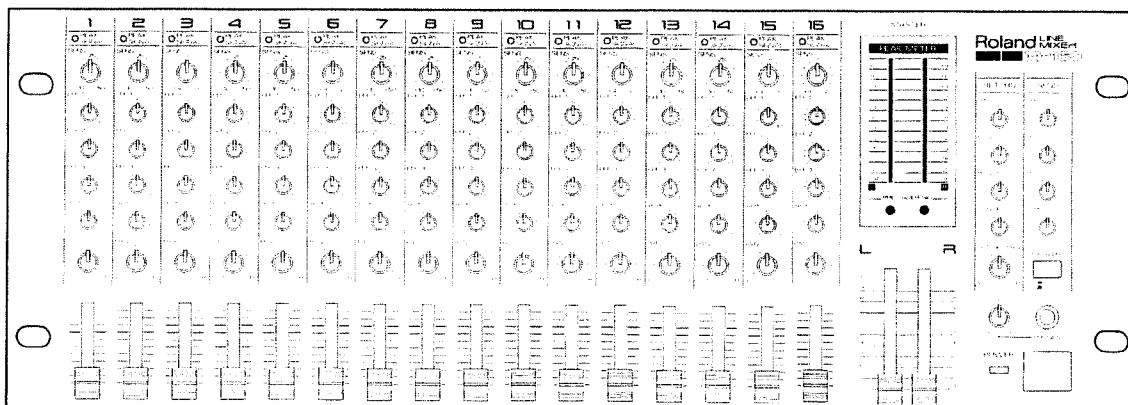


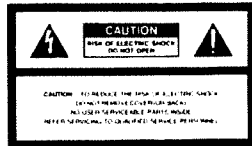
 Roland

LINE MIXER

M-160

OWNER'S MANUAL





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. To reduce the risk of injury, close supervision is necessary when a product is used near children.
3. 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.
4. This product should be used only with a cart or stand that is recommended by the manufacturer.
5. 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 level that is uncomfortable. If you experience any hearing loss or ringing in the ears, you should consult an audiologist.
6. The product should be located so that its location or position does not interfere with its proper ventilation.
7. The product should be located away from heat sources such as radiators, heat registers or other products that produce heat.
8. The product should avoid using in where it may be effected by dust.
9. The product should be connected to a power supply only of the type described in the operating instructions or as marked on the product.
10. The power-supply cord of the product should be unplugged from the outlet when left unused for a long period of time.
11. Do not tread on the power-supply cord.
12. Do not pull the cord but hold the plug when unplugging.
13. When setting up with any other instruments, the procedure should be followed in accordance with instruction manual.
14. Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings.
15. 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.
16. 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.

SAVE THESE INSTRUCTIONS

WARNING

THIS APPARATUS MUST BE EARTH GROUNDED.

The three conductors of the mains lead attached to this apparatus are identified with color as shown in the table below, together with the matching terminal on the UK type power plug. When connecting the mains lead to a plug, be sure to connect each conductor to the correct terminal, as indicated.

"This instruction applies to the product for United Kingdom."

MAINS LEADS		PLUG
Conductor	Color	Mark on the matching terminal
Live	Brown	Red or letter L
Neutral	Blue	Black or letter N
Grounding	Green-Yellow	Green, Green-Yellow, letter E or symbol

Please read the owner's manual carefully.

FEATURES

The Roland M-160 is a high-quality, rack-mount type, 16 channel line mixer.

- This mixer provides various excellent functions and high quality sounds equivalent to these of professional equipment.
- The inputs and outputs are compatible with the line level of professional equipment (+4dBm). Both standard phone jacks and XLR connectors (balance) are provided for outputs.
- This compact size mixer contains as many as 16 channel inputs, making it possible to deal with a number of sources in a small space. The input channels 1 and 2 can also be used for microphones.
- The Bus In jacks allows you to stack the mixer easily.
- Four sets of Effect Send and Return jacks are provided. AUX Send can select Pre or Post. Returns consist of three stereo jacks and one with panpot.
- The Phones Mix In allows you to monitor through headphones the monitor mix signals or sequencer's click sound. Moreover, the mixer features a highly sensitive Fader, easy-to-read Level Meter and Peak/Signal Indicator, etc.

