YAMAHA EQ-500U

Natural Sound Stereo Graphic Equalizer

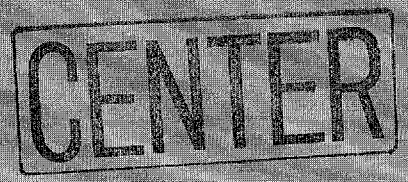
10 Bands of ±12 dB EQ per Channel

10-Band Frequency Spectrum Analyzer

Built-in Pink Noise Generator

Electret Condenser Microphone Supplied

Thank you for purchasing the YAMAHA EQ-500U stereo graphic equalizer.



OWNER'S MANUAL

CONTENTS

IMPORTANT

Please record the serial number of your unit in the space below.

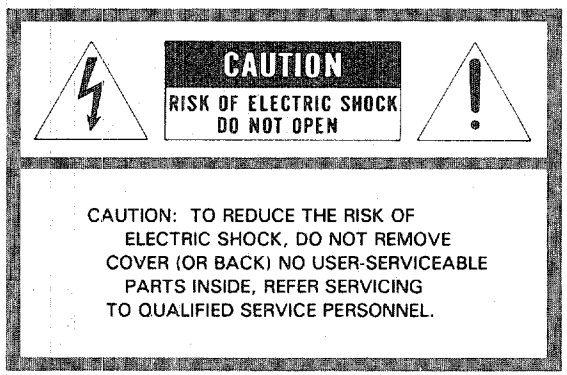
Model: **EQ-500U**
Serial No.:

The serial number is located on the rear of the unit.
Retain this Owner's Manual in a safe place for future reference.

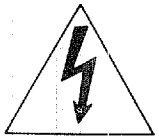
WARNING

To prevent fire or shock hazard, do not expose this appliance to rain or moisture.

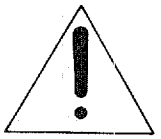
EQ-500U



- **Explanation of Graphical Symbols**



The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert you to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert you to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

SAFETY INSTRUCTIONS

1 Read Instructions — All the safety and operating instructions should be read before the appliance is operated.

2 Retain Instructions — The safety and operating instructions should be retained for future reference.

3 Heed Warnings — All warnings on the appliance and in the operating instructions should be adhered to.

4 Follow Instructions — All operating and other instructions should be followed.

5 Water and Moisture — The appliance should not be used near water — for example, near a bathtub, washbowl, kitchen sink, laundry tub, in a wet basement, or near a swimming pool, etc.

6 Carts and Stands — The appliance should be used only with a cart or stand that is recommended by the manufacturer.

7 Wall or Ceiling Mounting — The appliance should be mounted to a wall or ceiling only as recommended by the manufacturer.

8 Ventilation — The appliance should be situated so that its location or position does not interfere with its proper ventilation. For example, the appliance should not be situated on a bed, sofa, rug, or similar surface, that may block the ventilation openings; or cabinet that may impede the flow of air through the ventilation openings.

9 Heat — The appliance should be situated away from heat sources such as radiators, stoves, or other appliances that produce heat.

10 Power Sources — The appliance should be connected to a power supply only of the type described in the operating instructions or as marked on the appliance.

11 Power-Cord Protection — Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the appliance.

12 Cleaning — The appliance should be cleaned only as recommended by the manufacturer.

13 Nonuse Periods — The power cord of the appliance should be unplugged from the outlet when left unused for a long period of time.

14 Object and Liquid Entry — Care should be taken so that objects do not fall into and liquids are not spilled into the inside of the appliance.

15 Damage Requiring Service — The appliance should be serviced by qualified service personnel when:

A. The power-supply cord or the plug has been damaged; or
B. Objects have fallen, or liquid has been spilled into the appliance; or
C. The appliance has been exposed to rain; or
D. The appliance does not appear to operate normally or exhibits a marked change in performance; or
E. The appliance has been dropped, or the cabinet damaged.

16 Servicing — The user should not attempt to service the appliance beyond those means described in the operating instructions. All other servicing should be referred to qualified service personnel.

17 Grounding or Polarization — The precautions that should be taken so that the grounding or polarization of an appliance is not defeated.

CAUTION: READ THIS BEFORE OPERATING YOUR EQ-500U

1
For optimum operation of this sophisticated stereo graphic equalizer, read this manual carefully for proper installation and connecttion.

2
For best results, the EQ-500U should not be placed in direct sunlight or near a heat source. Choose a location free from vibrations and excessive dust, cold, or moisture, and do not place near sources of hum such as transformers or motors.

