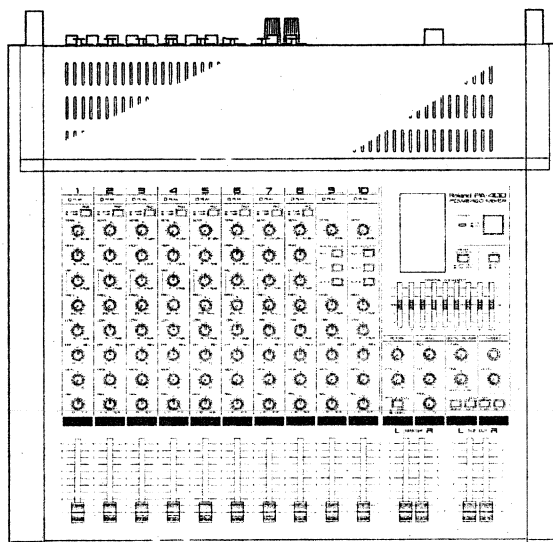




Roland

POWERED MIXER

PA-200/400

OWNER'S MANUAL



	CAUTION RISK OF ELECTRIC SHOCK DO NOT OPEN	
ATTENTION RISQUE DE CHOC ELECTRIQUE NE PAS OUVRIR		
<p>CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.</p>		



The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of un-insulated "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 the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

INSTRUCTIONS PERTAINING TO A RISK OF FIRE, ELECTRIC SHOCK, OR INJURY TO PERSONS.

IMPORTANT SAFETY INSTRUCTIONS

WARNING — When using electric products, basic precautions should always be followed, including the following:

1. Read all the instructions before using the product.
2. Do not use this product near water — for example, near a bathtub, washbowl, kitchen sink, in a wet basement, or near a swimming pool, or the like.
3. This product should be used only with a cart or stand that is recommended by the manufacturer.
4. This product, either alone or in combination with an amplifier and headphones or speakers, may be capable of producing sound levels that could cause permanent hearing loss. Do not operate for a long period of time at a high volume level or at a level that is uncomfortable. If you experience any hearing loss or ringing in the ears, you should consult an audiologist.
5. The product should be located so that its location or position does not interfere with its proper ventilation.
6. The product should be located away from heat sources such as radiators, heat registers, or other products that produce heat.
7. The product should avoid using in where it may be effected by dust.
8. The product should be connected to a power supply only of the type described in the operating instructions or as marked on the product.
9. The power-supply cord of the product should be unplugged from the outlet when left unused for a long period of time.
10. Do not tread on the power-supply cord.
11. Do not pull the cord but hold the plug when unplugging.
12. When setting up with any other instruments, the procedure should be followed in accordance with instruction manual.
13. Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings.
14. The product 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 product; or
 - C. The product has been exposed to rain; or
 - D. The product does not appear to operate normally or exhibits a marked change in performance; or
 - E. The product has been dropped, or the enclosure damaged.
15. Do not attempt to service the product beyond that described in the user-maintenance instructions. All other servicing should be referred to qualified service personnel.

For the USA

GROUNDING INSTRUCTIONS

This product must be grounded. If it should malfunction or breakdown, grounding provides a path of least resistance for electric current to reduce the risk of electric shock.

This product is equipped with a cord having an equipment-grounding conductor and a grounding plug. The plug must be plugged into an appropriate outlet that is properly installed and grounded in accordance with all local codes and ordinances.

DANGER: Improper connection of the equipment-grounding conductor can result in a risk of electric shock. Check with a qualified electrician or serviceman if you are in doubt as to whether the product is properly grounded. Do not modify the plug provided with the product — if it will not fit the outlet, have a proper outlet installed by a qualified electrician.


SAVE THESE INSTRUCTIONS

For the U.K.

WARNING: THIS APPARATUS MUST BE EARTHED

IMPORTANT: THE WIRES IN THIS MAINS LEAD ARE COLOURED IN ACCORDANCE WITH THE FOLLOWING CODE.
GREEN-AND-YELLOW: EARTH, BLUE: NEUTRAL, BROWN: LIVE

As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals in your plug proceed as follows:

The wire which is coloured GREEN-AND-YELLOW must be connected to the terminal in the plug which is marked by the letter E or by the safety earth symbol  or coloured GREEN or GREEN-AND-YELLOW.

The wire which is coloured BLUE must be connected to the terminal which is marked with the letter N or coloured BLACK.

The wire which is coloured BROWN must be connected to the terminal which is marked with the letter L or coloured RED.

The product which is equipped with a THREE WIRE GROUNDING TYPE AC PLUG must be grounded.

For West Germany

Bescheinigung des Herstellers/Importeurs

Hiermit wird bescheinigt, daß der/die/das

POWERED MIXER PA-200/400

(Gerät. Typ. Bezeichnung)

in Übereinstimmung mit den Bestimmungen der

Amtsbl. Vfg 1046/1984

(Amtsblattverfügung)

funk-entstört ist.

Der Deutschen Bundespost wurde das Inverkehrbringen dieses Gerätes angezeigt und die Berechtigung zur Überprüfung der Serie auf Einhaltung der Bestimmungen eingeräumt.

Roland Corporation Osaka/Japan

Name des Herstellers/Importeurs

For the USA

RADIO AND TELEVISION INTERFERENCE

WARNING — This equipment has been verified to comply with the limits for a Class B computing device, pursuant to Subpart J, of Part 15, of FCC rules. Operation with non-certified or non-verified equipment is likely to result in interference to radio and TV reception.

The equipment described in this manual generates and uses radio frequency energy. If it is not installed and used properly, that is, in strict accordance with our instructions, it may cause interference with radio and television reception. This equipment has been tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J, of Part 15, of FCC Rules. These rules are designed to provide reasonable protection against such a interference in a residential installation. However, there is no guarantee that the interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment on and off, the user is encouraged to try to correct the interference by the following measure:

- Disconnect other devices and their input/output cables one at a time. If the interference stops, it is caused by either the other device or its I/O cable. These devices usually require Roland designated shielded I/O cables. For Roland devices, you can obtain the proper shielded cable from your dealer. For non Roland devices, contact the manufacturer or dealer for assistance.
- If your equipment does cause interference to radio or television reception, you can try to correct the interference by using one or more of the following measures:
 - Turn the TV or radio antenna until the interference stops.
 - Move the equipment to one side or the other of the TV or radio.
 - Move the equipment farther away from the TV or radio.
 - Plug the equipment into an outlet that is on a different circuit than the TV or radio. (That is, make certain the equipment and the radio or television set are on circuits controlled by different circuit breakers or fuses.)
 - Consider installing a rooftop television antenna with coaxial cable lead-in between the antenna and TV. If necessary, you should consult your dealer or an experienced radio/television technician for additional suggestions. You may find helpful the following booklet prepared by the Federal Communications Commission: "How to Identify and Resolve Radio — TV Interference Problems"

This booklet is available from the U.S. Government Printing Office, Washington, D.C., 20402. Stock No. 004-000-00345-4.

For Canada

CLASS B

NOTICE

This digital apparatus does not exceed the Class B limits for radio noise emissions set out in the Radio Interference Regulations of the Canadian Department of Communications.

CLASSE B

AVIS

Cet appareil numérique ne dépasse pas les limites de la classe B au niveau des émissions de bruits radioélectriques fixés dans le Règlement des signaux parasites par le ministère canadien des Communications.

Thank you, and congratulations on your choice of a Roland product. Please take the time to read through this manual first, so you can familiarize yourself with the proper methods of operation for the unit.

Overview

The Roland PA-200/400 powered mixer, while being compact, delivers an amazing level of performance at a superior cost/performance ratio.

