

YAMAHA

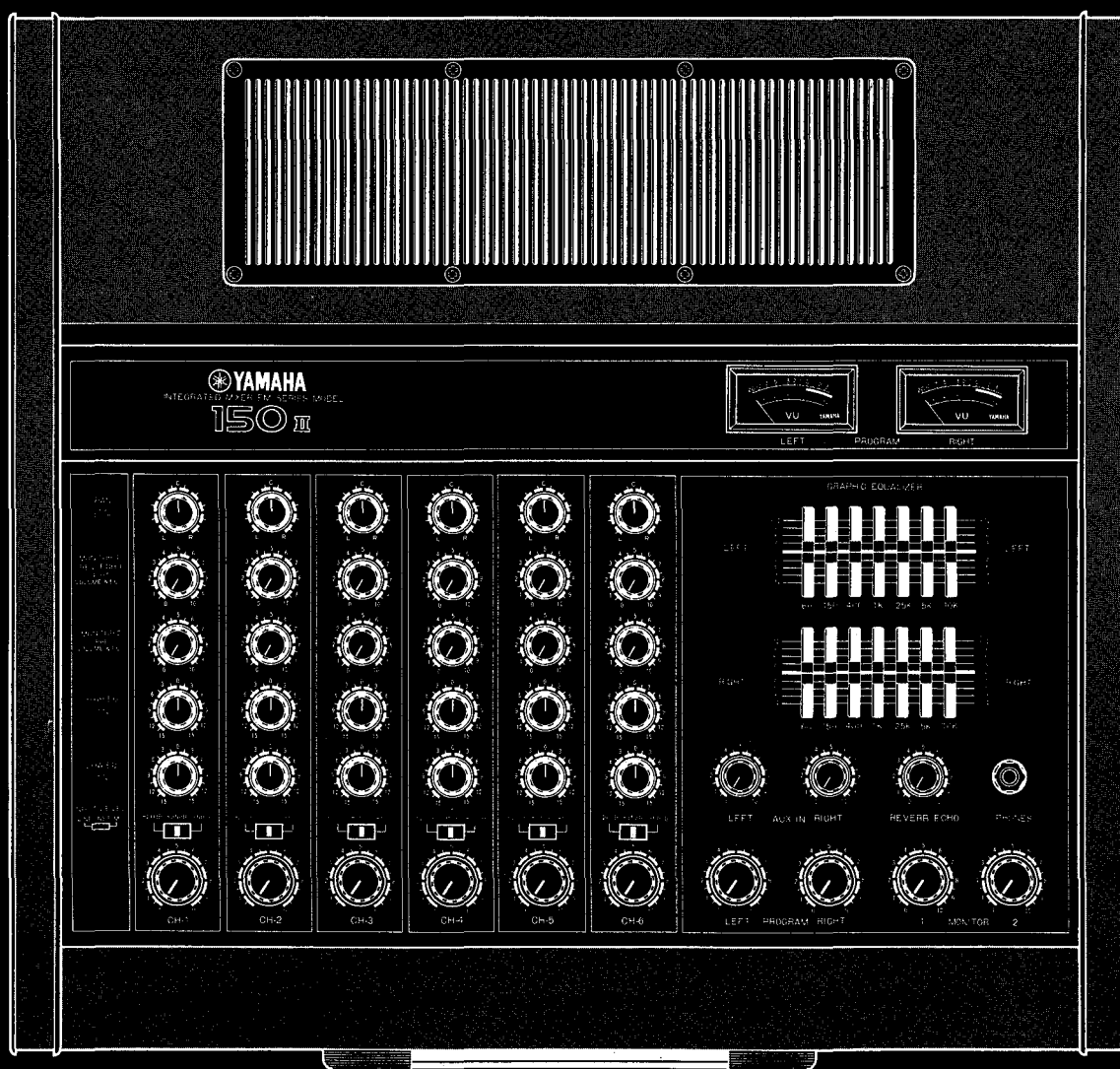
SOUND

REINFORCEMENT

MIXER

EM-150II

OWNER'S MANUAL



EM-150II PA MIXER

Your new YAMAHA mixer, incorporating six input channels, two output channels (stereo) and built-in power amplifier, is designed easy to use. It is equipped with a graphic equalizer, reverberation unit and monitor circuit which extend the mixer's application range from ordinary public address (PA) to business use. Please read this instruction manual carefully before you start to use it so that you can obtain its long life and best possible service.

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BEFORE OPERATION

Read the following carefully before operating your mixer.