3
If a foreign object falls into set, or if the set must be opened for any reason, contact your dealer to avoid risking damage to the unit or shock:

4
Do not apply excessive force to switches and knobs..

5
If the unit must be moved, first pull out the power cord and disconnect all connection wires.

6
To prevent damage to the EQ-500U's finish, do not clean with chemical solvents. Instead, use a clean, dry cloth.

7
Read the "troubleshooting" section in this manual for common operating errors if any problems occur. If they cannot be remedied in this way, contact your dealer.

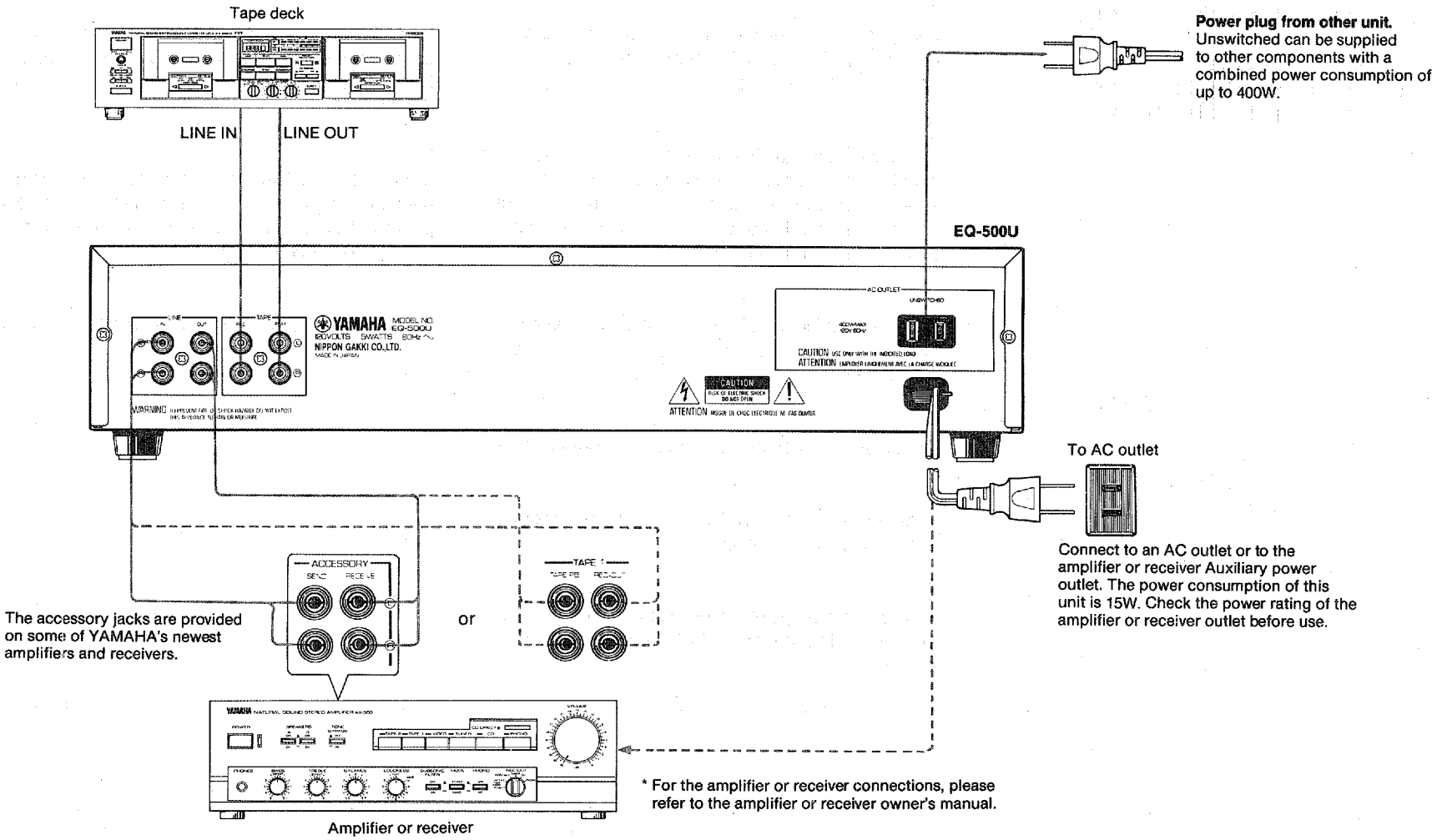
8
Check power requirements of audio components before connecting them to the AC outlet on the back panel. If they require more power than the outlet can provide do not connect them.

9
Keep this manual in a safe place for future reference.

EQ-500U

CONNECTIONS

- When connecting your equipment, turn the power to each unit off and make sure that you have correctly connected the Left (L) and Right (R) channels.