Features

- Stringent selection of parts supports a low-noise design, thus assuring sound quality.
- Channel inputs equipped with 20 dB Pad Switch. It of course provides for both MIC input level (-60 dBm) and professional line level (+4 dBm), and also accommodates up to a maximum of +24 dBm. The range covered is thus quite ample.
- In addition to standard phone jacks, XLR connectors are also provided for Normal Channels. Moreover, both balanced and unbalanced signals are accommodated.
- Equipped with 2 Stereo Channels. For each channel 3 types of input (total 6 types of input) can be connected. Also provided with RCA phono jacks, convenient when using audio equipment.
- Normal Channels are equipped with high-performance 3-band active equalization (MID variable center frequency). Thus a wide range of creative control over sound is obtained.
- The Mixer Section is ready for most any application, being equipped with Effect Send, Stereo Return, Master Out, Sub Out, and Rec Out (RCA phono jacks).
- Incorporates enhanced four-mode 16-bit digital reverb, offering a wide range of effects processing.
- Equipped with 9-band graphic equalizer capable of being turned on or off. Thus, overall corrections in the sound field, or in the sound quality can be accomplished.
- Since the Power Amplifier Section is equipped with Power Amp In connectors, the system can easily be upgraded through connection of equalizers or other equipment. Moreover, it incorporates BTL circuitry, allowing high-powered monaural output.
- Provided with Peak Indicators in the Channel Section and Pre-fader Peak Indicators in the Master Section. Monitoring of level is facilitated by an easy-to-read Peak Meter. (switchable between Master Out and Sub Out).
- Superior levels of durability and operational reliability are assured thanks to adoption of 60 millimeter stroke smooth faders, and a high-performance protection circuit in the Power Amplifier Section.

IMPORTANT NOTES

[Concerning the power supply]

- Whenever you make any connections with other devices, always turn off the power to all equipment first. This will help in preventing malfunction, and damage to speakers.
- Do not force the unit to share the same power outlet as one used for distortion producing devices (such as motors, variable lighting devices). Be sure to use a separate power outlet.
- Do not place heavy objects onto, step on, or otherwise risk causing damage to the power cord.

[Concerning placement]

- Avoid using or storing the unit in the following places, as damage could result.
 - Places subject to extremes in temperature. (Such as under direct sunlight, near heating units, above equipment generating heat, etc.)
 - Places near water and moisture. (Baths, washrooms, wet floors, etc.) Places otherwise subject to high humidity.
 - Dusty environments.
 - Places where high levels of vibration are produced.
- Placing the unit near power amplifiers or other equipment containing large transformers may induce hum.
- Should the unit be operated nearby television or radio receivers, TV pictures may show signs of interference, and static might be heard on radios. In such cases, move the unit out of proximity with such devices.
- Avoid placing the unit where it may be subject to direct sunlight, or where near devices that may emanate heat. Avoid confining it within a tightly closed car or other such places. Otherwise, the unit may become deformed or discolored.

[Maintenance]

- For everyday cleaning, wipe the unit with a soft dry cloth, or one that is dampened slightly. To remove dirt that is more stubborn, wipe using a mild, neutral detergent. Afterwards, make sure to wipe thoroughly with a soft cloth.
- Never apply benzene, thinners, alcohol or any like agents, to avoid the risk of discoloration and deformation.

[Other Precautions]

- Protect the unit from strong impact.
- Avoid getting any foreign objects (coins, wire, etc.), or liquids (water, drinks, etc.) into the unit.
- A certain small amount of heat will be radiated from the unit, and thus should not be considered abnormal.
- Make sure you correctly observe the polarity on the speakers.
- Never touch the metallic portions of the speaker outputs.
- The ventilation ports must never be blocked.
- Before using the unit in a foreign country, check first with your local Roland Service Station.
- At any time that you notice a malfunction, or otherwise suspect there is damage, immediately refrain from using the unit. Then contact the store where bought, or the nearest Roland Service Station.

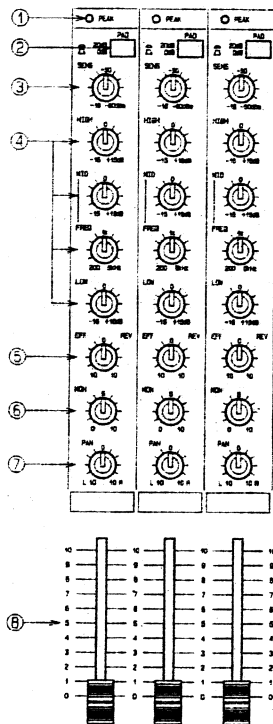
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2 Panel Descriptions

1. Channel Section

a. Normal Channel



1 Peak Indicator

Lights in red when signals being input are too high.

- * The Peak Indicator lights in red at -6 dB of the clipping level.
- * The Peak Indicator also monitors the level of the signals after they have passed through the Channel Equalizer.

2 Pad Switch

Used when the signal being input is too high. When pressed, 20 dB attenuation is obtained.

3 Sens Control Knob

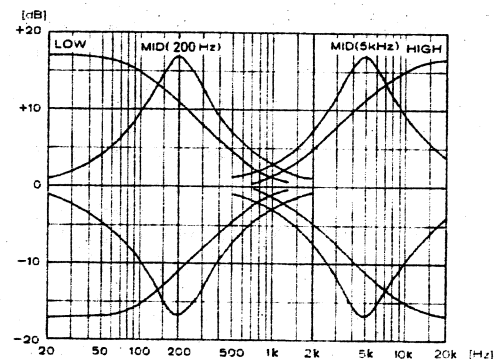
Provides for adjustment of the input sensitivity to suit the level of signals being input. Should be set so that the Peak Indicator intermittently lights in red. Should the Peak Indicator not light at all even though signals are being input, the Sens Control Knob should be turned up to increase the level being input. On the other hand, if the Peak Indicator remains lit too frequently even with the Sens Control Knob turned all the way to the left, press the Pad Switch.

- * Rated input is -60 dBm to +4 dBm.

4 Channel Equalizer Knobs

Provide for adjustment of the sound quality of signals that are input. At the "0" position a flat response is obtained.

- **HIGH:** Adjusts the upper range. With 10 kHz as the base frequency, adjustment can be made within the range of ± 15 dB.
- **MID:** Adjusts the middle range. With a center frequency of 200 Hz to 5 kHz, adjustment can be made over a range of ± 15 dB.
- **MID FREQ:** Alters the center frequency of the MID equalization. Can be adjusted in the range of 200 Hz to 5 kHz.
- **LOW:** Adjusts the lower range. With 100 Hz as the base frequency, adjustment can be made within the range of ± 15 dB.



5 Effect/Reverb Volume

Adjusts the level of what will be output to Effect Send or Reverb Send.

At the center position, the level output for both EFF (effects) and REV (reverb) will be 0. Turning towards left of center provides for adjustment of EFF, and when turned to the right of center, adjustment for REV can be made.

- * The point from which the signals are sent to Effect Send and Reverb Send is located after the Channel Faders (post-fader).

6 Monitor Volume

Adjusts the level of what is output to Monitor Send.

- * The point from which the signals are sent to Monitor Send is located before the Channel Faders (pre-fader).

7 Panpot

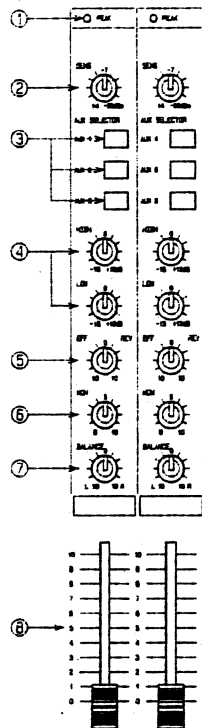
Determine the positioning of the sound image in the stereo field. At center, L and R will have the same volume.

8 Channel Fader

Adjust the level of what is output on the channel.

- * With a channel fader at "10" the rated output is obtained.

b. Stereo Channels



1 Peak Indicator

Lights in red when signals being input are too high.

- * The Peak Indicator lights in red at -6 dB of the clipping level.
- * The Peak Indicator also monitors the level of the signals after they have passed through the equalizer.

2 Sens Control Knob

Provides for adjustment of the input sensitivity to suit the level of signals being input. Should be adjusted so that the Peak Indicator intermittently lights in red. If the Peak Indicator does not light at all, even though signals are being input, the Sens Control Knob should be turned up further, or the level of what is being input should be increased.

- * The rated input is from -20 dBm to +4 dBm.

3 AUX Select Switch

Selects the signal input on the Stereo Channel.

