frequency response in the same way, and thus result in the same curve shapes.

Variations of the frequency response, as caused by the center-frequency controls.



Center-frequency control



Bandwidth controls

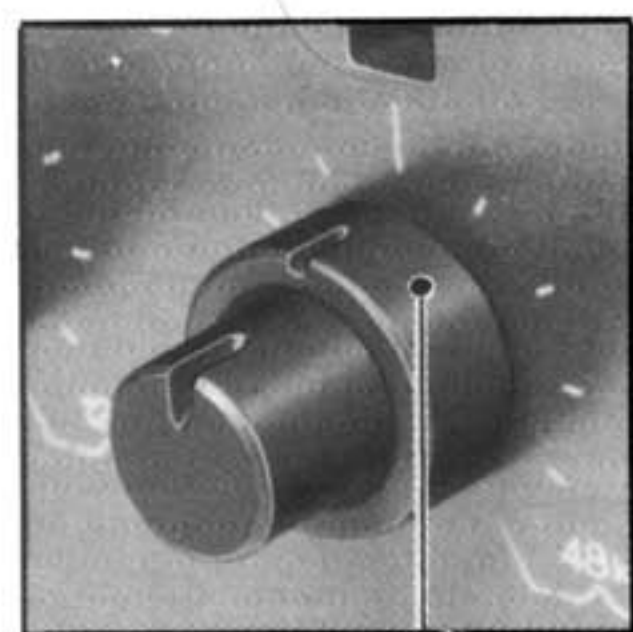
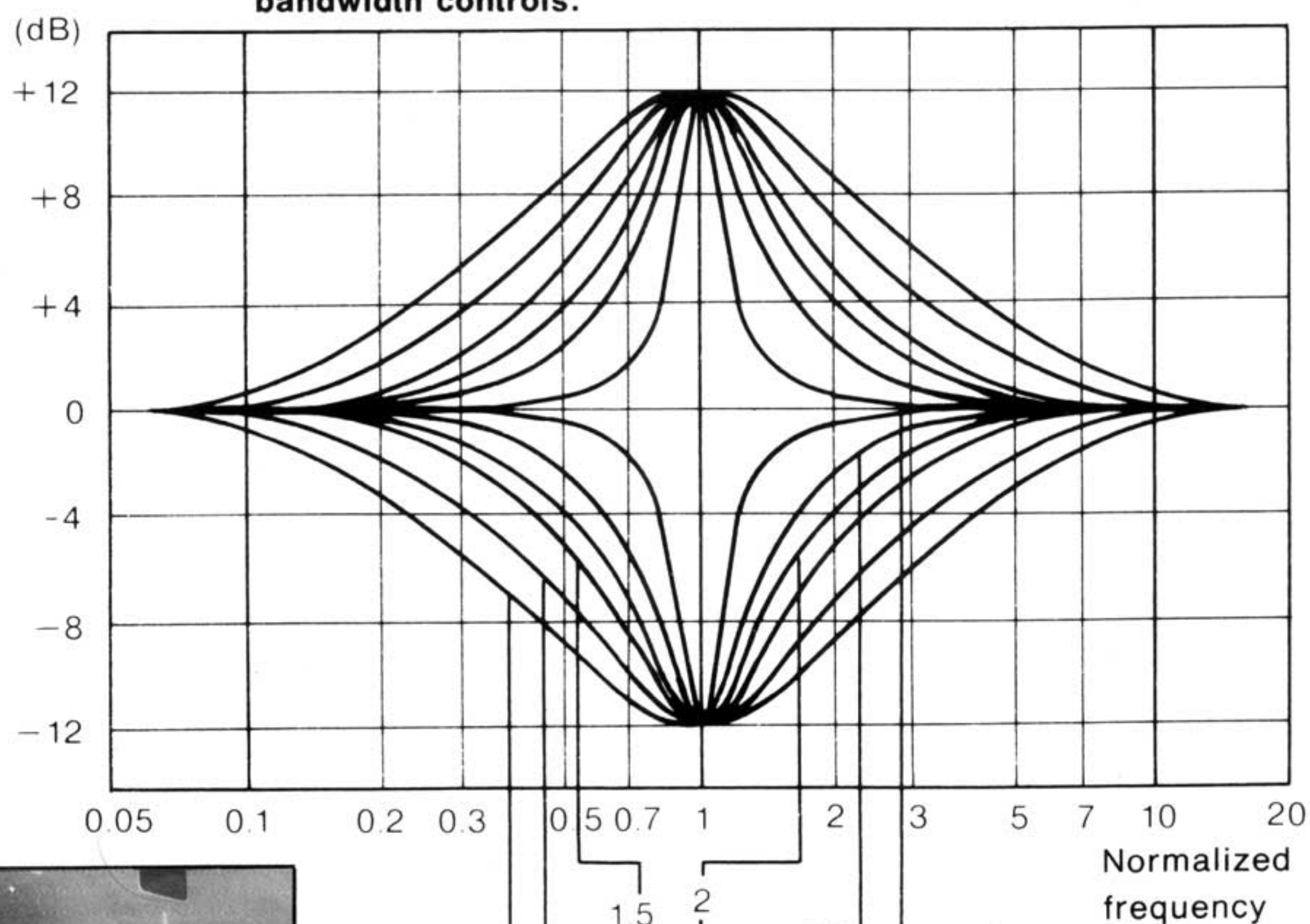
These controls can be used for continuously varying the sharpness of the peak and the dip of the frequency response.