- Do not install EM-150II where it will be exposed to direct sunlight, excessive heat (for instance, near a radiator), moisture, dust or vibration.
- Do not block the ventilation holes in the top, bottom and back panels of the mixer since they are designed to dissipate the heat which is generated internally.
- Make sure to use the commercially available AC line voltage.
When wiring, please refer to p. 5 for correct connections and make sure that the power switch is set to OFF.
- As to the speaker impedance, the acceptable speaker load is from 8 to 16 ohms for USA and Canadian models and from 4 to 16 for general models. Do not connect a speaker system with a total impedance of less than 8 ohms in case of USA and Canadian models and 4 in case of general models.

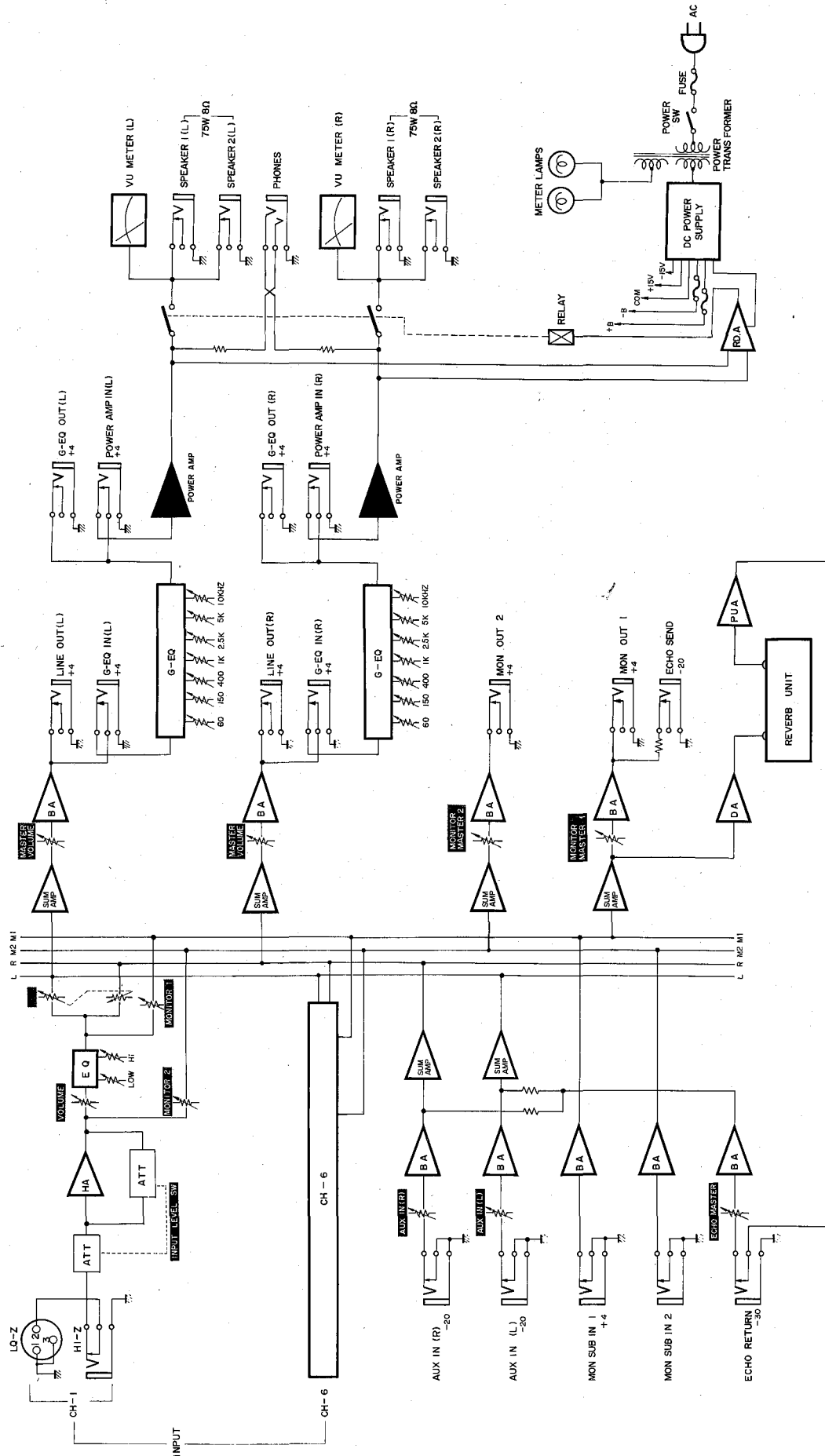
- Do not set the controls to the following positions.