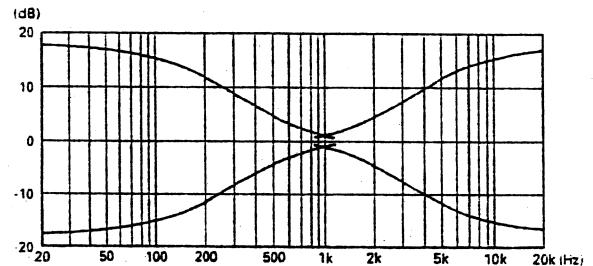
CAUTION!

For each channel, never simultaneously press two or more switches at the same time.

4 Channel Equalizer Knobs

Provide for adjustment of the sound quality of signals that are input. At the "0" position a flat response is obtained.

- **HIGH:** Adjusts the upper range. With 10 kHz as the base frequency, adjustment can be made within the range of ± 15 dB.
- **LOW:** Adjusts the lower range. With 100 Hz as the base frequency, adjustment can be made within the range of ± 15 dB.



5 Effect/Reverb Volume

Adjusts the level of what will be output to Effect Send or Reverb Send.

At the center position, the level output for both EFF (effects) and REV (reverb) will be 0. Turning towards left of center provides for adjustment of EFF, and when turned to the right of center, adjustment for REV can be made.

- * The point from which the signals are sent to Effect Send and Reverb Send is located after the Channel Faders (post-fader).

- * When monaural input is being used, the output level will rise by 6 dB. (Refer to "Stereo Input Jacks", under Rear Panel.)

6 Monitor Volume

Adjusts the level of what is output to Monitor Send.

- * The point from which the signals are routed to Monitor Send is located before the Channel Faders (pre-fader).

- * When monaural input is being used, the output level will rise by 6 dB. (Refer to "Stereo Input Jacks", under Rear Panel.)

7 Balance Volume

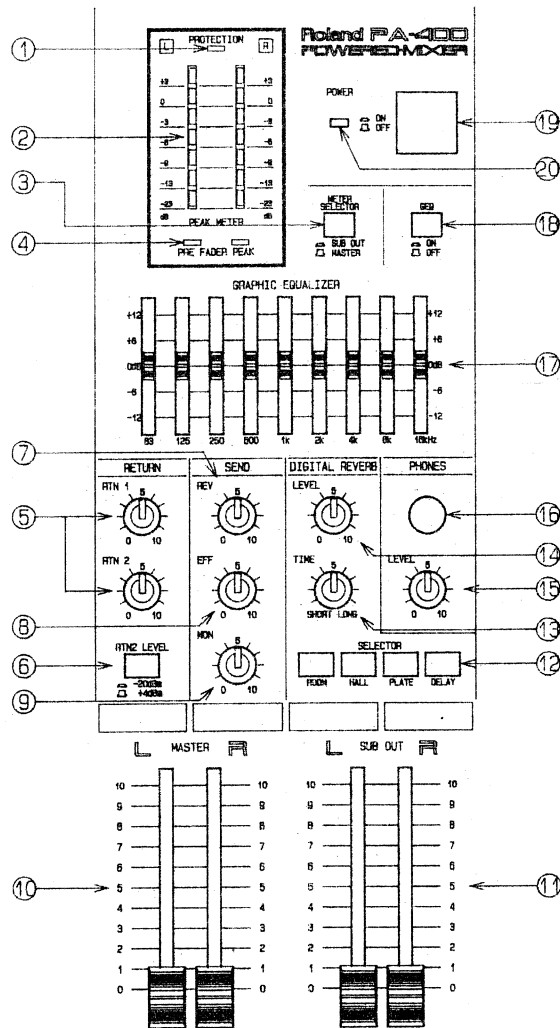
Determines the balance of the volume for L and R. At center, L and R will have the same volume.

8 Channel Fader

Adjust the level of what is output on the channel.

- * With a Channel Fader at "10" the rated output is obtained.

2. Master Section



1 Protection Indicator

Indicates the operation of the power amplifier protection circuitry. While in operation, the Protection Indicator lights, and no sound will be output from Speakers Out.

- * The Protection Indicator will light for approximately 6 seconds after the Power Switch is turned on.
- * Should the Protection Indicator light while the unit is in use, immediately turn the Power Switch OFF. Then check all connections, and the operational condition that any connected devices may be in.

2 Peak Meter

Monitors the level output by Master Out and Sub Out. It is a level meter indicating peak values. Ordinarily, the output level of Master Out is indicated. When the Meter Select Switch is pressed in, the output level of Sub Out will be shown. When lit to indicate 0 db, a level of +4 dBm is output from Master Out or Sub Out.

3 Meter Select Switch

Provides selection of what is indicated by the Peak Level Meter. To indicate the output level of Master Out, it is put at MASTER. To indicate Sub Out level, it is switched to SUB OUT.

4 Pre-fader Peak Indicator

An indicator used to monitor the level, after the signals from each channel (L and R) have been mixed. The point from which the signal is taken is located before the Master Faders (pre-fader). The indicator lights at -6 dB of the clipping level.

5 Return Volume

Adjusts the level of the signals input at the Return Jacks.

6 Return 2 Level Switch

Provides selection of the input level for Return 2. Selection should be made as needed to suit devices that are connected.

- * The input level can be switched between either +4 dBm or -20 dBm.

7 Reverb Send Volume

Provides for the final adjustment in output level for the reverb signals which have had their level adjusted by Effect/Reverb Volume on each channel.

- * With Reverb Send Volume at "8", the rated output is obtained.

8 Effect Send Volume

Provides for the final adjustment in output level for the effects signals which have had their level adjusted by Effect/Reverb Volume on each channel. Reverb signals are output to Reverb Send and internal Reverb.

- * With Effect Send Volume at "8", the rated output is obtained.

9 Monitor Send Volume

Provides for the final adjustment in output level for the signals which have had their level adjusted by Monitor Volume on each channel.

- * With Monitor Send Volume at "8", the rated output is obtained.

10 Master Faders

Provide adjustment of the final output level for the mixed signals.

- * With the Master Faders at "8", the rated output is obtained.

11 Sub Out Faders

Provide adjustment of the final output level for the mixed signals.

- * With the Sub Out Faders at "8", the rated output is obtained.

12 Reverb Mode Selector

Switch providing selection of the mode used by the internal Reverb.

- * There are 4 modes available for Reverb, as follows:

ROOM: A sharply defined, expansive sound is obtained. The density of reverberated sounds is high, thus a fatter sound is obtained.

HALL: Provides more moderate, relaxed sounds; with more feeling of depth compared with ROOM. The density of the reverberation is low, and a pleasant resonance is obtained.

PLATE: A bright, brilliant effect can be obtained, with little decay in the higher sounds.

DELAY: Portions of sound are delayed. Provides an effect similar to an echo.

- * Whenever a change in the Reverb mode is made, a muting circuit will come into effect, so reverberated sounds will be interrupted for approximately 1 second.

13 Reverb Time Control

Adjusts the Reverb Time or Delay Time (differs depending on the mode) for the internal Reverb.

- * If Reverb Time Control is moved while in the DELAY mode, you may at times hear a click sound.

14 Reverb Level Control

Adjusts the level of what is sent from internal Reverb. This control is equivalent to the Return Volume using the external effects device.

15 Headphone Volume

Adjusts the the level of volume for headphones.

16 Headphones Jack

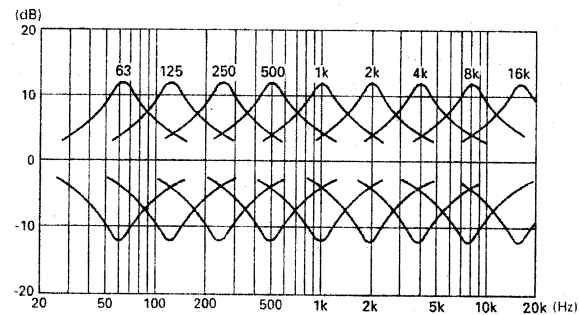
Accepts connection of stereo headphones.