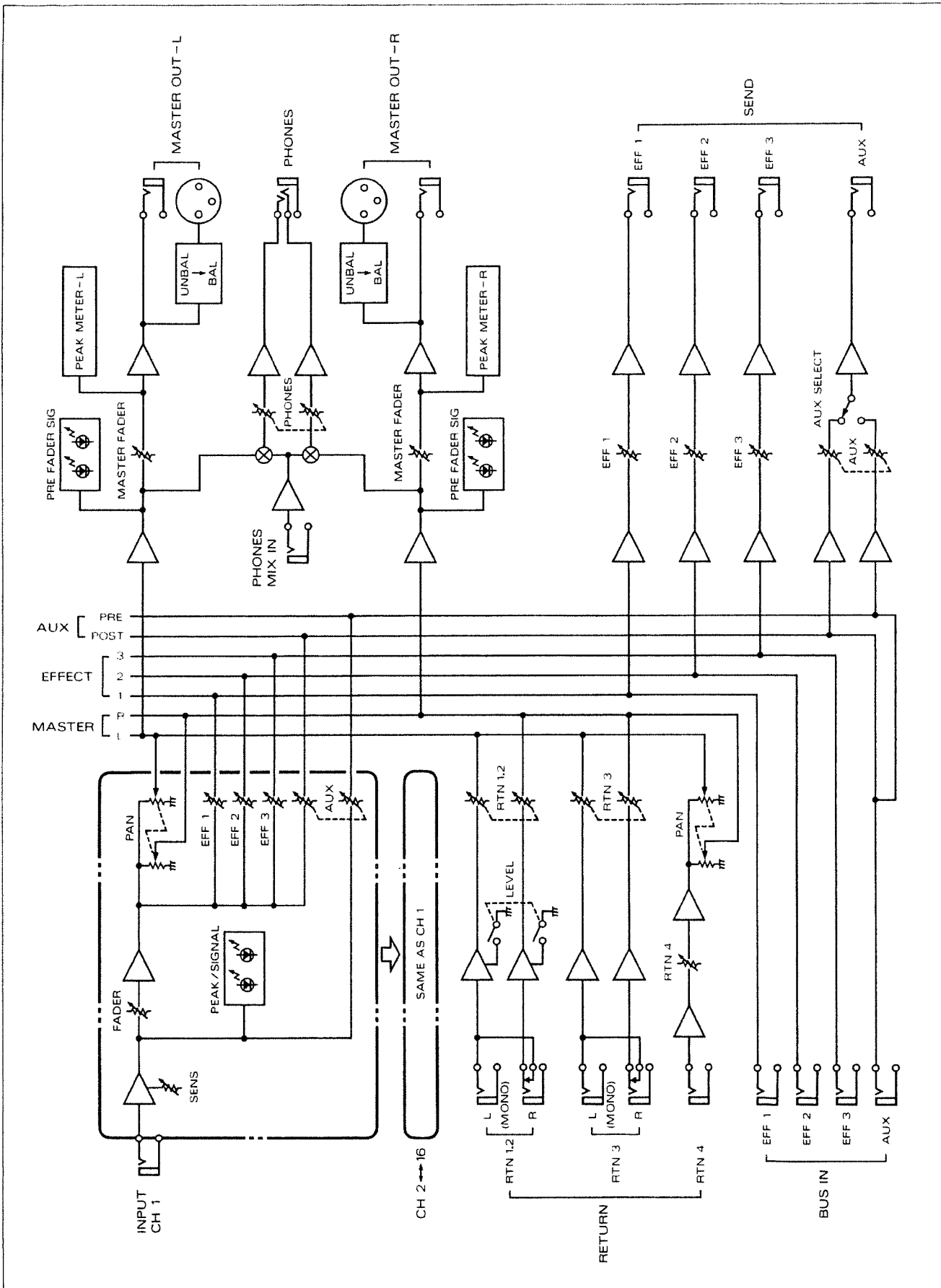
CONTENTS

1	Block Diagram and Signal Flowing	4
1.	Channel Section	
2.	Master Section	
a.	Return	
b.	Phones Mix In	
c.	Master Out	
d.	Effect Send	
e.	AUX Send	
f.	Bus In	
2	Panel Description	6
1.	Channel Section	
2.	Master Section	
3.	Rear Panel	
3	Connections and Operation	9
■	Basic Operation	
1.	Connections of Microphones and Musical Instruments	
■	Mixing of Microphones and Musical Instruments	
2.	Connections of Effect Units	
■	Delay and Reverb	
3.	Connections of Monitoring Units	
■	Monitor Mixing and Foldback	
4.	Connection for Stacking	
5.	Rack Mount Installation	
4	Level Diagram	13
5	Specifications	14

IMPORTANT NOTES

- Do not use the same socket used for any noise generating unit such as a motor or variable lighting system.
- Before connecting the Power cable to the socket, turn the unit off.
- When disconnecting the power cable from the socket, do not pull the cord but hold the plug.
- Handle the cables gently.
- When the unit is not to be used for a long period of time, disconnect the power cable from the socket.
- When making or breaking connections, turn all the unit off.
- For about a few seconds, muting circuits work, therefore no sound is output.
- Turn on the power amplifier after turning on the mixer, and turn off the mixer after turning off the amplifier. These should be done with the Faders of the mixer set to 0.
- Operating this device near a neon or fluorescent lamp may cause noise interference. If so, change the angle or the position of the device.
- Avoid using this device in extreme heat, humidity or where it may be affected by dust or vibration.
- Use a mild detergent and soft cloth for cleaning. Do not use solvents such as thinner.
- Placing a unit using a large type transformer such as a power amplifier just above this mixer may cause hum.
- Do not place or drop a heavy object on the power cable or connection cord.
- Do not touch the inside of the unit, as it may cause you an electric shock and the unit a breakdown.
- Do not let any solid or liquid material in this unit.
- Do not give strong shock to the unit.
- If this unit does not operate properly, unplug the power cable immediately and contact your local Roland service.
- The XLR connectors of this unit adopt the connection system of 1st=ground, 2nd=cold and 3rd=hot.

1 BLOCK DIAGRAM AND SIGNAL FLOWING



1. Channel Section

Input signals are sent to the Headamplifier where the sensitivity is adjusted. When signals are fed in, the Peak/Signal Indicator light green, and when the input signals are too high levels, it lights red.

The signals level-adjusted at the Headamplifier are processed at the Channel Fader, then divided into L and R at the Panpot, then finally reach the Master Section. A part of signals goes to the AUX Volume without going to the Fader, and the other signals go to the Effect Volume after the Fader instead of going to the Panpot.

2. Master Section

a. Return

The signals fed into Returns 1, 2 and 3 are sent to the Buffer Amplifiers, then to the Master Outputs after level-adjusted at the Return Volumes. Return 4's input signals also go to the Buffer Amplifier, then to the Return Volume, divided into L and R at the Panpot, and finally go to the Master Outputs.

b. Phones Mix In

The signals sent into this jack are processed at the Buffer Amplifier, mixed with the Main Bus signals, go to the Headphone Amplifier, then to the headphone volume, then to the Headphone Output.

c. Master Output

The signals sent from each Channel are mixed, then level-adjusted at the master fader, then sent to the Master Outputs.

d. Effect Send

The signals sent from the Effect Volumes of each Channel are mixed, then level-adjusted at the Effect Send Volume, then sent to the Effect Sends.