■ CONNECTING AN AMPLIFIER OR RECEIVER

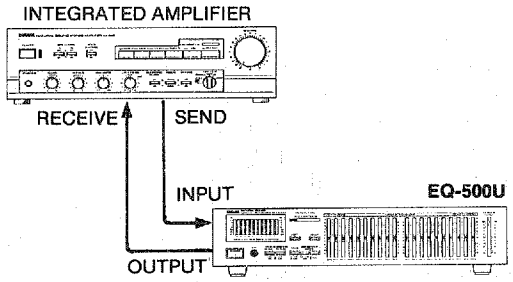
Check from the connection diagram that you have made the correct connections. Please note that input procedures and program source selection may vary according to the capabilities of the amplifier or receiver and the connections between it and this unit.

● To connect an integrated amplifier or receiver using the ACCESSORY jacks:

The ACCESSORY jacks are provided on some of Yamaha's newest amplifiers and receivers.

1. Connect the SEND jacks of the ACCESSORY jacks to the LINE IN of this unit.
2. Connect the RECEIVE jacks of the ACCESSORY jacks to the LINE OUT of this unit.

The program source selected with the integrated amplifier's or receiver's input selector can be equalized.

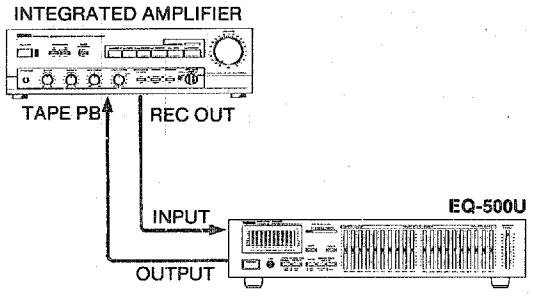


● To connect an integrated amplifier or receiver without using the ACCESSORY jacks:

1. Connect the REC OUT jacks of the TAPE jacks to the LINE IN of this unit.
2. Connect the TAPE PB jacks of the TAPE jacks to the LINE OUT of this unit.

The following operations can be carried out via the amplifier or receiver:

Amp	Program Source	Setting
With a REC OUT selector.	Selected with the REC OUT Selector.	Set the INPUT SELECTOR to TAPE.
With a TAPE MONITOR switch.	Selected with the input selector.	Turn the TAPE MONITOR switch ON.

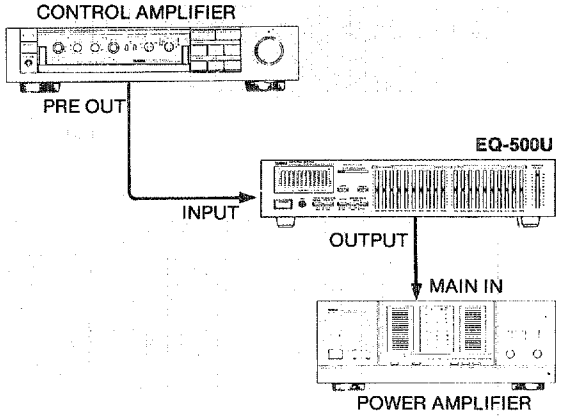


● To connect a separate amplifier or receiver:

1. Connect the PRE OUT jacks of the control amplifier to the LINE IN jacks of this unit.
2. Connect the MAIN IN jacks of the power amplifier to the LINE OUT jacks of this unit.

In this way, you will be able to equalize the program source selected with the control amplifier input selector.

The pink noise level cannot be adjusted with the control amplifier's volume control. Adjust the volume level with the OUTPUT LEVEL control of this unit.



■ CONNECTING A TAPE DECK

Connect the tape deck to the TAPE jacks. Connect the PLAY jacks to the tape deck's LINE OUT terminal, and the REC jacks to the tape deck's LINE IN jacks.

■ AUXILIARY POWER OUTLET (AC OUTLET)