- * The point from which the signal for the headphones is taken is located before the Master Faders (pre-fader).
- * The Graphic Equalizer cannot be used to provide correction of the sound quality for signals output from the Headphones Jack.

17 Graphic Equalizer

A 9-band graphic equalizer that provides for a ± 12 dB alteration for each octave, from 63 Hz to 16 kHz.

- * The correction provided by the Graphic Equalizer is available only for Master Out and Speakers Out.



18 Graphic Equalizer On/Off Switch

Selects whether or not the internal Graphic Equalizer will be employed. At "ON" the Graphic Equalizer can be used, at "OFF" it is inactive.

19 Power Switch

When pressed in, the unit is turned on and readied for operation. Press once again to turn the unit off.

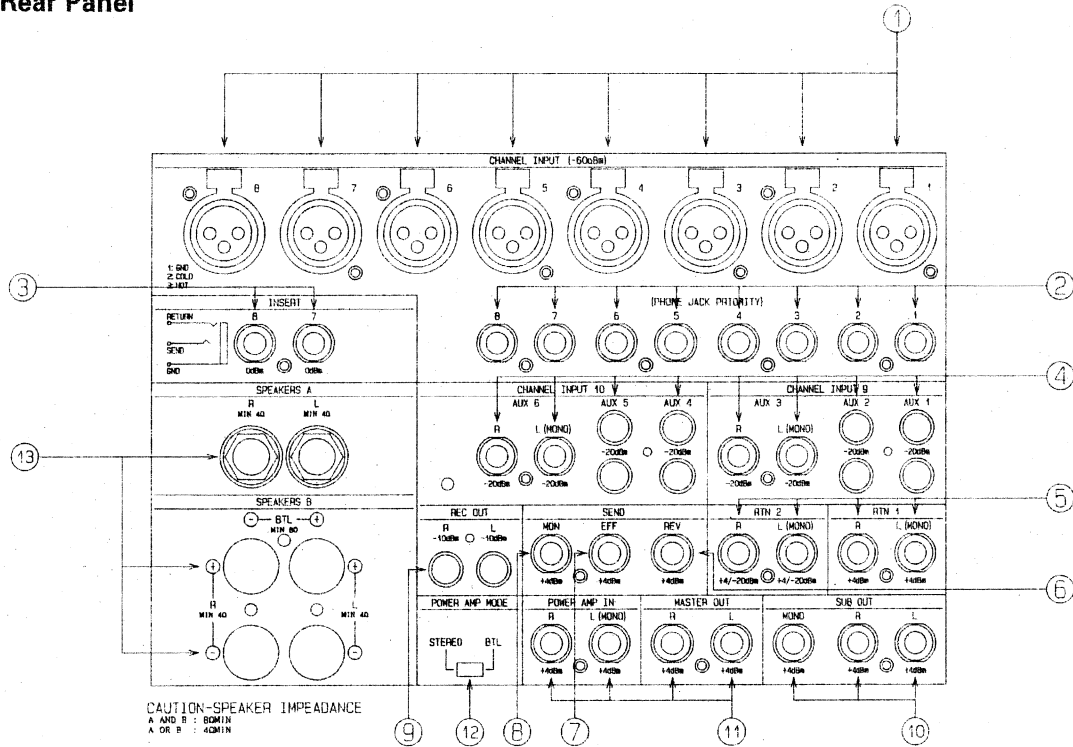
- * Always set the Master Faders to "0" whenever the Power Switch is turned on or off.

- * For approximately 6 seconds after power has been turned on a muting circuit will be active, so no sound will be output.

20 Power Indicator

Lights up when the Power Switch is turned on, indicating the unit is in the operable state.

3. Rear Panel

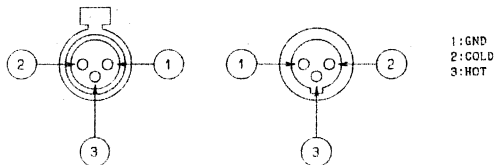


(This figure shows PA-400.)

① Input Connectors

XLR (balanced) type input connectors, used for connecting microphones or electronic musical instruments. When connections are made to both the Input Jacks and the Input Connectors for any particular channel, the Input Jacks take priority.

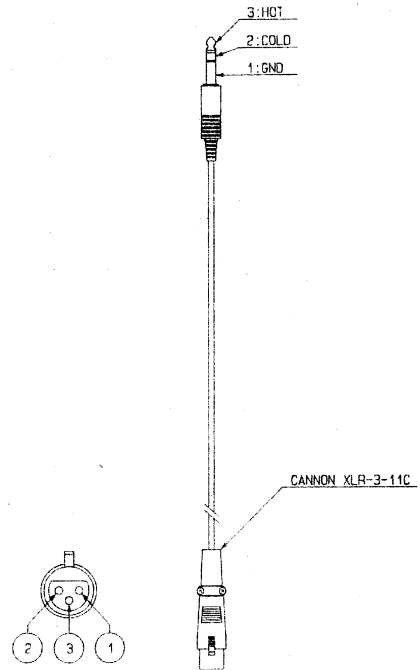
- * The signal assignments for the pins on an XLR connector can be of two types; either American or European. This unit uses American style connectors; whereby pin no. 1 is Ground, 2 is Cold, and 3 is Hot. When making connections with other devices, make certain the pin assignments on their connectors are the same.



② Input Jack

Input Jacks used for connecting microphones or electronic musical instruments. Since stereo standard phone jacks are employed, balanced input is made possible. The input will be unbalanced if standard phone plugs are used.

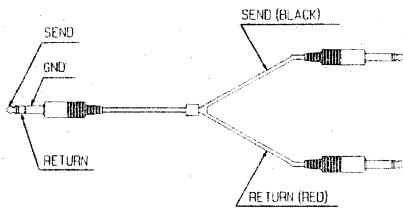
- * When balanced input is to be employed, please use a special input cable (PCS-30:optional).



③ Insert Jacks

Input/output jacks used to connect an effects device with the channels.
Can also be used for the Channel Direct Out.

- * When the Channel Direct Out is employed, the signals will not flow to the Master Section.
- * The point from which the signal is taken is located after the Channel Equalizer and before the Channel Faders (pre-fader).
- * To connect an effects device, use an Insert Cable (PCS-31: optional). To use for direct output, use standard phone plugs.



④ Stereo Input Jack

Jacks used to input to the Stereo Channels. AUX 1, 2, 4, and 5 are RCA phono jacks. AUX 3 and 6 are 1/4" standard phone jacks. Note that with AUX 3 and 6, mono input is accomplished if only the one marked L of the pair is used.

- * The Stereo Input Jack provides unbalanced input.

⑤ Return Jack

Jacks used to input the signals that are returned from an effects device. Can also be used for auxiliary input. The Return Jacks are stereo compatible. Note that mono input can be accomplished if only the one marked L of the pair is used.

⑥ Reverb Send Jack

Jack used to send signals to an external reverb device.

- * The same signals as those sent to the internal Reverb are output here.

⑦ Effect Send Jack

Jack used to send signals to an external effects device.

⑧ Monitor Send Jack

Jack providing output of the monitor signal.

⑨ Rec Out Jack

Jacks providing output to a tape recorder or other device connected here.

- * Monitored playback cannot be accomplished while recording takes place.

CAUTION!

When using a tape recorder to perform a recording, oscillation may be produced if the sound of the tape recorder's playback is fed back to mixer. Either put the Channel Fader for the channel to which the tape recorder is connected to "0", or disconnect it.

- * The point from which the signals are taken is located before the Master Faders (pre-fader).

⑩ Sub Out Jack

Output jacks used when making connections with an external power amplifier or other such unit. From "MONO" the signals of both L and R are output.

⑪ Master Out Jack/Power Amp In Jack

Used when wishing to connect devices such as an equalizer or limiter, and thus make alterations in the sound field.

- * The Master Out Jack can be used when wishing to use solely the mixing capabilities of this unit; or when adding on a power amplifier.

- * The Power Amp In Jack can also be used when wishing to use solely the Power Amplifier Section of this unit.