INPUT LEVEL controls	-50 for all channels
Channel controls	Max. for all channels
LOW-EQ, HIGH-EQ controls	Max. for all channels
GRAPHIC EQUALIZER	Max. for each frequency
PROGRAM master controls	Max.

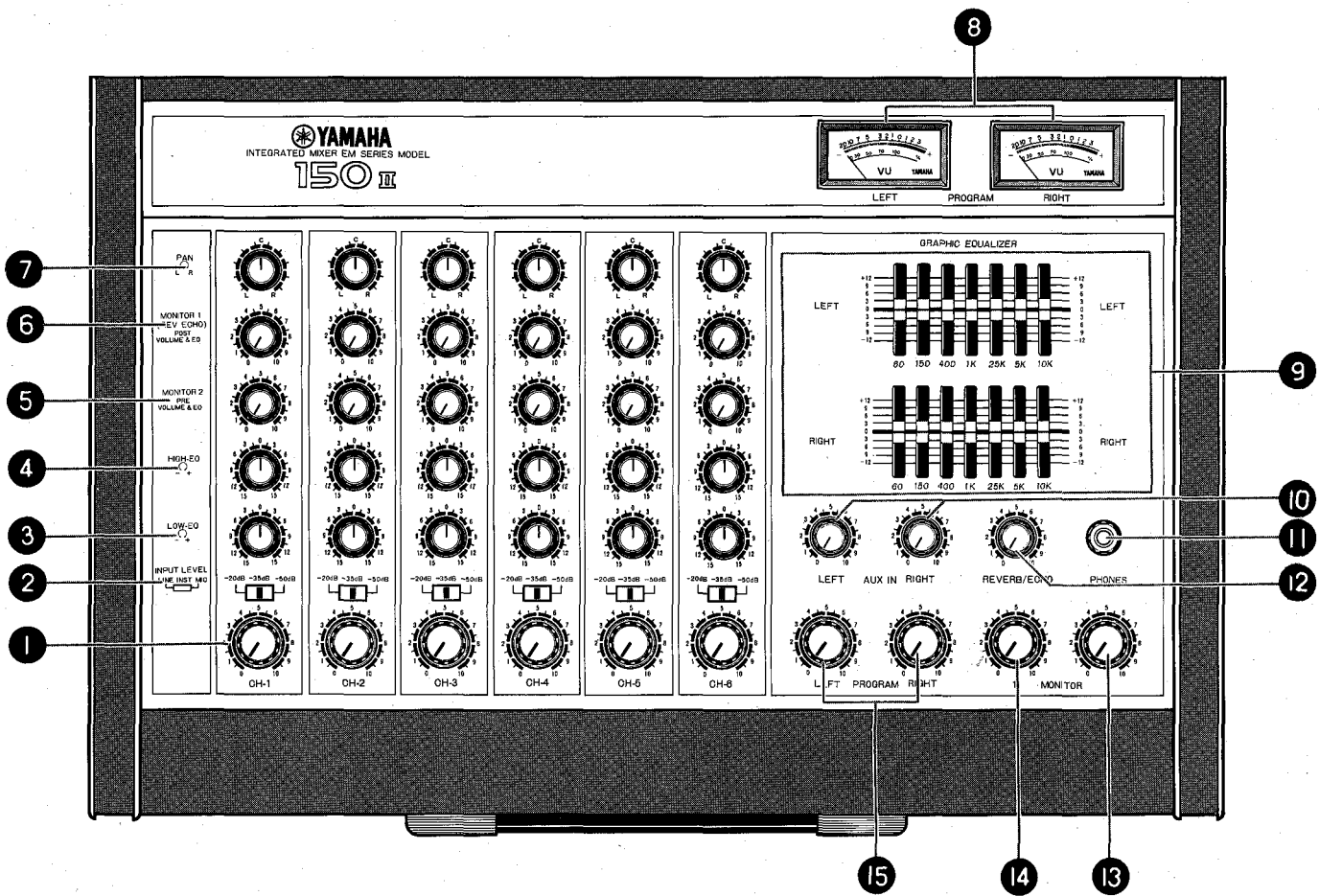
Although any of the above settings can't be expected in normal use, please remember that if you inadvertently set the controls to the positions given above and if it coincides with certain conditions of the equipment connected to the input connectors or the load speakers, oscillation may occur and result in damage to the speakers.