The sharpness of the peak and dip is expressed by the letter Q. By using these controls, the value of Q shown in figure 2 ("Definition of Q") can be continuously varied within a range of from 0.7 to 7 times. The value of Q becomes larger as the peak or dip becomes sharper. When the index mark of the control is at the center, the value of Q is 2.

- When the bandwidth controls are turned to the left, the value of Q becomes smaller (the peak or dip becomes less sharp), and, when turned all the way to the left, the value of Q becomes 0.7.
- When the bandwidth controls are turned to the right, the value of Q becomes larger (the peak or dip becomes sharper), and, when turned all the way to the right, the value of Q becomes 7 times higher.

Figure 1 shows the frequency response curves which result from using the bandwidth controls. Each of the 5 left and 5 right controls can be used to vary the frequency response in the same way, and thus result in the same curve shapes.

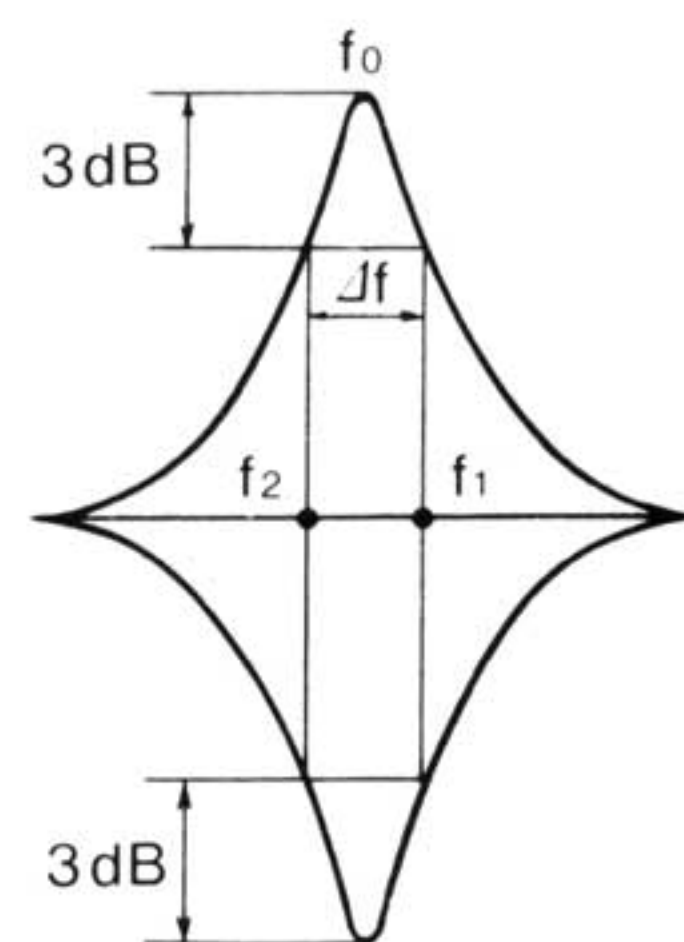
Variations of frequency response, as caused by the bandwidth controls.