- * When the Power Amp In Jacks are to be used while the Mode Switch is at BTL (mono), only the L channel will be active

⑫ Mode Switch

Selects which of the two operational modes for the Power Amplifier will be used. Affects the output from Speakers Out. When at STEREO, L and R are separate signals, while at BTL (mono), L and R are combined.

- ⑬ Speakers Out A (jacks) /Speakers Out B (terminals)
Provide for output to speakers.

CAUTION!

Do not use Speakers Out A (jacks) while the Mode Switch is set to BTL (mono).

- * When used in the BTL (mono) mode, the signals of L and R combined are output from Speakers Out B (terminals).

- * When the BTL (mono) mode is to be employed, the speakers should be connected to the upper, positive terminals of L and R. In addition, observe the polarity shown next to "BTL" on the panel, with positive going to the the L side, and negative going to the R side.

CAUTION!

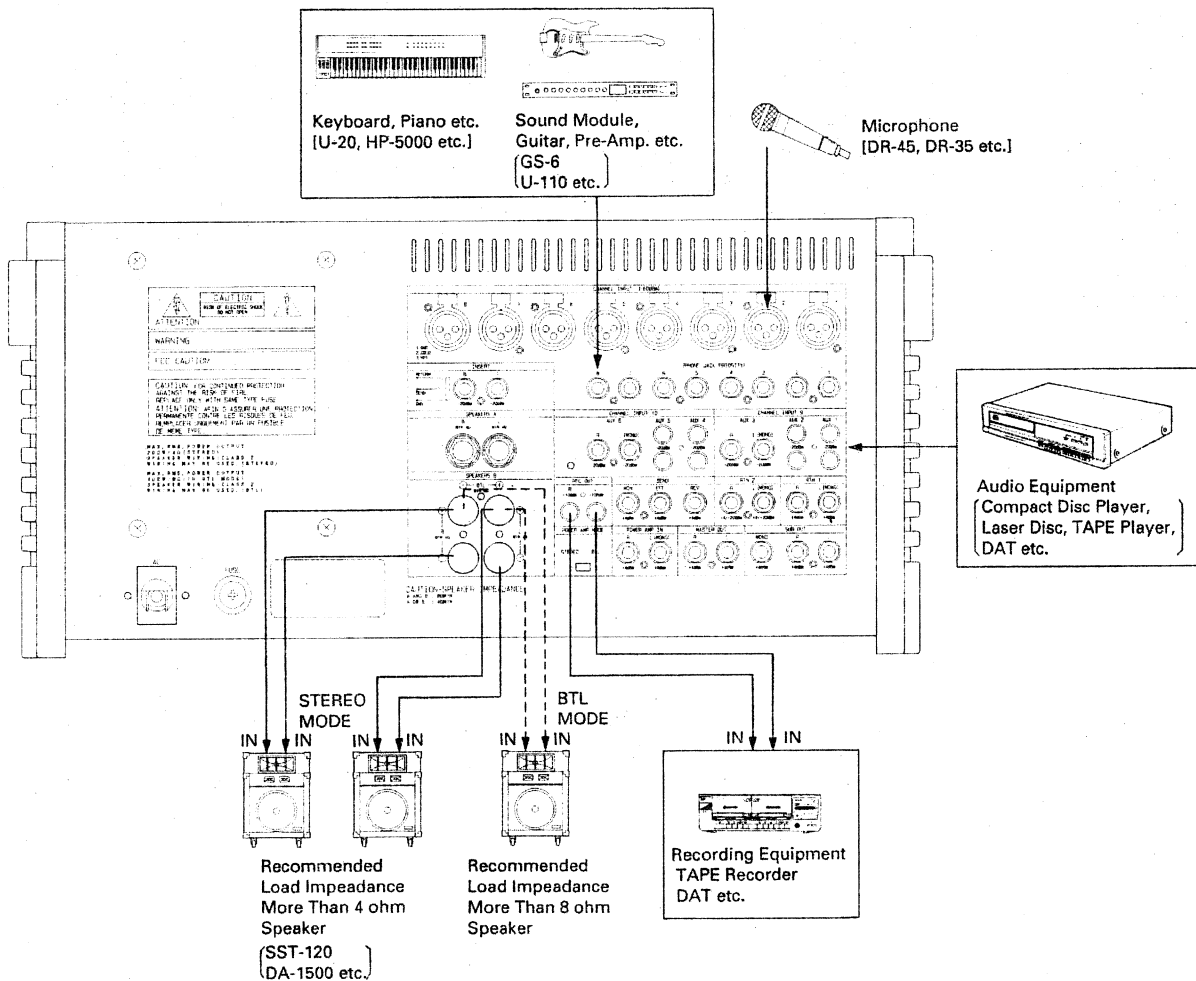
Do not connect speakers with an impedance lower than that specified, for both Speakers Out A (jacks) or Speakers Out B (terminals). Avoid causing short circuits.

3 Setup and Operation

■ Starting Up

- ① After confirming that the Power Switch is off, insert the plug on the power cord into an outlet.
- ② Connect up all equipment that is going to be used. (refer to the illustrations)
- ③ Set all knobs and faders to "0".
- ④ After all connections have been checked, turn on power to the devices that is to be used for input. Then, turn on power on this unit. (When quitting and turning off power, reverse the above order.)

1. Basic setup for using Microphones, Electronic Instruments, etc.



- * When the Power Amp In Jacks are to be used while the Mode Switch is at BTL (mono), only the L channel will be active.
- * Do not use Speakers Out A (jacks) while the mode switch is set to BTL (mono).
- * When the BTL (mono) mode is to be employed, the speakers should be connected to the upper, positive terminals of L and R. In addition, observe the polarity shown next to "BTL" on the panel, with positive going to the the L side, and negative going to the R side.

- * For connecting speakers use only speaker-use cable. Cables with great electrostatic capacity (such as shielded cables) can cause an undue amount of load to be applied to the power amplifier. Avoid using such cables since they can cause excess heat or malfunction.

CAUTION!

Do not connect speakers with an impedance lower than that specified, for both Speakers Out A (jacks) or Speakers Out B (terminals). Avoid causing short circuits.

<Reference>

Calculation of the impedance when speakers are connected to both Speakers Out A (jacks) and Speakers Out B (terminals) can be carried out as follows:

$$R = A \times B / (A+B)$$

- A: The impedance of speakers connected to Speakers Out A (jacks) (Ω)
- B: The impedance of speakers connected to Speakers Out B (terminals) (Ω)
- R: Combined impedance (Ω)

Connect only speakers that will result in a value for "R" that is in excess of 4.

		The impedance of speakers connected to Speakers Out A (Jacks)			
		(Ω)	(Ω)	(Ω)	(Ω)
The impedance of speakers connected to Speakers Out B (Terminals)	(Ω)	4	6	8	16
	4	x	x	x	x
	6	x	x	x	○
	8	x	x	○	○
	16	x	○	○	○

■ **Mixing Using Microphones, Electronic Musical Instruments, etc.**

- ① While a performance is produced, adjust the Sens Control Knobs so that the Peak Indicators lights intermittently.
- * **If the Peak Indicator remains lit in red too frequently even with the Sens Control Knob turned all the way to the left, press the Pad Switch.**
- ② Set the Channel Faders to around "7", then adjust overall volume using the master faders.
- ③ Adjust sound quality using the Channel Equalizer.
- * **If at this time the Peak Indicator or Pre-fader Peak Indicator lights in red too often, lower the Sens Control Knob.**
- * **If even with the Sens Control Knob turned all the way to the left the Peak Indicator remains lit in red too frequently, press the Pad Switch.**
- ④ Determine the position of the sound image, respective to L and R, using the Panpot.

- ⑤ Adjust the balance of sound volume for each channel using the Channel Faders.
- ⑥ Finally, apply any corrections as desired to the sound field using the Graphic Equalizer.

<Reference>

Suppression of howling using the Graphic Equalizer

While using microphones with the volume turned up high, you may at times suddenly hear a high-pitched tone being produced. This is what is referred to as howling, and is caused by the microphone repeatedly picking up sound from the speakers. One solution is to simply turn down the volume, but then it may not be loud enough for your needs. A better remedy is to use the PA-200/400's built-in graphic equalizer to suppress howling, without sacrificing any sound volume.