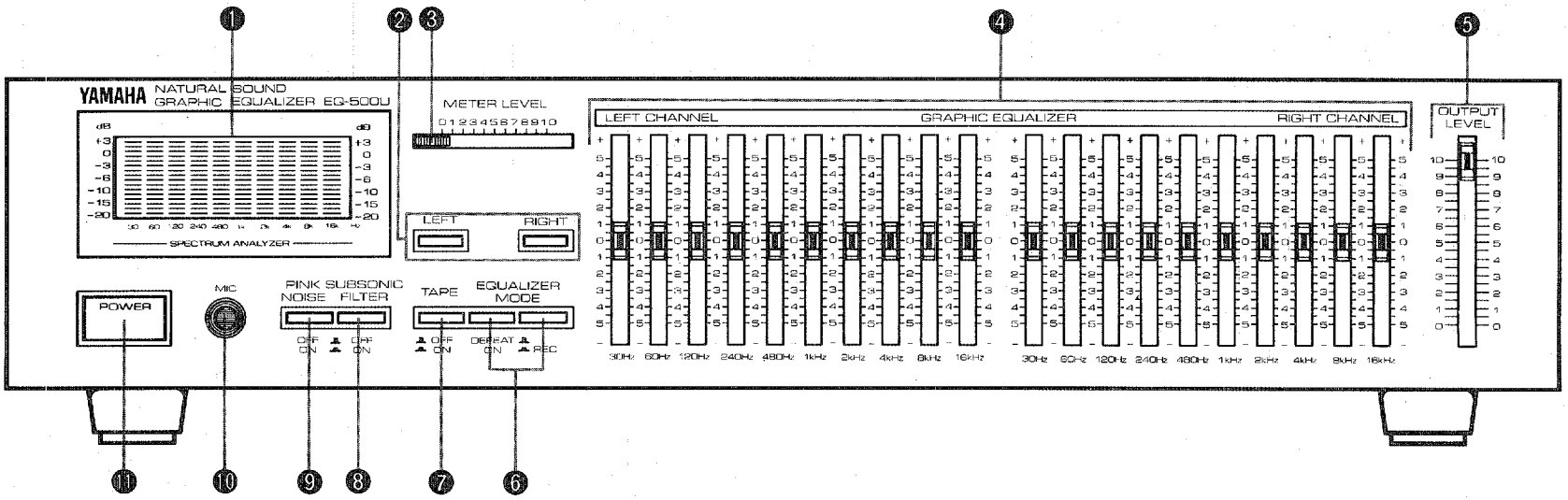
This is an unswitched auxiliary outlet which can be used to supply power to other audio equipment. The other equipment must have a power consumption rating less than 400W. Power will be supplied even if this unit is turned off.

CAUTION:

Always be sure to check that the power consumption of the unit you are connecting is less than 400W.

EQ-500U

FRONT PANEL PARTS AND FUNCTIONS



❶ FREQUENCY SPECTRUM ANALYZER

This frequency spectrum analyzer divides a 30 Hz — 16 kHz frequency range into 10 bands and displays the relative signal level of each band. Since the frequency of each band corresponds to an equalizing control frequency, you can check the equalizing effect directly.

❷ Meter select switches

These switches are used to select the SPECTRUM ANALYZER display mode.

These buttons allow you to independently select a spectrum analyzer display of output level on the left and right channels, respectively. When both buttons are pressed, the spectrum analyzer displays a combined output level of both channels.

* When the PINK NOISE switch is ON, the LEFT and RIGHT switches can be used to display the pink noise level.

❸ METER LEVEL control

This is used to control the level displayed by the spectrum analyzer. No display will appear when the knob is at the "0" position. The variable level display it provides facilitates monitoring a wide range of relative output levels with ease.

❹ GRAPHIC EQUALIZER controls

Independent level controls for both the left and right channels are provided for each of the ten frequency bands. These are sliding type controls, and in the center position provide no level boost or cut. A ±12. dB range of equalization is available on each frequency band. Red LED indicators on each control light when the left EQUALIZER MODE switch is set to ON, providing visual confirmation of level settings at a glance. When the left EQUALIZER MODE switch is set to DEFEAT, these controls will have no effect, regardless of their settings.

• 30 Hz slide control
Moving this slide control down reduces very low frequency rumble, or compensates a warped disc. Moving the slide control up emphasizes the very low frequencies.

• 60 Hz slide control
Moving this slide control down reduces AC line hum and (reduces) the lower tone. Moving slide control up emphasizeslow tones such as pipe organ, drums, bass, etc.

• 120 Hz slide control
This range supports the lower end of the music and controls overall depth. The slide control may be moved down to eliminated "boomy bass" caused by room acoustics.

• 240 Hz slide control
This is the middle-to-lower tone range, but it has an effect on the overall sound. Mainly, the richness of the strings can be controlled. When strings are overly warm under actual listening conditions, moving the slide control down may help.

• 480 Hz slide control
This range is the foundation of music including both instruments and the human voice and it controls the overall power of the sound. As the slide control is moved up, midrange sounds will become more forward.

• 1 kHz slide control
This range affects the presence of the music (depth of tone), and is especially effective when playing back vocals. Moving the slide control up and down will cause the vocals to be more "up front" or more reserved.

• 2 kHz slide control
This is the frequency range where the human ear is most sensitive. Boosting the level slightly will add brilliance, crispness, etc. to instruments. Cutting the level slightly makes for easy listening.

• 4 kHz slide control
The human ear is also highly sensitive in this range. Mainly effective for increasing/decreasing the harmonics of the primary tone. Boosting this range a bit makes strings more intense. Over-intense, tiresome music becomes easy listening when the slide control is moved down.