e. AUX Send

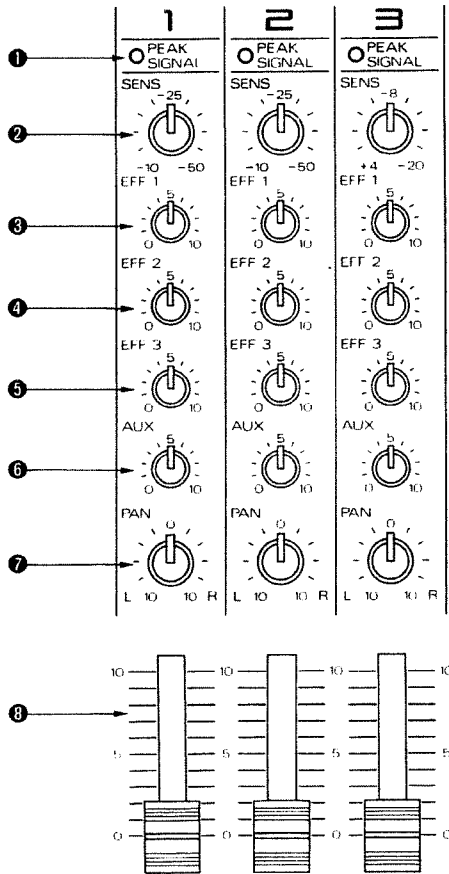
The signals that go to the AUX Volume either without or after going to the Channel Fader are level-adjusted there, mixed, then level adjusted at the AUX Send Volume, then sent out to the AUX Send.

f. Bus In

The signals fed through these jacks are directly mixed with the Effect Send and AUX Send Busses, then sent to Effect Send and AUX Send Volumes, then finally sent out.

2 PANEL DESCRIPTION

1. Channel Section



1 Peak/Signal Indicator

When signals higher than -24dB (rated level) are input, the indicator lights up green, which means the input signals are sufficient level. When signals reach the clipping level (-6dB), the indicator lights in red.

2 Sens Knob

This knob adjust the sensitivity of the input signal. Set this so that the Peak/Signal Indicator will light green and occasionally red. If the Peak/Signal Indicator does not light up at all, rotate the Sens Knob clockwise or increase the level of the input signal.

* Channels 1 and 2 have rated inputs of -50 to -10dBm which are appropriate input sensitivities for microphone level, while Channels 3 to 16 have -20dBm to $+4\text{dBm}$ rated input appropriate for line level.

3, 4 and 5 Effect Volume Knobs

These adjust the level of the signals to be sent to Effect Sends.

* The position where the signals are sent to the Effect Send is Post Fader (after passing the Channel Fader).

6 AUX Volume Knob

This adjusts the level of the signal to be sent to the AUX Send. This, therefore, can be used for monitor sending, recording output or effect sending.

* The position where the signals are sent to the AUX Send can be selected at the Master Section; Pre or Post.

7 Panpot

This sets the placing of the sound imaging in stereo sound field. At the center position, the volumes of L and R are equal.

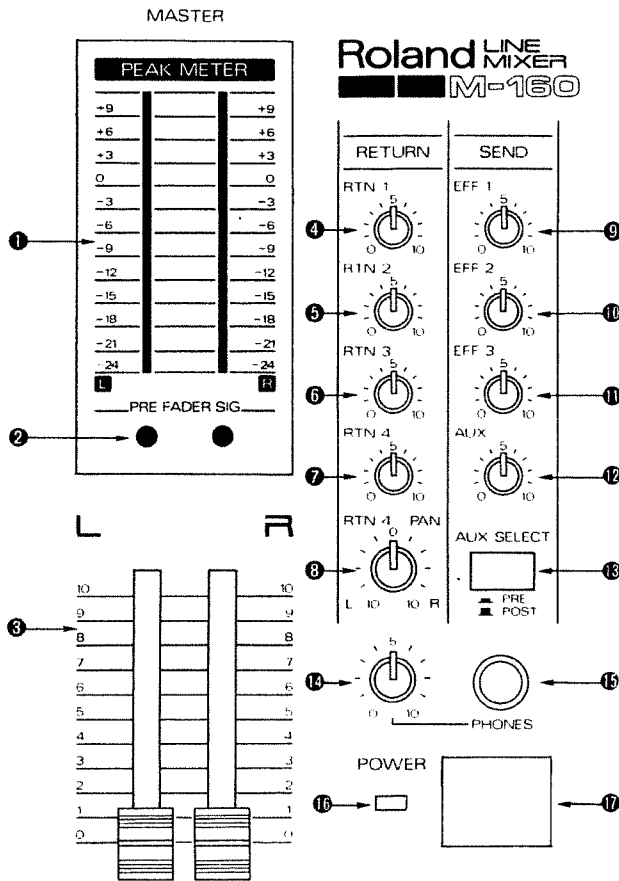
8 Channel Fader

This sets the level of the signal to be sent out from a Channel.

* Before switching on or off the mixer, be sure to set the Master Fader to zero.

* For about 3 seconds, muting circuits work, therefore, no sound is output.

2. Master Section



1 Peak Meters

Use these peak-indicating level meters to observe the output levels from the Master Out's. When "0dB" lights up, the level from the Master Out is +4dBm.

2 Pre-fader Signal Indicators

These can be used to observe the output levels of the amplifiers where signals from Channels are mixed. The position where the signals are read is Pre Master Fader (before the Master Fader). When it is equal to the rated level -20dB, the indicator lights in green, and when it is clipping level -6dB, it lights in red.

3 Master Faders

These adjust the final sending levels of the mixed signals.

4, 5, 6 and 7 Return Volume Knobs

These adjust the levels of the signals sent to the Return Jacks.

8 Panpot

This sets the sound imaging of the Return 4. At the center position, the volumes of L and R are the same.

9, 10 and 11 Effect Send Volume Knobs

These adjust the levels of the signals to be sent to the effect units.

12 AUX Send Volume Knob

This adjusts the final sending level of the signal mixed at the AUX Volume of each Channel.

13 AUX Selector Switch

This selects the position where the signals are sent to the AUX Send. When PRE is selected, the signals are taken before the Channel Fader, therefore, the mixer can be used as a monitor. When POST is selected, the signals are taken after the Channel Fader, therefore the mixer can be used as an effect send.

14 Headphone Volume Knob

This adjusts the volume of the headphone signals which are the mixture of the signals from each Channel Fader and the Phones Mix In.

* The signals are sent out before going to the Master Fader, therefore the headphones can be used for monitoring.

15 Headphone Jack

Connect stereo headphones to this jack.