The howling can be kept to a minimum by an appropriate amount of lowering of the frequency range in which the problem occurs. (For example, 2 or 4 kHz for a high-pitched tone that is still barely musical; and 8 or 16 kHz for a piercingly high tone.)

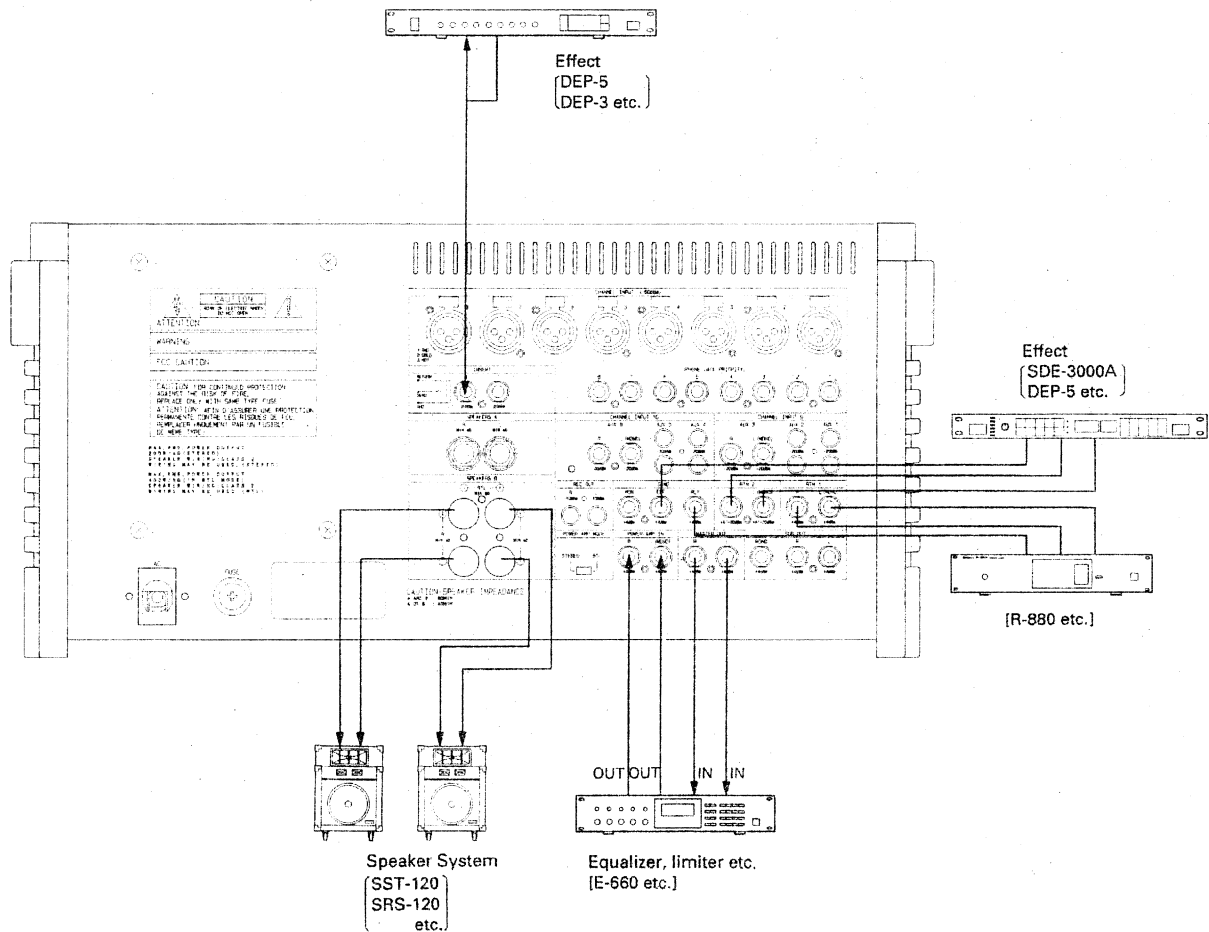
Also remember that if speakers and microphones are too close together, or non-directional microphones are used there is more chance that howling will occur. The setup could be changed so there is more distance between microphones and speakers, or uni-directional microphones could be used.

- * **If headphones are to be used during mixing, their volume should be adjusted to an appropriate level using their volume control. Note that, using the Graphic Equalizer, no corrections in sound quality can be applied to the signals output from the Headphones Jack.**

■ **Effects Processing Using Internal Reverb**

- ① Select which reverb mode is to be used.
- ② Raise, to an appropriate level, the Effect/Reverb Volume for the channel to which reverb is to be applied. Next, using the Master Section's Reverb Send Volume, adjust the overall level of what is to be sent to reverb.
- ③ Adjust the level of reverb using the Reverb Level Control.
- ④ Adjust the Reverb Time Control.
- * **When monaural input is being used on a Stereo Channel, the channel's output level will rise by 6 dB. Adjust the level to an appropriate degree using Effect/Reverb Volume.**

2. Setup using effects devices



■ Effects Processing Using External Delay, Reverb, etc.

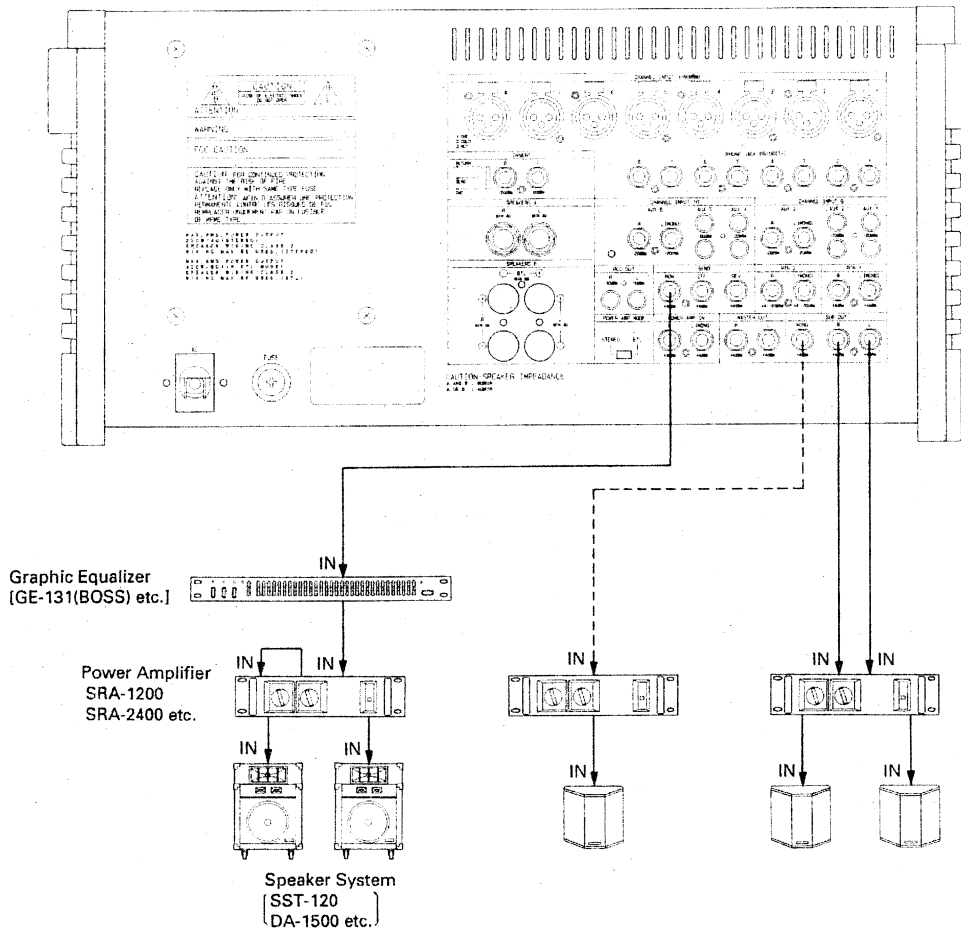
- ① Raise the Effect Reverb Volume for the channel to which effects are to be applied to a suitable level. Then, while looking at the input level meter (or equivalent) on the effects device, adjust the overall level of what is to be sent using the Master Section's Effect Send Volume.
- ② Adjust the level of signals returning from the effects device using Return Volume.