• 8 kHz slide control
High frequency range. Strings, horns, etc. will be emphasized and this gives a slight difference in tone glaze and quality. Moving the slide control down reduces over-emphasized consonants in vocals and objectionable tape hiss. Moving the slide control up, on the other hand, improves the sharpness of such instruments as cymbals.

• 16 kHz slide control
Super-high frequency range. This affects high harmonics rather than the fundamental tones of the instruments themselves, and has an effect on the delicacy and atmosphere of the music. Moving the slide control up adds a delicate, fresh sound to cymbals, triangles, etc.

⑤ OUTPUT LEVEL control
This controls LINE OUTPUT level of this unit.
* REC OUT level cannot be changed.

⑥ EQUALIZER MODE switches
Selects the equalization mode.
DEFEAT: No equalization — flat response is achieved.
ON: The equalizer control indicators light up and equalization can be effected.
REC: The signal routed to the Rec Out terminals is equalized.

⑦ TAPE monitor switch
Used to select a tape deck for tape monitoring.

⑧ SUBSONIC FILTER switch
This switches the subsonic filter on and off to cut frequencies in the 15 Hz range as selected by the SUBSONIC FILTER controls.

⑨ PINK NOISE switch
Pink noise, which is emitted by a built-in generator, is a random noise signal which is distributed at an even level at all frequencies, and when monitored through the supplied microphone, allows you to measure the acoustic response characteristics of the listening environment.

⑩ MIC jack
This is the input terminal for the microphone to be used with the spectrum analyzer to measure the acoustic response characteristics of the listening environment.

⑪ POWER switch
This switch turns the power to this unit ON and OFF. The switch is pressed once to turn the power on, and a second time to turn the power off.

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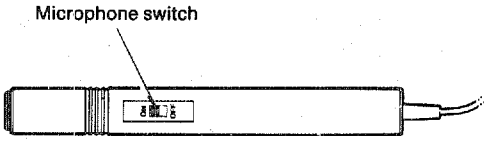
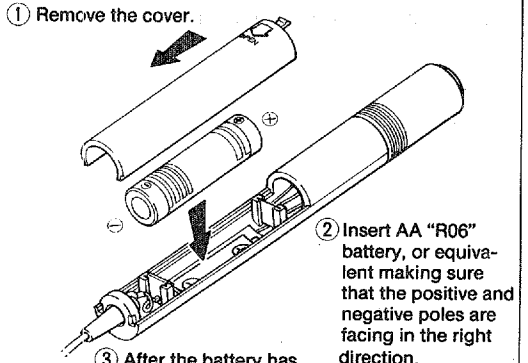
THE MM-110 ELECTRET CONDENSER MICROPHONE

An electret condenser microphone for use in measuring the acoustic response characteristics of the listening environment is provided with this unit. Microphone input will be displayed on the spectrum analyzer when the microphone is connected to the front panel MIC jack, the MIC switch is turned on, and a signal of level high enough to be measured is output through the speakers.

* Remove the battery from the microphone if you do not expect to be using it for some time.



Changing the battery



If the battery runs down, the sensitivity of the microphone will decrease. Change the battery as soon as it starts to run down.

Battery Cautions

If the battery is replaced incorectly, dangerous leakage or collosion may result. Be especially careful of the following points:

When replaceing:

- Insert the battery with correct (+) and (–) indications correctly into the battery compartment.

Rechargeable batteries:

- There are two types of batteries; rechaargeable and nonrechargeable. Check the cautions label on the battery before use.

To avoid accidents:

- Never disassemble, heat or throw a battery into a fire. When disposing, deal with batteries as inflammable matter.
- Do not short the (+) and (–) terminals directly.

When battery leakage occurs:

- Wipe off the liquid in the battery compartment and replace the battery with new one.

THE SPECTRUM ANALYZER

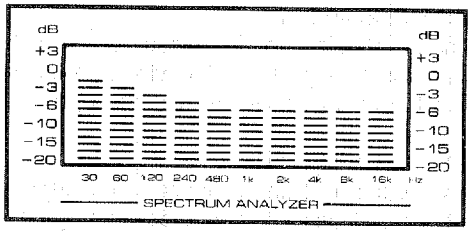
The spectrum analyzer displays the frequency dispersion of signals for direct monitoring. Monitor levels can be adjusted with the METER LEVEL control for enhanced readability of the level adjustment.