16 Power Indicator

This lights up when the mixer is switched on.

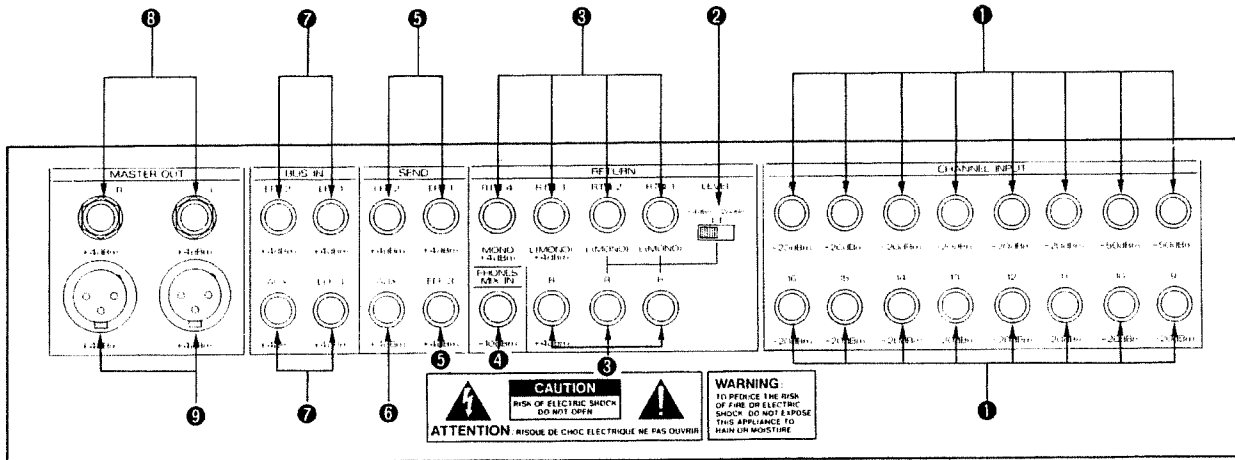
17 Power Switch

Pushing this switch turns the mixer on, and pushing it again turns off.

* Before turning on or off the mixer, be sure to set the Master Faders to zero.

* For about 3 seconds after the mixer is turned on, muting circuits work, therefore no sound is output.

3. Rear Panel



1 Input Jacks

Channels 1 and 2 are for connecting microphones, musical instruments, etc. Channels 3 to 16 are for devices with line level and musical instruments.

2 Level Switch

This selects the input level for the Returns 1 and 2 depending on the connected unit.

3 Return Jacks

These are to feed the signals returned from the effect units. These can also be used as AUX input jacks. Returns 1 to 3 are for stereo input, and Return 4 is for monaural only. Returns 1 to 3 can also be used as monaural inputs if L sides are connected.

4 Phones Mix In Jack

This is to feed the Monitor Mix signal, sequencer click sound, etc. The input signals are sent to the Headphone Jack only.

* The signals fed through this jack are not sent to the Master Out

5 Effect Send Jacks

These are to send the signals to the effect units.

6 AUX Send Jack

This sends out the signals to a monitor or effect unit.

7 Bus In Jacks

Signals fed through these jacks can be directly mixed with the Effect Send and AUX Send Busses. When two mixers are stacked, connect the Effect Send of one mixer to the Bus In Jack of the other one, and effects on two mixers can be controlled by one mixer.

* The signals fed through these jacks are not sent to the Master Out (L, R).

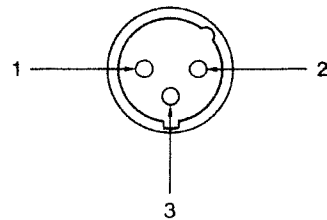
8 Master Out Jacks

These are to connect to a power amplifier, etc.

9 Master Out Connectors

These are XLR (balanced) type connectors for connecting a power amplifier, etc. The standard jacks 8 and the XLR connectors 9 can be used simultaneously.

* The XLR Connectors of this unit are standardized to 1st pin-Ground, 2nd pin-Cold and 3rd-Hot. When connecting to the other unit, check the type of the connectors.