- * The direct sounds will be processed within the mixer, so return only the effect sound to the mixer.
- * The point from which the signals for Effect Send are taken is located after the Channel Faders (Post-fader).

- * When monaural input is being used on the Stereo Channel, the channel's output level will rise by 6 dB. Adjust the level to an appropriate degree using Effect/Reverb Volume.

- Through connection of an effects device to Channel Insert, effects processing can be carried out directly with respect to the channel.
- You can enhance your system further if you connect an equalizer or limiter between Master Out and Power Amp In. You then will be able to make corrections in the sound field and overall quality of the sound.

3. Monitoring and use of fold-back; monitoring using Sub Out



■ Procedure for Monitoring (Use of fold-back)

① Using each channel's Monitor Volume, adjust the level of output for the sound you wish to monitor.

② Next, using the Master Section's Monitor Send Volume, adjust overall volume.

* **The mixing balance and volume for monitoring can be set independently, without being affected by the Channel Faders and Master Faders.**

* **When the Stereo Channel is being used for monaural input, the channel's output level will rise by 6 dB. Adjust the level to an appropriate degree using Monitor Volume.**

* **Your system can be upgraded by connecting an equalizer or limiter between the mixer and power amplifier. You then will be able to make corrections in the sound field and overall quality of the sound.**

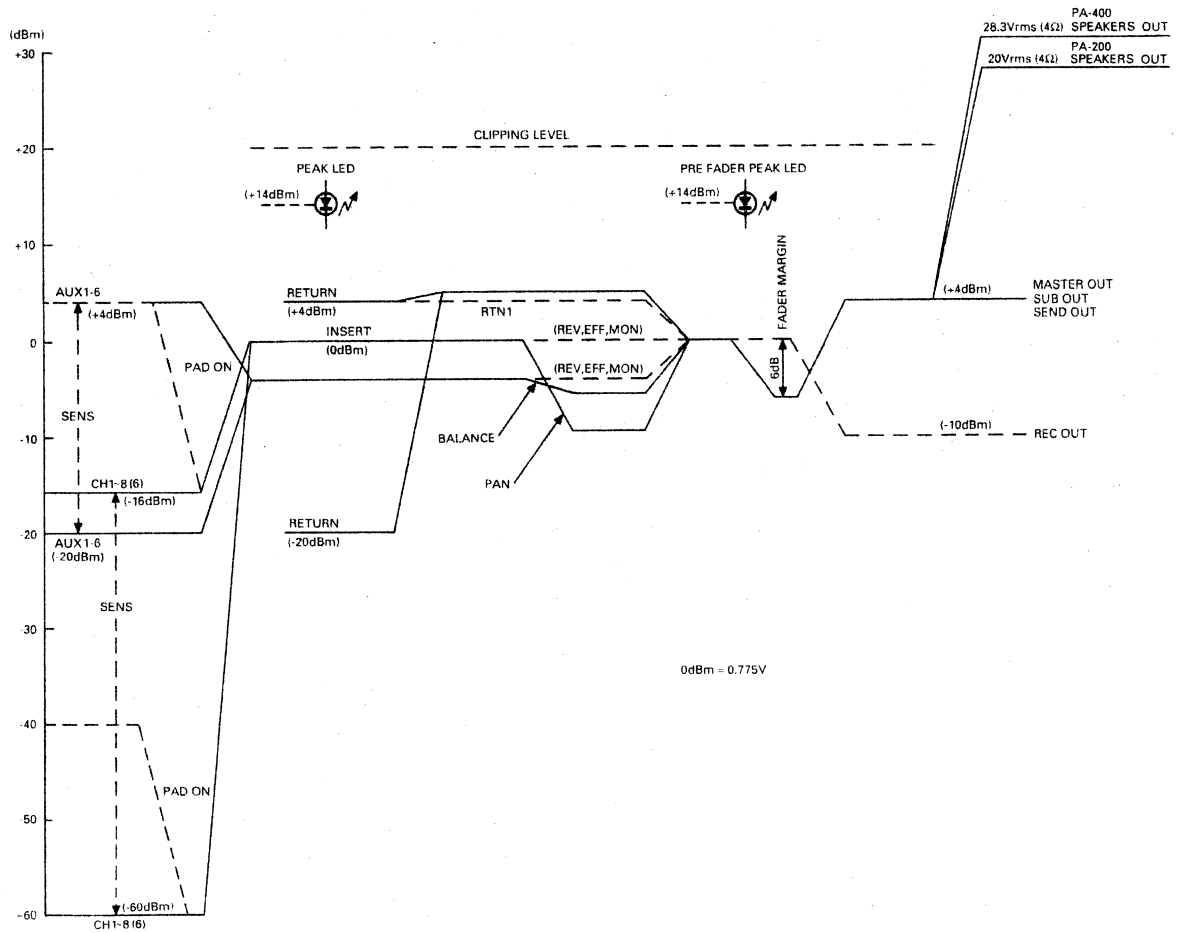
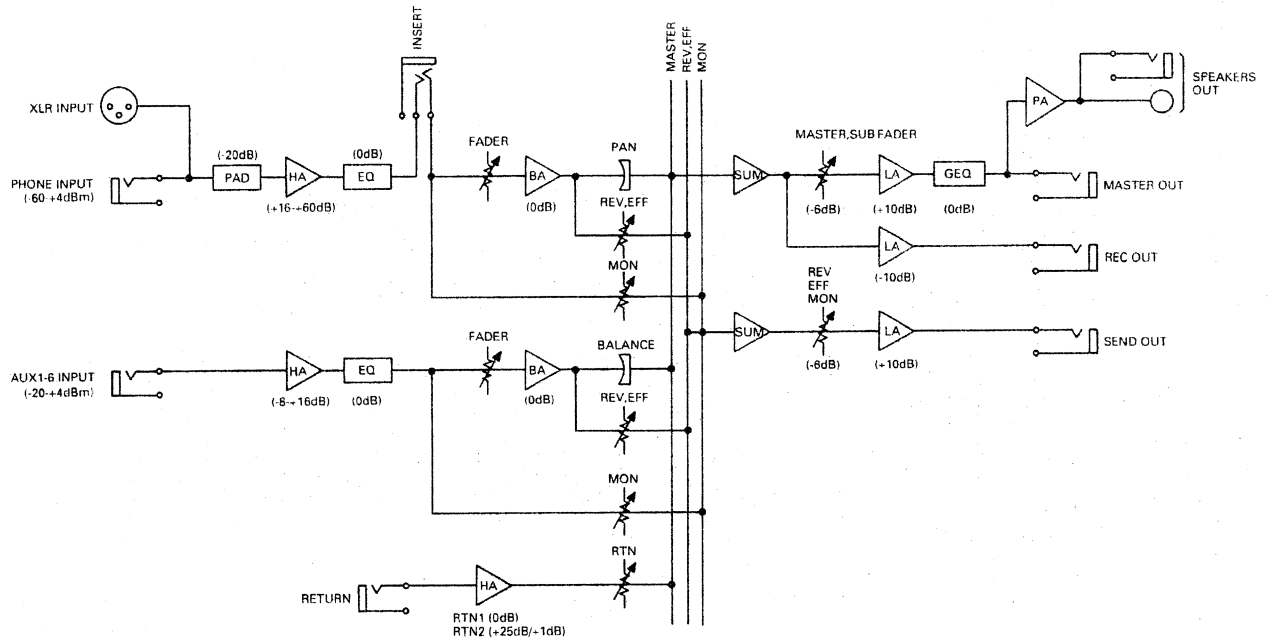
■ Monitoring Using Sub Out

① Adjust volume using Sub Out Faders.