Enhancing Sound Quality

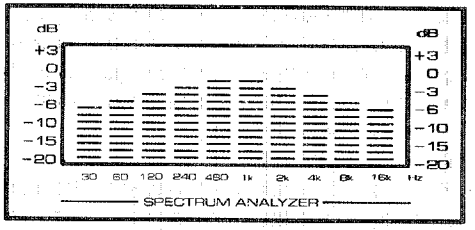
As the equalizer control frequencies are in agreement with the frequency divisions of the spectrum analyzer, equalization effects can be verified visually.

Frequency Dispersion Differs According to the Program Source

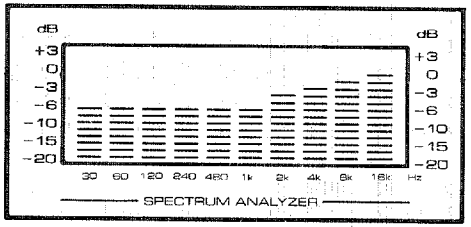
- **Frequency dispersion in a source with numerous low frequency components**



- **Frequency dispersion in a source with numerous middle frequency components**



- **Frequency dispersion in a source with numerous high frequency components**



OPERATIONS

This unit provides control of 10 bands for a total range of 30 Hz to 16 kHz. Thus, the GRAPHIC EQUALIZER controls can be used to finely adjust each frequency as desired.
In addition, by using the built-in pink noise generator and the spectrum analyzer together, the acoustic characteristics of the listening room can be measured and compensated for.

Before operation:

- Refer to the respective owner's manuals on how to operate the amplifier, receiver, tape deck, and so on.
- Set the tone controls of the connected amplifiers or receiver to FLAT or DEFEAT.

■ START PLAY BACK OF THE PROGRAM SOURCE WHICH IS TO BE EQUALIZED

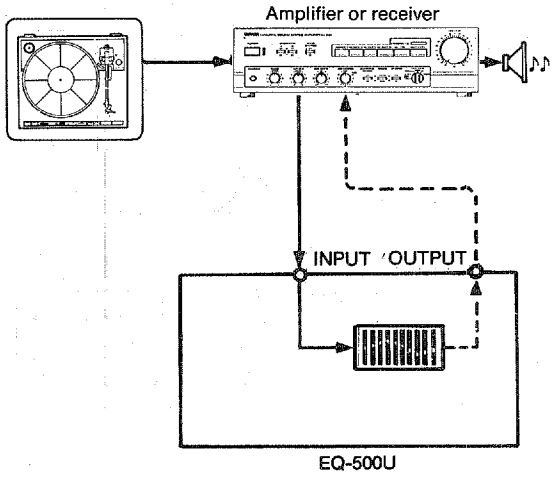
1. Press the POWER switch.
2. Set the left EQUALIZER MODE switch to ON.
3. Select the program source.
   When playing back a program source which is connected to the amplifier or receiver, turn the TAPE monitor switch or this unit to OFF. (For signal path refer to the right figure.)
   (The procedure for selecting a program source from the amplifier or receiver will differ according to the amplifier or receiver. Refer to the section on "Connecting an Amplifier or Receiver.") When using a tape deck connected to this unit, set the TAPE switch to ON.
4. Start playback of the program source, and adjust the volume with the amplifier's or receiver's volume control.
5. Operate the GRAPIHC EQUALIZER while listening to the sound in order to obtain the optimum frequency response of the signal.

* Check the effect by alternately pressing the EQUALIZER MODE switch ON and DEFEAT positions.

Equalizing record play, etc.

EQUALIZER MODE → ON
TAPE → OFF

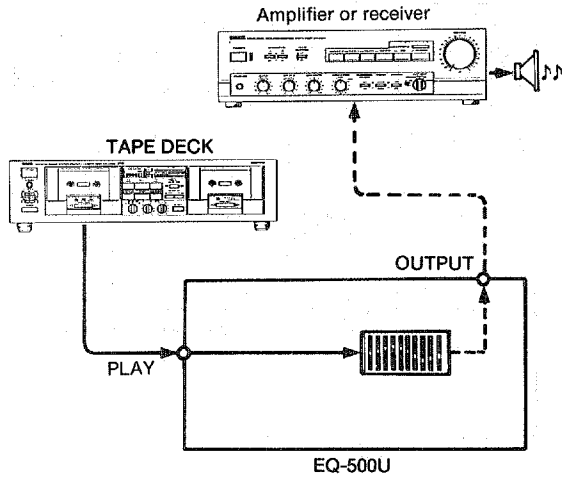
→ Unequalized signal
- - → Equalized signal