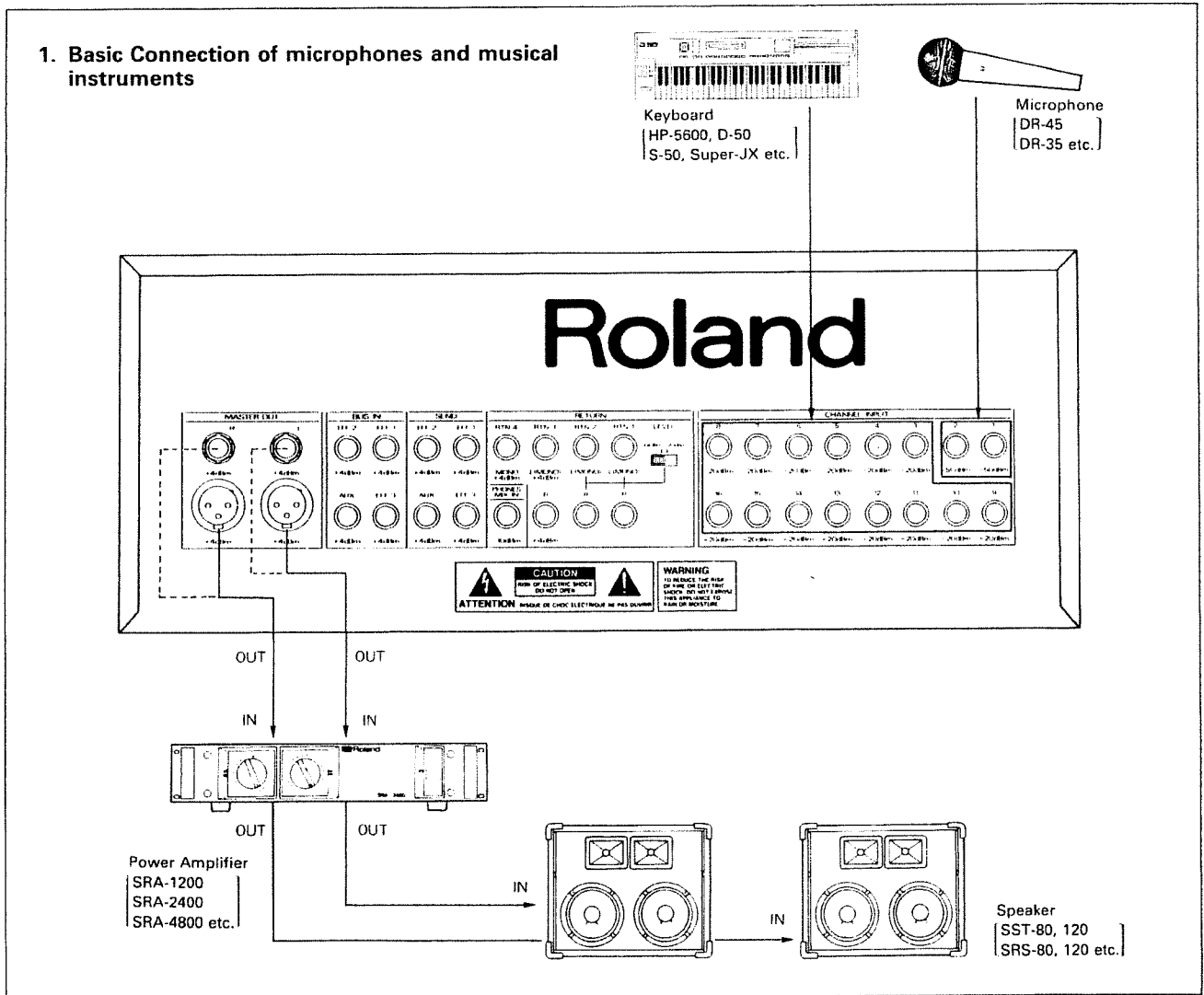


1: GND
2: COLD
3: HOT

3 CONNECTIONS AND OPERATION

■ Basic Procedure

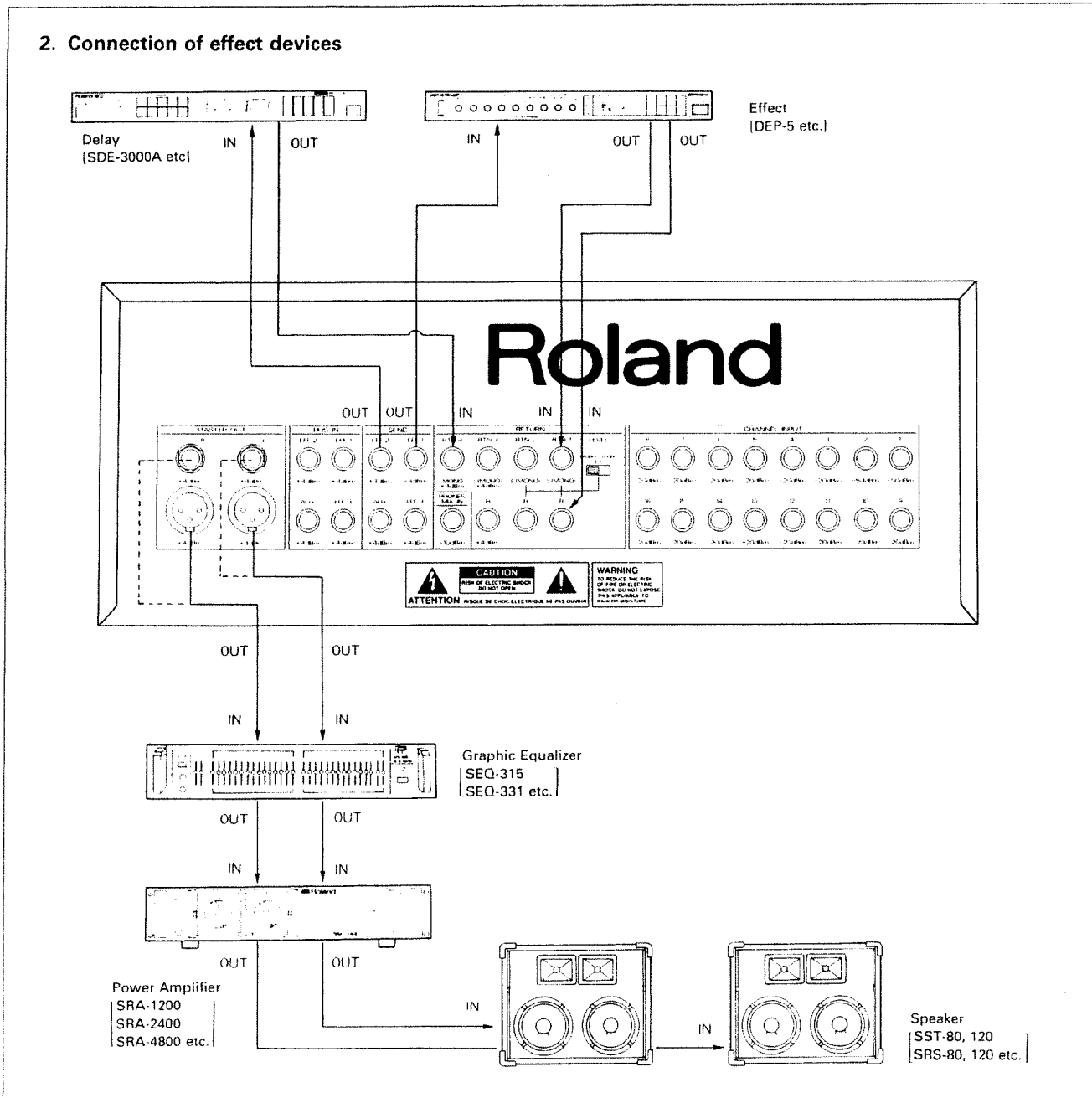
- ① Make sure that the mixer is turned off, then connect the power cable to the socket.
- ② Connect all the relevant devices to the mixer. (See the picture shown below.)
- ③ Set all the control knobs and faders to zero.
- ④ Check if all the connections have been correctly made. Turn the pre-stage devices on, then the mixer, then the power amplifier. When switching off the devices, take the reverse procedure.