- When the power switch is set to ON, it takes a few seconds before anything is heard from speakers. This is simply because the circuit to control the speakers is at work to prevent the shock noise at the time of turning the switch to ON and OFF, and therefore is not any trouble at all.
- Clean panels etc. with a soft dry cloth only. Never use paint thinner and such, for the color of the panels may change.

BLOCK DIAGRAM



CONTROL PANEL OPERATIONS



① VOLUME controls

These are mixing volume controls to select the sound volume of each channel, so that volume levels are in good proportion. As to the unused channel, make sure to keep its VOLUME control set to "0".

② INPUT LEVEL controls

These are used to select the input levels of the channels. Switch them to one of MIC, INST, and LINE in accordance with the output signal of the equipment connected to the INPUT connectors of the rear panel.

Proper setting of the input levels not only prevents the overdrive of the head amplifier which causes distortion of the sound but also is the key to create a clear and agreeable sound for ears.

The table below lists the general settings. Set the controls to the proper level in accordance with the intended application.

INPUT LEVEL control setting		Input source
MIC	-50dB	General dynamic type microphone, condenser type microphone
INST	-35dB	Electric or electronic musical instrument such as electric guitar
LINE	-20dB	General audio equipment such as tape deck or tuner

③ LOW-EQ controls

These are used to control the sound quality in the low range of each channel. The low frequency of 100Hz can be controlled within the range of $\pm 15\text{dB}$, and a flat response can be yielded at "0" position.

④ HIGH-EQ controls

These are used to control the sound quality in the high range of each channel. The high frequency of 10kHz can be controlled within the range of $\pm 15\text{dB}$, and a flat response can be yielded at "0" position.

⑤ MONITOR 2 PRE-VOL. & EQ controls

These are the MONITOR 2 channel controls and they are used to control the signal level which is fed out from the pre-stages of the channel controls and equalizer and sent to the MON OUT 2 jacks. They are also used as foldback (stage monitor) mixing controls for performers.

⑥ MONITOR 1 (REV/ECHO) POST-VOL. & EQ controls

These are the MONITOR 1 channel controls and they are used to control the signal level which is fed out from the post-stages of the channel controls and equalizer and sent to the reverberation circuit, and to each of the MON OUT 1 and ECHO SEND jacks.

These controls perform the following roles in accordance with the intended application.

1. Channel controls for reverberation effect.
2. Channel controls for echo effect. (When using an echo unit)
3. Mixing controls for foldback (stage monitor).

⑦ PAN controls

These controls are used to distribute the input signals of each channel to the left and right channels, and also to position the sound images.

⑧ PROGRAM VU meters

These are used to monitor the output levels of the left and right channels. An output of $37.5\text{W}/8\Omega$ is indicated when the pointers deflect to OVU and likewise $75/8\Omega$ (full power) when the pointers deflect to +3VU.

⑨ GRAPHIC EQUALIZER

These seven linear controls for each channel, left and right, vary the frequency response across $\pm 12\text{dB}$ range for the frequencies centered on 60Hz, 150Hz, 400Hz, 1kHz, 2.5kHz, 5kHz and 10kHz in accordance with the intended application or location, and they thereby vary the sound quality of the whole system. For instance, they can be used to control levels at frequency ranges where howl is easily produced, or to emphasize a certain frequency range so that the sound quality is finely controlled.

⑩ AUX IN controls

These are used to control the AUX IN L and AUX IN R input levels.

⑪ PHONES jack

This is the output jack for stereo headphones. This allows the power amplifier output to be monitored.

The volume is controlled by the PROGRAM master controls.

⑫ REVERB/ECHO control

This is used to control the output level of the built-in reverberation unit. When an echo unit has been connected to the ECHO RETURN input jack, the built-in reverberation unit is cut off, and the output level of the echo unit is controlled.

⑬ MONITOR 2 master control

This is used to control the overall level of the signals which have been controlled by the MONITOR 2 control of each channel, and to feed them out at the MON OUT 2 jack.

⑭ MONITOR 1 master control

This is used to control the overall level of the signals which have been controlled by the MONITOR 1 control of each channel, and to feed them out at the MON OUT 1 and ECHO SEND jacks. (Reverberation signals are not controlled.)

⑮ PROGRAM master controls

These are used to set the volume of the sound which is ultimately heard through the main speakers by controlling the overall signals which have been mixed by each channel control.

CONNECTION FIGURE

FUSE:

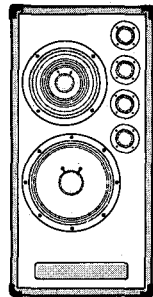
When its replacement is necessary, be sure to disconnect the AC plug from the power socket before replacing it with another fuse with the same ratings. A blown fuse is most likely caused by some error in use or some trouble of the unit. When it occurred, please consult your dealer.