Bandwidth control

Figure 1

Definition of "Q"

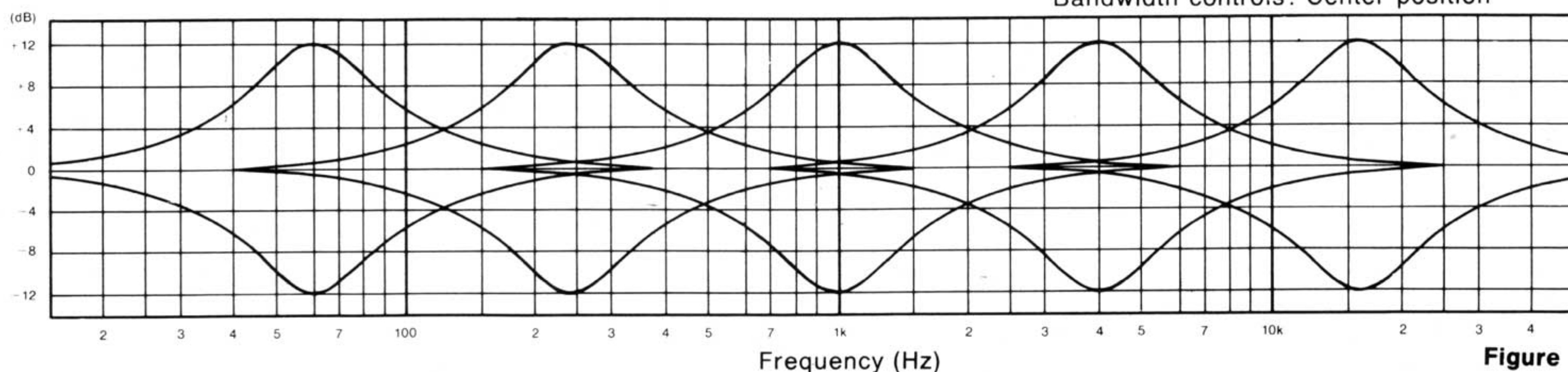


"Q" expresses the sharpness of the peak and the dip, and its value is expressed as the value obtained when the center frequency (f_0) is decreased by 3 dB less than the peak point (the dip point is increased by 3 dB), and is divided by the frequency range ($\Delta f = f_1 - f_2$).

$$Q = \frac{f_0}{\Delta f}$$

Figure 2

Total frequency response



Center-frequency controls: Center position
Bandwidth controls: Center position

Figure 3

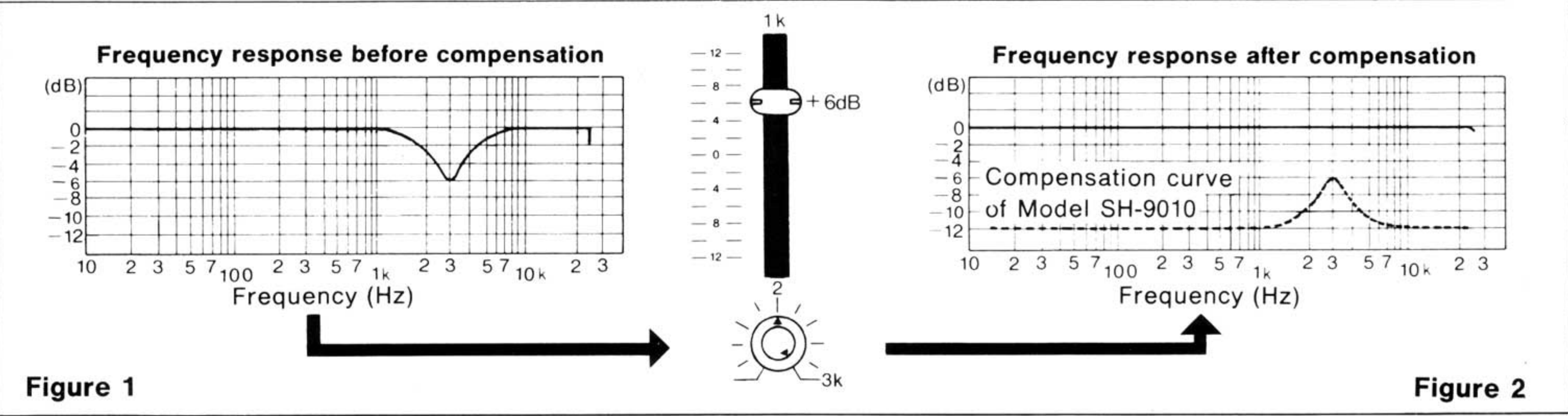
FREQUENCY-RESPONSE-CHECK GRAPHS

These check graphs can be used to make notations of the adjustment position of each of the controls of this unit when making frequency response compensations for a phono cartridge, speakers, etc., or when making acoustical compensation of the sound quality for your complete audio system. If, for example, you want to make compensa-

tion for a frequency response which has a 3-kHz "dip" such as shown in figure 1, make a notation of the adjustment position settings of each of the 3 controls, as shown in the figure.