■ Mixing of microphones and musical instruments

- ① As you play the instrument, set the Sens Knob so that the Peak/Signal Indicator will occasionally light red.
 - ② Set the Channel Fader around 7, then adjust the overall volume with the Master Fader.
 - ③ Set the sound imaging of L and R with the Panpot.
 - ④ Adjust the volume balance of each Channel with the Channel Fader.
- * If the Pre-fader Signal Indicator lights in red too often, lower the Channel Fader.

2. Connection of effect devices



■ Adding effects such as delay and reverb

- ① Adjust the output level of the signal sent to the effect unit using the Effect Volume Knob, then the overall output level with the Effect Send Volume with the aid of the input level indicators of the effect unit, etc.
- ② Adjust the level of the signal returned from the effect unit with the Return Volume Knob.

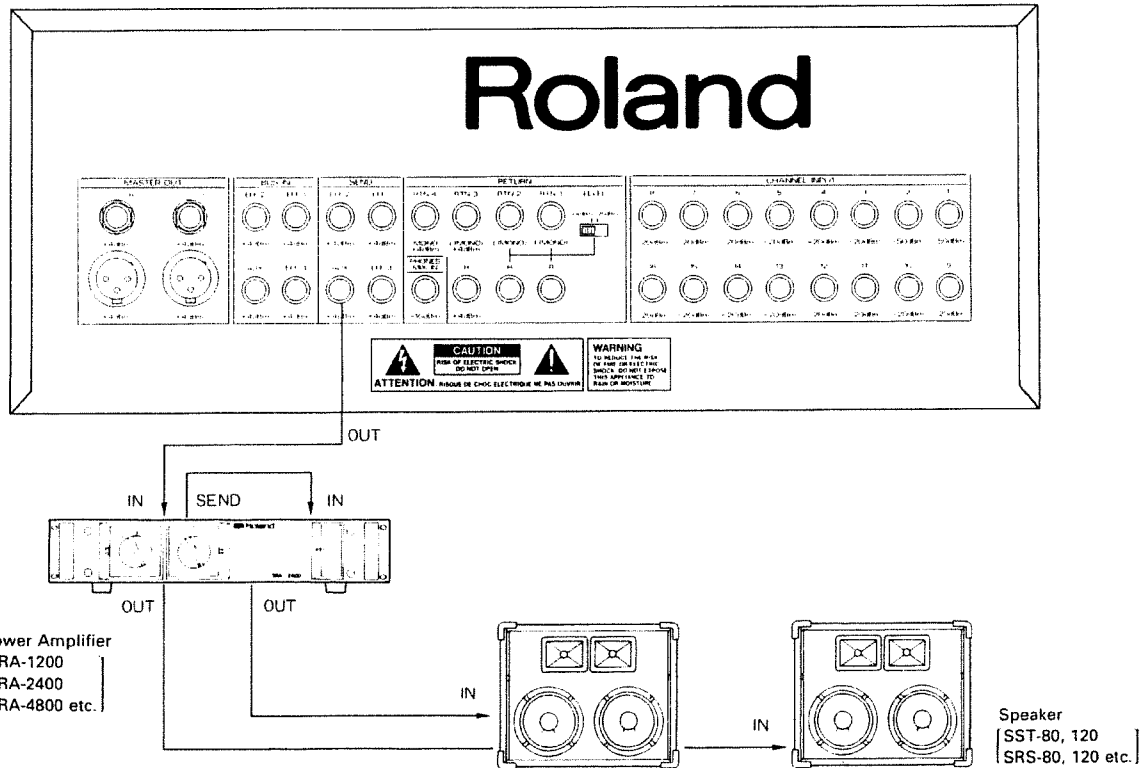
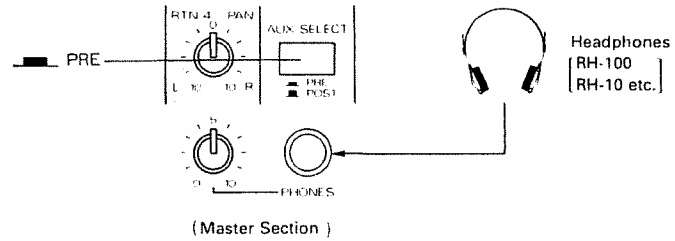
The Return Jacks 1 to 3 are capable with stereo input. Therefore, connect the stereo outputs from the effect units to L and R of RTN 1 to 3. When monaural output is connected to RTN 4, the L and R sound imaging can be set with the Panpot.

* Direct sounds are processed within the mixer, so return only the effect sounds to the mixer.

* The input signals are sent to the Channel Fader before going to the Effect Send. Therefore if the Channel Fader is set too low, no effect is obtained.

By using a graphic equalizer between the mixer and the power amplifier, sound imaging and overall volume can be adjusted.