POWER SW:

This is a power switch which accommodates reversed polarities with two ON positions. If hum or noise is heard, set it to the other ON position.

EM-150II U.S.A. MODEL

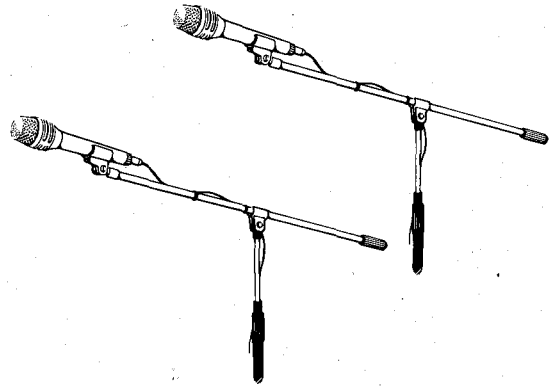
AO 1 1 2 T
For FOLDBACK



(SELF-POWER MONITOR)

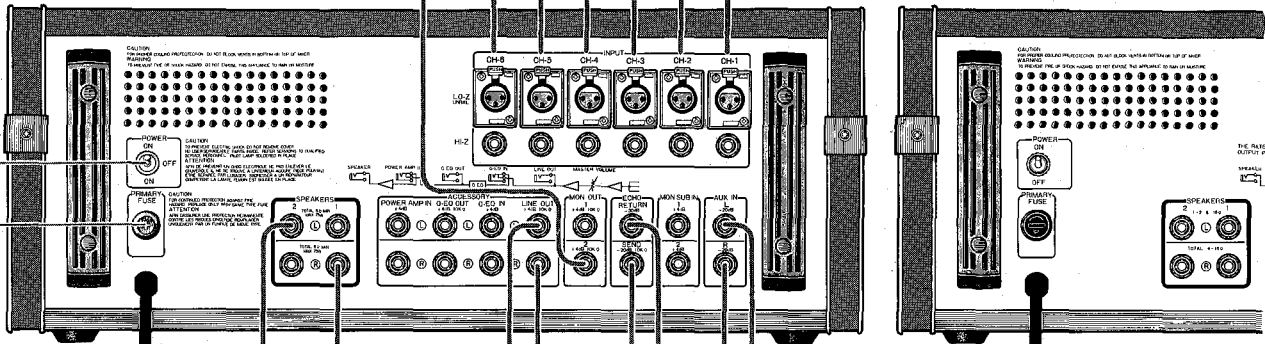
5 MON. OUT 2

Microphone



1 INPUT

GENERAL MODEL



Connect this to the AC power outlet

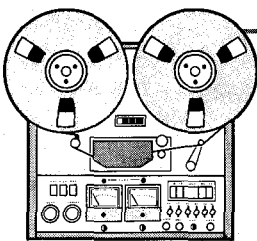
(L) 4 LINE OUT

(R)

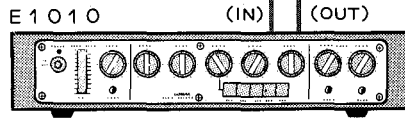
3 AUX IN (R)

2 SPEAKERS

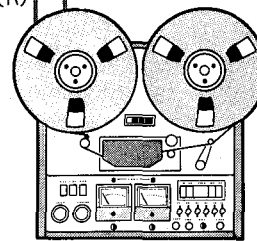
6 ECHO SEND
ECHO RETURN
(IN) (OUT)



Tape deck (recording)

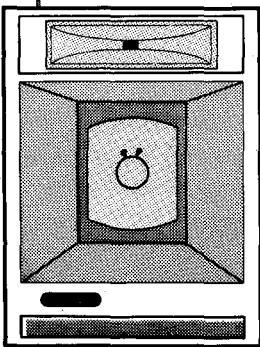


Delay unit (echo unit)



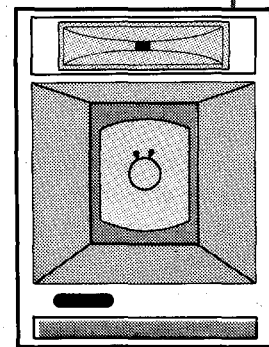
Tape deck (playback)

Main speaker (L)



S 4 1 1 5 H

Main speaker (R)



S 4 1 1 5 H

PROTECTIVE CIRCUIT FOR SPEAKER

When DC voltage exceeding a certain amount occurs at the amplifier, the speaker is protected by the relay operation to separate the speaker from the amplifier. If the sound stops while using the mixer, it is due to this protective circuit at work.