Equalizing a playback from tape deck

TAPE → ON
EQUALIZER MODE → ON

→ Unequalized signal
- - → Equalized signal



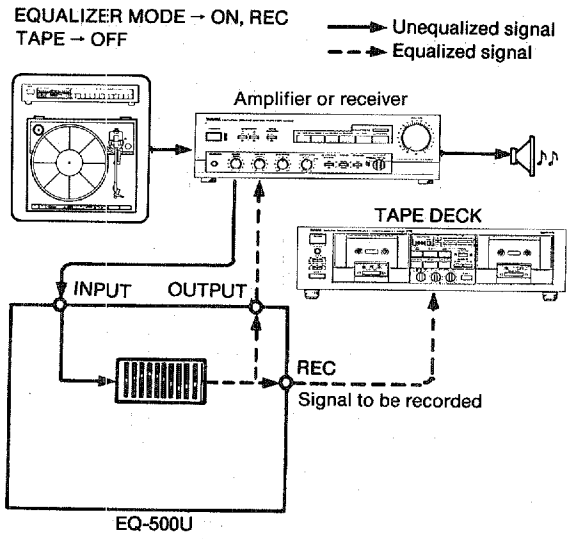
■ RECORDING AN EQUALIZED PROGRAM SOURCE

An equalized program source can be recorded on a tape deck connected to the TAPE REC jacks of the this unit.

1. Press the POWER switch.
2. Press the left EQUALIZER MODE switch to ON.
3. Turn the TAPE monitor switch to OFF.
4. Operate the amplifier or receiver and select the program source to be recorded.
5. Operate the GRAPHIC EQUALIZER controls to obtain the optimum equalization of the signal.
6. Set the EQUALIZER MODE switch to REC.
   * To record without equalization, set the EQUALIZER MODE switch to OFF.
7. Adjust the recording level on the tape deck and then begin recording.

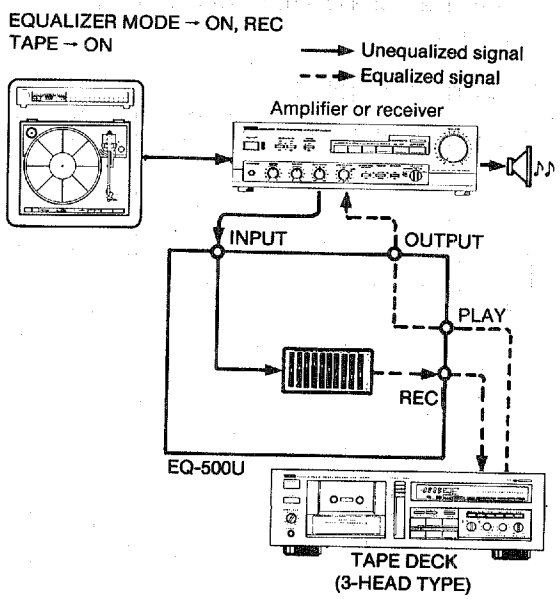
EQ-500U

Recording an Equalized Program Source



Tape Monitoring

If you are using a 3-head tape deck, it will be possible to monitor the result of an equalized recording in real time. Set the tape deck's monitor selector to Tape, and the TAPE monitor switch of this unit to ON.

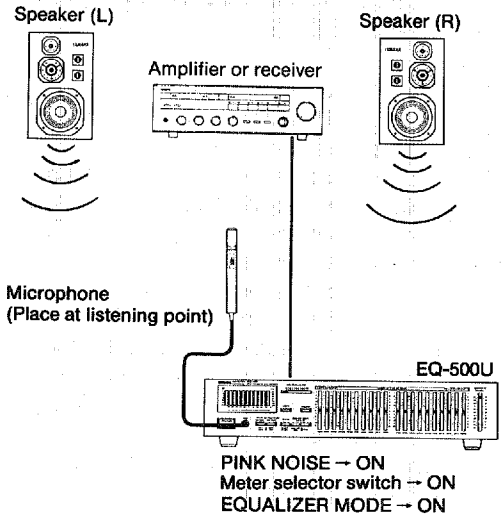


■ MEASURING AND ENHANCING THE CHARACTERISTICS OF A SOUND ENVIRONMENT

Every room has its own, unique acoustic response characteristics, and your listening environment does influence the sound you are hearing. This unit lets you boost or cut the output level of your music signal at different points of the frequency spectrum, before it reaches your speakers, in anticipation of what the room is going to do it, so the effect of room acoustics on the output signal will be effectively negated.

How to Measure the Acoustic Characteristics of the Listening Room:

1. Connect the microphone supplied as an accessory. Microphone placement is crucial to proper equalization. The microphone position should correspond as closely as possible to where your ears will be when listening. Height of the microphone is thus also a factor.