3. Connection for Monitor

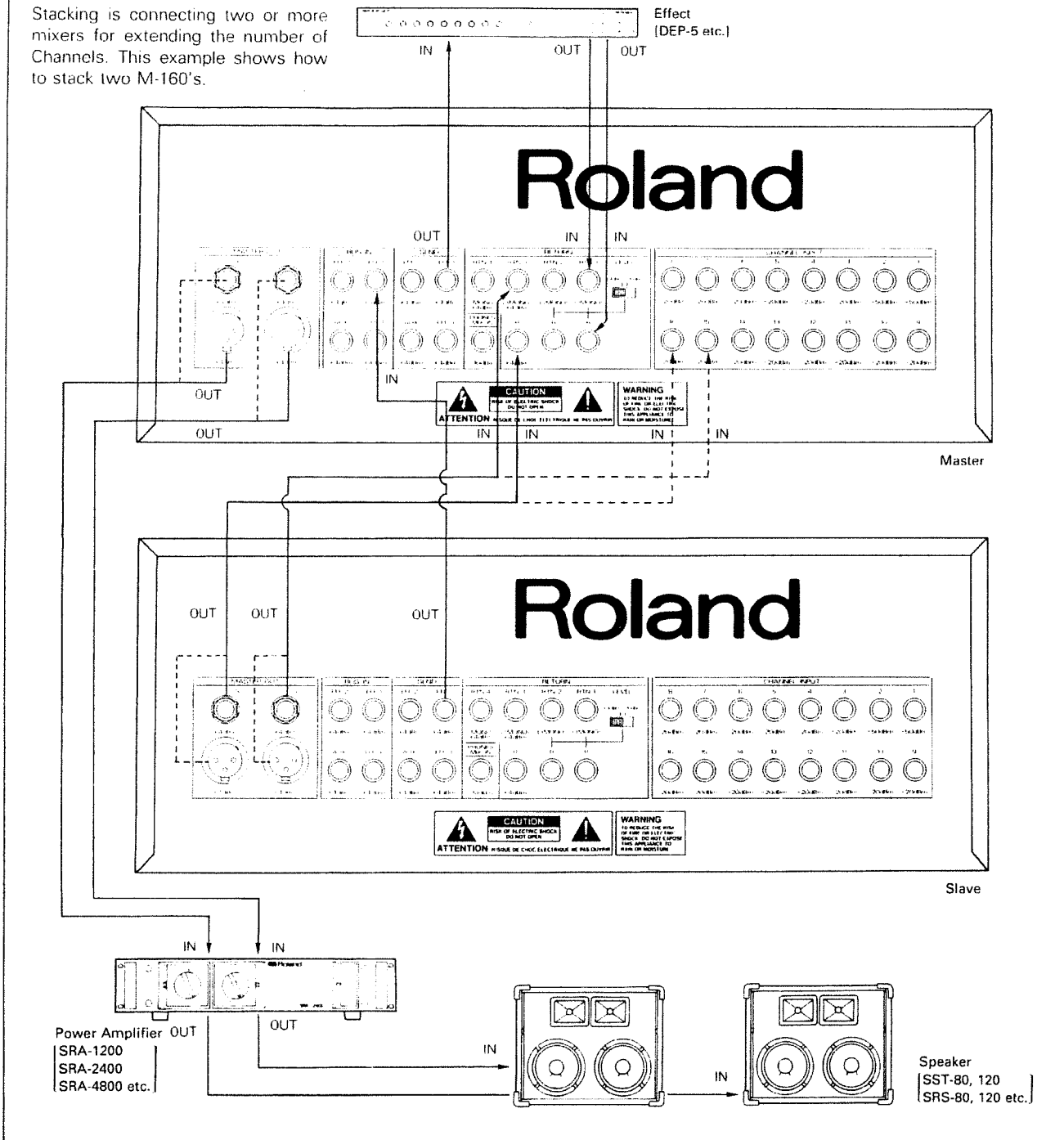


■ Monitor mixing and fold-back

- ① Set the AUX Selector Switch in the Master Section to "PRE".
 - ② Adjust the monitoring level of each Channel with the AUX Volume knob of each Channel.
 - ③ Adjust the overall volume with the AUX Send Volume of the Master Section.
- * The positions of the Channel Fader and the Master Fader do not affect the monitor mixing balance or the volume.
 - * To monitor the signal sent from the Master Out, use headphones.

4. Connection for Stacking

Stacking is connecting two or more mixers for extending the number of Channels. This example shows how to stack two M-160's.



▷ The signals coming from the Master Out of the slave mixer are sent to the Return Jack (RTN3) of the master mixer, then sent to the Master Out of the master mixer together with the signals of the master mixer.

By stacking two mixers as shown above, you can control effects of two mixers by operating one mixer, as well as extending the number of the Channels. In the above stacking example, only one effect unit is used, but actually, up to three effects can be set up.

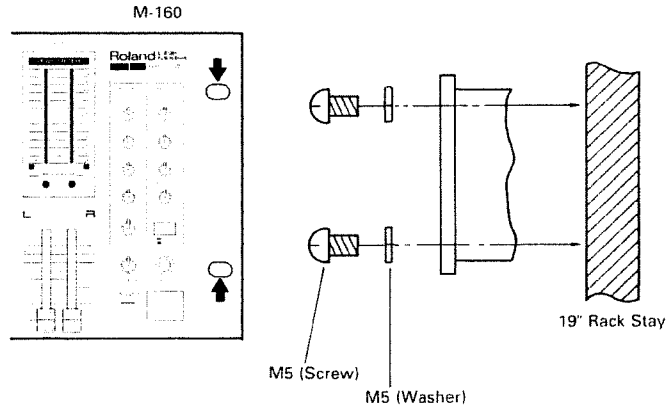
* You may input the signals from the Master Out of the slave mixer to the input of an empty Channel. (This allows you to use up to four effect devices.)

▷ By connecting the Effect Send Jack on the slave mixer to the Bus In Jack on the master mixer, the outputs of both mixers are sent out through the Effect Send Jack on the master mixer.