* **Settings for the volume can be made irrespective of the positions of the Master Faders.**

* **Your system can be upgraded by connecting an equalizer or limiter between the mixer and power amplifier. You then will be able to make corrections in the sound field and overall quality of the sound.**

4 Level Diagram



5 Input/Output Standards (refer to separate sheet)

■ Input Standard

1. MIXER SECTION

Input Socket		Input Sensitivity	Rated Input Level	Input Impedance	Recommended Source Impedance	Type of Connectors
CHANNEL INPUT (SENS=MAX) (PAD=OFF)	CH1-8{6} (XLR-BAL)	-66 dBm (0.39 mV)	-60 dBm (0.78 mV)	3 kΩ	Less than 600 Ω	XLR-3-31 (XLR Connector)
	CH1-8{6} (PHONE-BAL)	-66 dBm (0.39 mV)	-60 dBm (0.78 mV)	8.5 kΩ	Less than 1 kΩ	STEREO PHONE
	CH1-8{6} (PHONE-UNBAL)	-66 dBm (0.39 mV)	-60 dBm (0.78 mV)	5 kΩ	Less than 1 kΩ	STEREO PHONE
STEREO CHANNEL INPUT (SENS=MAX)	AUX1,2,4,5	-26 dBm (38.8 mV)	-20 dBm (77.5 mV)	11 kΩ	Less than 2 kΩ	RCA Phono
	AUX3,6	-26 dBm (38.8 mV)	-20 dBm (77.5 mV)	11 kΩ (STEREO) 5.5 kΩ (MONO)	Less than 2 kΩ (STEREO) Less than 1 kΩ (MONO)	PHONE
INSERT (RETURN)	CH7,8{5,6}	-6 dBm (388 mV)	0 dBm (775 mV)	12 kΩ	Less than 2 kΩ	STEREO PHONE
RETURN	RTN 1	-2 dBm (615 mV)	+4 dBm (1.23 V)	10 kΩ (STEREO) 5 kΩ (MONO)	Less than 2 kΩ (STEREO) Less than 1 kΩ (MONO)	PHONE
	RTN 2	-26 dBm (38.8 mV)	-20 dBm (77.5 mV)	10 kΩ (STEREO) 5 kΩ (MONO)	Less than 2 kΩ (STEREO) Less than 1 kΩ (MONO)	PHONE

2. POWER AMP SECTION

Input Socket	Input Sensitivity	Rated Input Level	Input Impedance	Recommended Source Impedance	Type of Connectors
POWER AMP IN (L, R, MONO)	-2 dBm (615 mV)	+4 dBm (1.23 V)	18 kΩ	Less than 2 kΩ	PHONE

■ Output Standard

1. MIXER SECTION

Output Socket		Rated output Sensitivity	Non-Clip Max, Output	Output Impedance	Recommended Load Impedance	Type of Connectors
MASTER OUT	UNBALANCED	+4 dBm (1.23 V)	+20 dBm (7.75 V)	300 Ω	More than 3 kΩ	PHONE
SUB OUT	L,R	+4 dBm (1.23 V)	+20 dBm (7.75 V)	300 Ω	More than 3 kΩ	PHONE
	MONO	+4 dBm (1.23 V)	+20 dBm (7.75 V)	3 kΩ	More than 10 kΩ	PHONE
INSERT (SEND)	CH7,8{5,6}	0 dBm (0.775 V)	+20 dBm (7.75 V)	300 Ω	More than 3 kΩ	STEREO PHONE
SEND	EFF,REV, MON	+4 dBm (1.23 V)	+20 dBm (7.75 V)	300 Ω	More than 3 kΩ	PHONE
REC OUT		-10 dBm (0.245 V)	+20 dBm (7.75 V)	300 Ω	More than 3 kΩ	RCA Phono
PHONES		—	100 mW + 100 mW *1	100 Ω	More than 8 Ω	STEREO PHONE

2. POWER AMP SECTION

Output Socket	Rated output Sensitivity	Non-Clip Max, Output	Recommended Load Impedance	Type of Connectors
SPEAKERS OUT	STEREO 200W {100w} *2	28.3 {20} Vrms (4Ω) 32.2 {21.9} Vrms (8Ω)	More than 4 Ω	PHONE, BINDING POST
	BTL 400W {200W} *3	56.5 Vrms (8Ω) {40 Vrms (8Ω)}	More than 8 Ω	BINDING POST

{ } : PA-200

@ : 0 dBm+0.775 Vrms

*1 : Both Channels 100 Ω Loaded

*2 : Both Channels 4 Ω Loaded

*3 : 8 Ω Loaded

6 SPECIFICATIONS

1. Mixer Section

Frequency Response: 15 Hz — 25 kHz $\pm 1/2$ dB
(SENS=min.)

Total Harmonic Distortion: 0.05% or less (20 Hz - 20 kHz rated output)

Noise Level (Input Shorted, IHF-A Typ.)

Equivalent Input Noise: -128 dBm

Residual Noise:

PA-400 -98 dBm [All Fader: min.]
-81 dBm [Master Fader: max.]
[All Channel Fader: min.]
-75 dBm [Master Fader: max.]
[All Channel Fader: max.]
[All SENS.: max.]
-48 dBm [Master Fader: max.]
[All Channel Fader: max.]
[All SENS.: max.]

PA-200 -98 dBm [All Fader: min.]
-82 dBm [Master Fader: max.]
[All Channel Fader: min.]
-76 dBm [Master Fader: max.]
[All Channel Fader: max.]
[All SENS.: max.]
-50 dBm [Master Fader: max.]
[All Channel Fader: max.]
[All SENS.: max.]

Crosstalk: -70 dB or less (1 kHz between channels)
-60 dB or less (1 kHz between L and R)

Equalizer:

Normal Channel:

HIGH EQ ± 15 dB (10 kHz shelving type)
MID EQ ± 15 dB (0.2-5 kHz peaking type)
LOW EQ ± 15 dB (100 Hz shelving type)

Stereo Channel:

HIGH EQ ± 15 dB (10 kHz shelving type)
LOW EQ ± 15 dB (100 Hz shelving type)

Graphic Equalizer:

Frequencies: 63, 125, 250, 500, 1k, 2k, 4k, 8k, 16k [Hz]

Variable Width: ± 12 dB

Digital Reverb:

Sampling Frequency: 31.25 kHz
Signal Processing: 16 bits
Delay Time: 50 ms — 480ms

2. Power Amplifier Section

Rated Output:

PA-400

Stereo, both chan. 4 ohm load: 130 W x 2
Stereo, both chan. 8 ohm load: 200 W x 2
BTL, 8 ohm load: 400 W

PA-200

Stereo, both chan. 4 ohm load: 65 W x 2
Stereo, both chan. 8 ohm load: 100 W x 2
BTL, 8 ohm load: 200 W

Recommended load impedance:

Stereo: more than 4 ohms
BTL: more than 8 ohms

Frequency Response: 10 Hz—50 kHz (± 1 dB 1W/8 ohm)

Total Harmonic Distortion: Stereo, both chan. 8 ohm load: 0.1% or less (8 ohm, 1 kHz)

S/N Ratio:

PA-400

104 dB or greater (main in shorted, IHF-A, Typ.)

PA-200

102 dB or greater (main in shorted, IHF-A, Typ.)

3. Others

Power: AC 117V/220V/240V (50/60 Hz)

Power Consumption:

PA-400

400VA, 310W (117V)
1000VA (220/240V)

PA-200

270VA, 220W (117V)
500VA (220/240V)

Dimensions:

PA-400

488 (W) x 501 (D) x 235 (H) mm
19"-1/4 (W) x 19"-23/32 (D) x 9"-1/4 (H)

PA-200

460 (W) x 501 (D) x 235 (H) mm
18"-1/4 (W) x 19"-23/32 (D) x 9"-1/4 (H)

Weight:

PA-400 18.1 kg / 39 lb 15 oz

PA-200 14.7 kg / 32 lb 7 oz

* Specifications are subject to change without notice.

PA-200 / 400

Corrections

Please make corrections in your Owner's Manual as show below.

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In the right :

Rated Output :

PA - 400

Stereo, both chan. 8 ohm load : 130W × 2

Stereo, both chan. 4 ohm load : 200W × 2

BTL, 8 ohm load : 400W

PA - 200

Stereo, both chan. 8 ohm load : 65W × 2

Stereo, both chan. 4 ohm load : 100W × 2

BTL, 8 ohm load : 200W

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