2. Set the control knobs to the following positions:

AMP	Volume control	→ Lowest
	Tone control	→ Flat
EQ-500U	OUTPUT LEVEL control	→ Maximum (10)
	EQUALIZER controls	→ Center (0)
	SUBSONIC FILTER switch	→ OFF
	EQUALIZER MODE switch	→ DEFEAT
	Meter select switches	→ LEFT, RIGHT ON
	PINK NOISE switch	→ ON
	METER LEVEL control	→ Maximum (10)
	TAPE monitor switch	→ OFF
Mic	Mic switch	→ ON

3. When the volume of the amplifier or receiver is gradually raised, a buzz will be heard from the speakers. This is pink noise. Set the volume at an acceptable listening level. At this point, if the level indicated by the spectrum analyzer is too high, turn the METER LEVEL knob down bit by bit, and adjust until all displayed levels are a little above the center.

Compensating for deficiencies in the Listening Environment

1. Set the control knobs and switches to the following positions:

OUTPUT LEVEL control	→ Maximum (10)
EQUALIZER controls	→ Center (0)
SUBSONIC FILTER switch	→ OFF
EQUALIZER MODE switch	→ DEFEAT
Meter select switches	→ LEFT, RIGHT ON
PINK NOISE switch	→ ON
TAPE monitor switch	→ OFF

2. Press the left EQUALIZER MODE switch to ON.
3. Turn the LEFT meter select switch off. (Equalizing adjustment is carried out channel by channel with a final overall adjustment.)
4. Start playback through the RIGHT channel. The spectrum analyzer will indicate the response of that channel.
5. Operate the GRAPHIC EQUALIZER controls for the RIGHT channel, adjusting them until the spectrum analyzer display is flat.
6. Turn the RIGHT meter select switch off and the LEFT switch on.
   Operate the GRAPHIC EQUALIZER controls for the LEFT channel, adjusting them until the spectrum analyzer display is flat.
7. Turn the Meter select switches for both channels on.
8. Start playback through both channels simultaneously, and recheck and readjust the spectrum analyzer. This completes the overall sound enhancement procedure.

SPECIFICATIONS

Input Sensitivity/Impedance
LINE IN, TAPE, 1 kHz 1V/47k-ohms
MIC 0.3 mV/47k-ohms
Rated Output/Impedance
LINE OUT, REC OUT, 1 kHz
(OUTPUT LEVEL → Max.) 1V/600-ohms
Frequency Response ..... 10 Hz — 35 kHz, ±0.5 dB
Center Frequencies ..... 30 Hz, 60 Hz, 120 Hz, 240 Hz, 480 Hz, 1 kHz, 2 kHz, 4 kHz, 8 kHz, 16 kHz,
Equalizer Control Range ..... ±12 dB
Signal-to-Noise Ratio (Input short, IHF A Network)
At 1V output ..... More than 105 dB
Total Harmonic Distortion
(1 kHz, 1V output) ..... Less than 0.005%
Maximum Output
(20 Hz — 20 kHz) ..... More than 7V
Subsonic Filter Cutoff
Frequency ..... 15 Hz (12 dB/Oct)
Pink Noise Output ..... 150 mV RMS
Display ..... 10 bands
Switchable between L or R, L + R
Power Supply ..... AC 120V, 60 Hz
Power Consumption 15W
Dimensions (W x H x D) ..... 435 x 100 x 232 mm (17-1/8" x 3-15/16" x 9-1/8")
Weight ..... 3.7 kg (8 lbs. 2 oz.)
Accessories ..... Pin plug cords (2)
MM-110 Electret Condenser Mic
Mic stand
Dry battery "AA" (R06) type (1)

* Specifications subject to change without notice.

TROUBLESHOOTING

Before assuming that your amplifier or receiver is faulty, check by following troubleshooting list which details corrective action which you can take yourself. If the fault persists, or is not mentioned in the list, turn off and disconnect the unit immediately, and get in touch with your nearest Yamaha dealer.

Fault	Cause	Cure
Power is not supplied even through the Power switch is turned on.	• The power plug is not securely plugged in.	• Plug it in securely.
No sound is heard.	• The TAPE Monitor switch is not set correctly. • Improper connections to INPUT jacks. • The OUTPUT LEVEL control is set too low.	• Set the switch correctly. • Make sure all connections are properly done. • Move the OUTPUT LEVEL control.
There is no sound from one speaker.	• The pin plug is not properly connected.	• Check the connections.
Sound quality cannot be enhanced.	• The EQUALIZER MODE switch is in the DEFEAT position.	• Set the switch to ON.
Spectrum analyzer will not light up.	• The METER LEVEL control is set to 0.	• Slide the METER LEVEL control to the right.
	• The meter select switches are not set properly.	• Set these switches correctly.

SINCE 1887 YAMAHA
NIPPON GAKKI CO., LTD. HAMAMATSU, JAPAN

VC71330