Even when the power switch is set to OFF and then to ON again, if the sound is not heard, or if the protective circuit operates readily, it means that something is wrong with the mixer itself and that you should contact your dealer.

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BACK PANEL OPERATION

1 INPUT

Both the LO-Z (low impedance) and HI-Z (high impedance) INPUT jacks are unbalanced.

Connect such outputs of high-impedance microphones, general electric and electronic musical instruments to the HI-Z INPUT jacks.

Connect low-impedance microphones to the LO-Z INPUT jacks.

* It is not possible to use both the LO-Z and HI-Z INPUT jacks simultaneously for the same channel.

2 SPEAKERS

Connect the main speakers to these jacks.

NOTE:

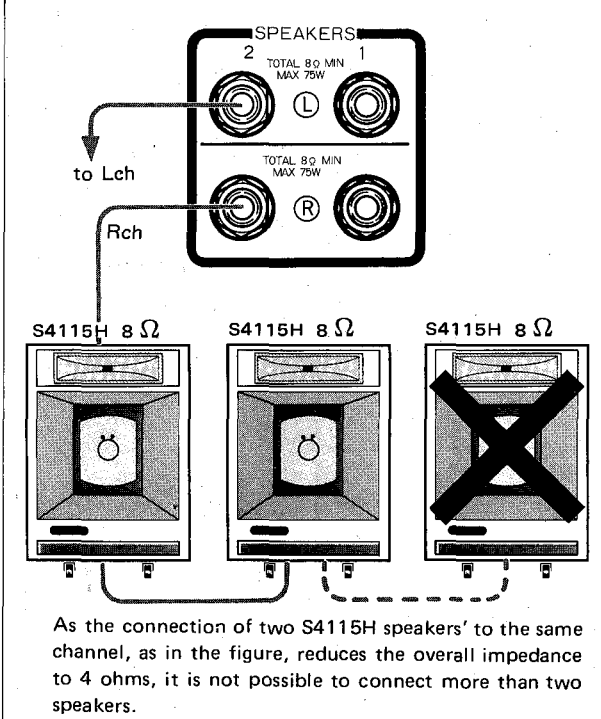
LOAD IMPEDANCE

8 – 16Ω USA & CANADIAN MODELS

4 – 16Ω GENERAL MODELS

Do not connect a speaker system with a total impedance of less than the minimum of above specified values.

GENERAL MODEL



3 AUX IN

Connect the tape deck (playback) or another mixer for increasing the number of channels to these jacks.

4 LINE OUT

Use these jacks to feed out the recording output signals or the signals produced when the mixer is being used as a submixer in order to increase the number of channels.

5 MON. OUT 1, MON. OUT 2

Use these jacks to connect the foldback (stage monitor) speaker.

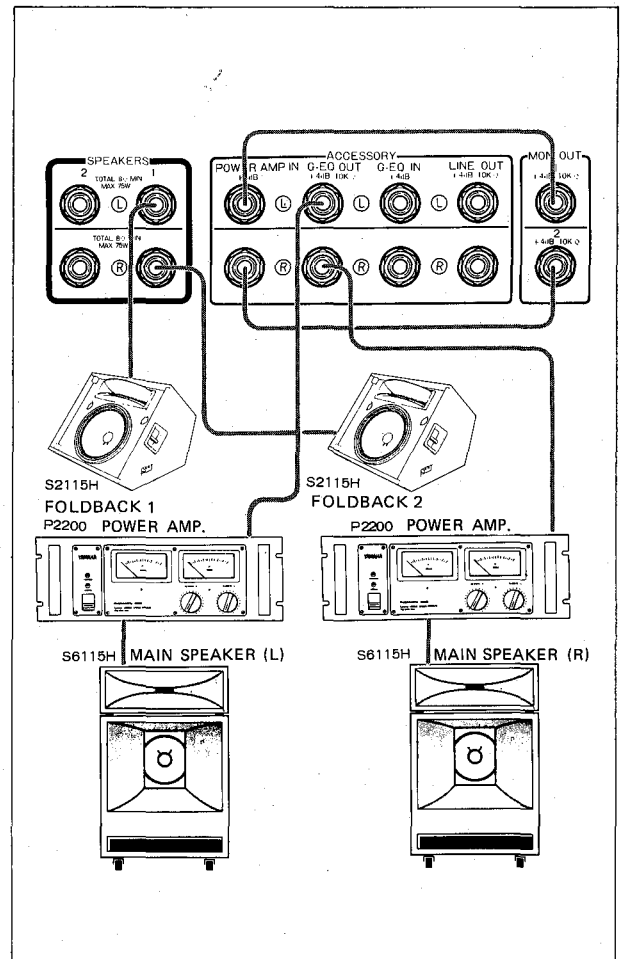
* A power amplifier is required for both MON. OUT 1 and MON. OUT 2 jacks. Use a speaker with a built-in power amplifier or a separate power amplifier.