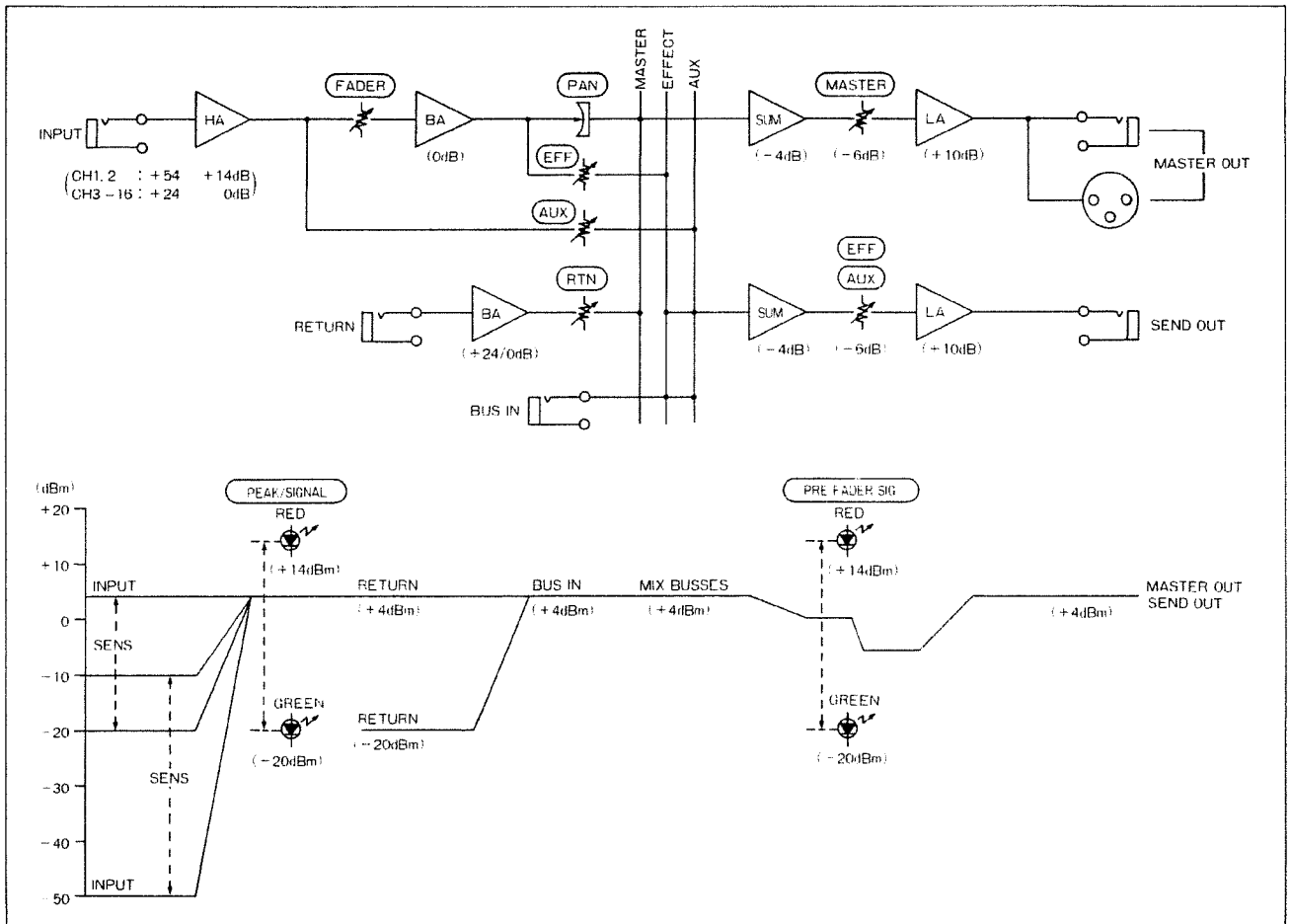
▷ The signals sent from the effect units should be returned to the Return Jacks on the master mixer.

5. Rack Mount Installation

This mixer can be mounted on a standard 19" rack using 5mm screws as shown below.



4 LEVEL DIAGRAM



5 SPECIFICATIONS

■ Input

Input		Input Sensitivity (Max. Gain)	Rated Input	Input Impedance	Recommended Source Impedance	Type of Connector
INPUT (SENS=MAX)	CH1,2	-56dBm (1.23mV)	-50dBm (2.45mV)	10kΩ	Less than 1kΩ	PHONE (Standard phone)
	CH3-16	-26dBm (38.8mV)	-20dBm (77.5mV)	20kΩ	Less than 2kΩ	PHONE
RETURN	RTN1,2 (LEVEL = -20dBm)	-26dBm (38.8mV)	-20dBm (77.5mV)	20kΩ	Less than 2kΩ	PHONE
	RTN3,4	-2dBm (615mV)	+4dBm (1.23V)	20kΩ	Less than 2kΩ	PHONE
PHONES MIX IN		-16dBm (123mV)	-10dBm (245mV)	20kΩ	Less than 2kΩ	PHONE
BUS IN	EFF1-3	-2dBm (615mV)	+4dBm (1.23V)	10kΩ	Less than 1kΩ	PHONE
	AUX	-2dBm (615mV)	+4dBm (1.23V)	5kΩ	Less than 1kΩ	PHONE

■ Output

Output		Rated Output	Non-clip Max. Output	Output Impedance	Recommended Load Impedance	Type of Connector
MASTER OUT	BALANCED	+4dBm* ¹ (1.23V)* ¹	+20dBm* ¹ (7.75V)* ¹	600Ω	More than 600Ω	XLR-3-32 (XLR Connector)
	UNBAL	+4dBm (1.23V)	+20dBm (7.75V)	300Ω	More than 3kΩ	PHONE
SEND	EFF1-3 AUX	+4dBm (1.23V)	+20dBm (7.75V)	300Ω	More than 3kΩ	PHONE
PHONES		—	90mW+90mW* ²	100Ω	More than 8Ω	STEREO PHONE

(注) : 0dBm=0.775Vrms *1: 600Ω Loaded *2: Both Channels 100Ω Loaded

- **Frequency Response** 10 to 60kHz ±1dB (SENS MIN.)
- **T.H.D.** Less than 0.1% (at 20Hz to 20kHz rated input)
- **Noise Level** (Input short, IHF-A, Typ.)
Equivalent Input Noise Level -124dBm
Residual Noise

-102dBm	[All Faders : min]
-88dBm	[Master Faders : max]
	[All Channel Faders: min]
-87dBm	[Master Faders : max]
	[All Channel Faders: max]
	[All SENS's : min]
-79dBm	[Master Faders : max]
	[All Channel Faders: max]
	[All SENS's : -20dB]
- **Cross Talk** Less than -70dB (1kHz, between channels)
Less than -70dB (1kHz, between L and R)
- **Power** 120/220/240V (AC 50/60 Hz)
- **Consumption** 26 W
- **Dimensions** 482 (W) × 250 (D) × 180 (H) mm / 19" × 9-13/16" × 7-1/16"
- **Weight** 5.6 kg / 12 lb 6 oz

*Specifications are subject to change without notice.

Roland®

71156224

UPC 71156224



10991

M-160

Roland

87-8-C3-1N