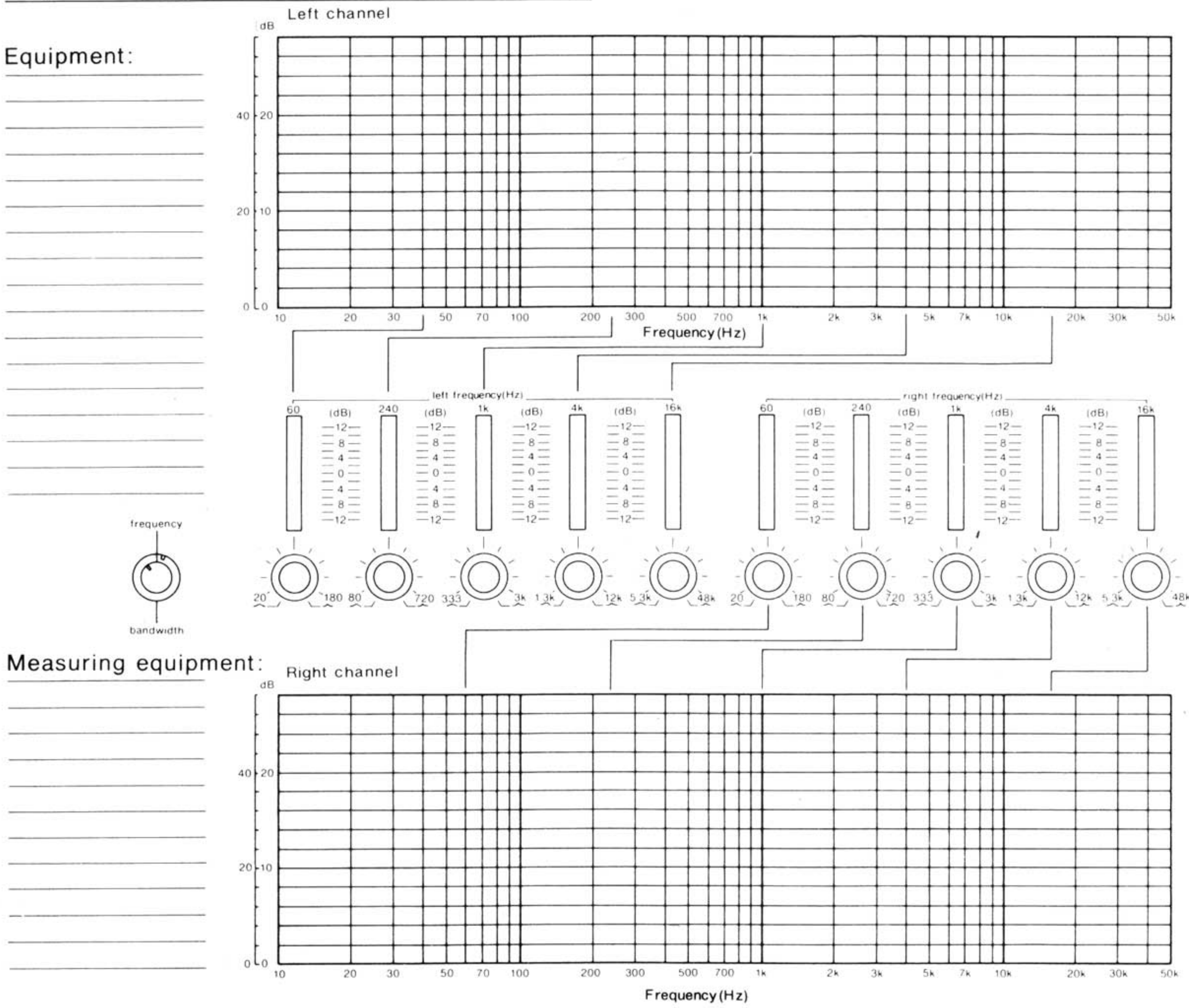
In this way, by noting the frequency response and adjustment position setting of each control, it is easy, after making frequency response compensations of other equipment, to once again make compensations of the frequency response shown in the figure.

Please use these graphs for most effective use of this unit and to obtain its maximum performance.



Subject: _____

Equipment:



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