6 ECHO RETURN, ECHO SEND

These are the input and output jacks for the echo unit. (When the echo unit is connected, it is no longer possible to use the built-in reverberation unit.) Use the MONITOR 1 (REV/ECHO) controls to control the echo effect of each channel, and the REVERB/ECHO control to control the overall effect.

POWER AMP IN

These external input jacks may be used in various ways, such as when using the built-in power amplifier independently (feeding input signals of another mixer), or when amplifying PGM signals and monitor signals with a separate power amplifier and the built-in power amplifier respectively so as to increase power of PGM signals.

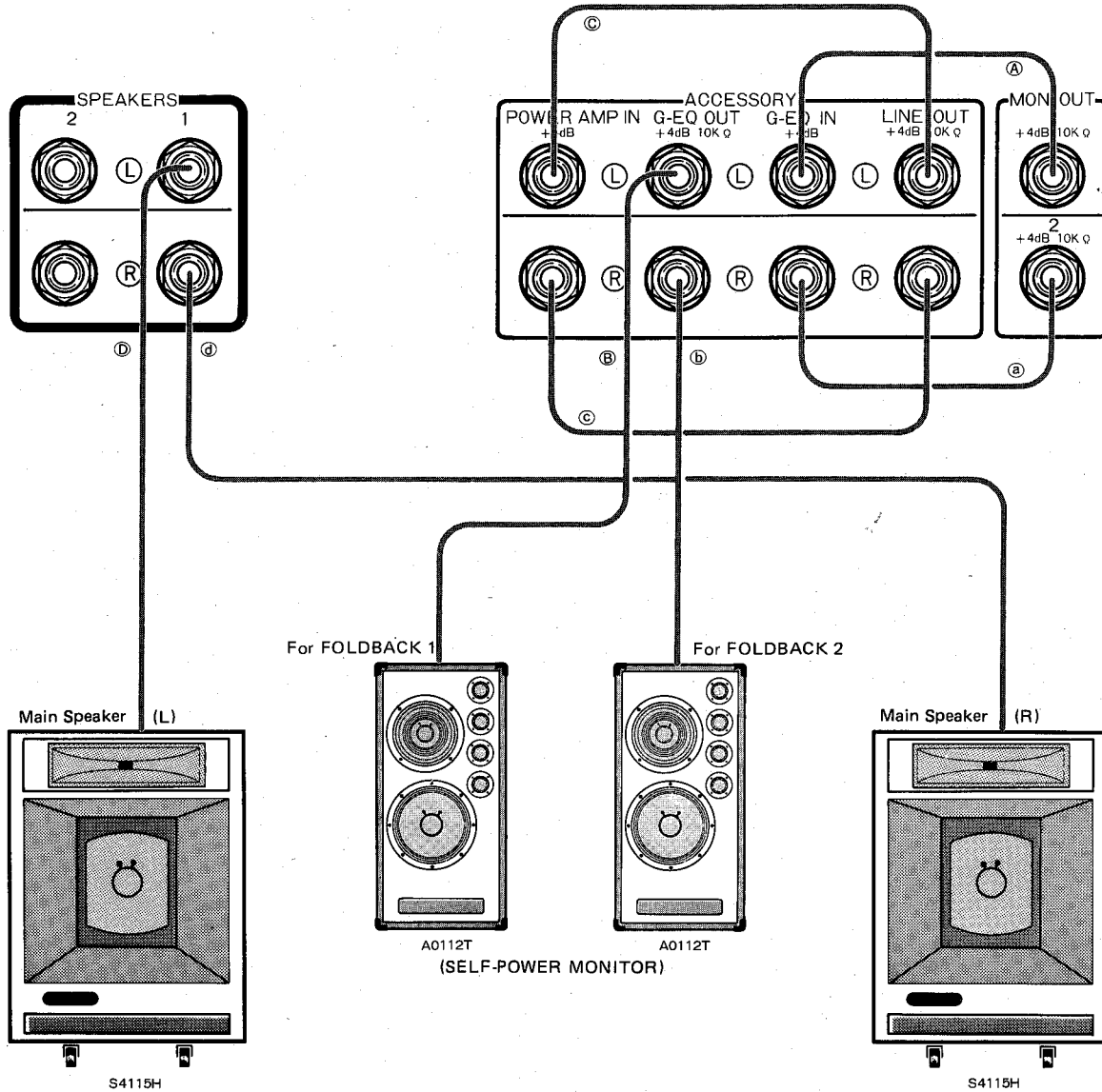


MON. SUB IN

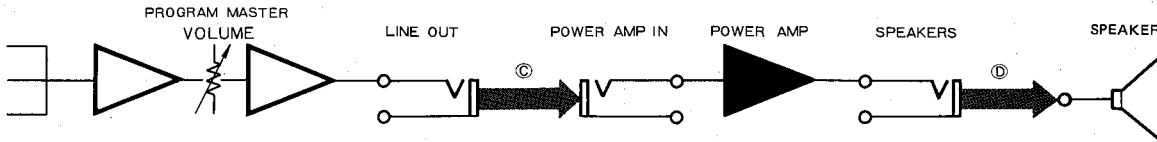
Connect another mixer to these jacks when you want to increase the number of monitor channels.

● **G-EQ IN, G-EQ OUT**

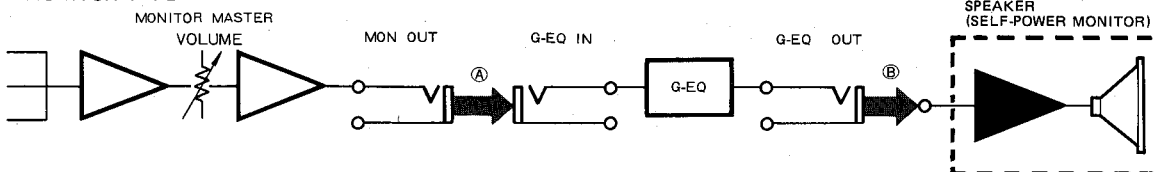
By using these jacks, the graphic equalizer built in this mixer may be used independently, or as a monitor. In the above cases, connect LINE OUT jack with POWER AMP IN jack, as PGM signals stop before G-EQ IN jack.



● **PGM TYPE**



● **MONITOR TYPE**



● **GRAPHIC EQUALIZER**

The graphic equalizer set for each channel, left and right, functions to increase or decrease the frequency response through seven sectors of the audio-frequency range so that acoustically agreeable sound is produced. In general, the characteristics of the sound, when it comes out of the speakers, vary to quite an extent under the influence of environmental factors such as the room space, the interior building plan, kinds of building materials, etc. Above all, there is a tendency that the frequency response in the low frequency range increases, causing the confined low-pitched sound, howl, etc. In such a case, the graphic equalizers permit the operator to decrease the frequency response in the low frequency range so that a clearer sound is produced and howl is prevented.

INPUT / OUTPUT SPECIFICATION

● **Input jacks**

Connection	Actual Load Impedance	For Use With Nominal	Sensitivity (at max. gain)	Input level		Connector
				Nominal	Max. before Clip	
INPUTS (1 ~ 6) -50 -35 -20	HI-Z 20K Ω LO-Z 1K Ω	HI-Z 3K Ω ~ 10K Ω LO-Z 150 Ω ~ 600 Ω	-50dB* (2.5mV) -35dB (14mV) -20dB (78mV)	-50dB (2.5mV) -35dB (14mV) -20dB (78mV)	-22dB (62mV) - 7dB (346mV) + 8dB (1.95V)	XLR-3-31 and Phone Jack
AUX IN (L, R)	30K Ω	5K Ω	-20dB (78mV)	-20dB (78mV)		Phone Jack
ECHO RETURN	30K Ω	5K Ω	-30dB (25mV)	-30dB (25mV)		Phone Jack
GEQ IN (L, R)	100K Ω	5K Ω	+ 4dB (1.23V)	+ 4dB (1.23V)	+ 18dB (6.2V)	Phone Jack
POWER AMP IN (L, R)	30K Ω	5K Ω	+ 4dB (1.23V)	+ 4dB (1.23V)		Phone Jack
MON. SUB IN (1, 2)	30K Ω	5K Ω	+ 4dB (1.23V)	+ 4dB (1.23V)	+ 24dB (12.3V)	Phone Jack

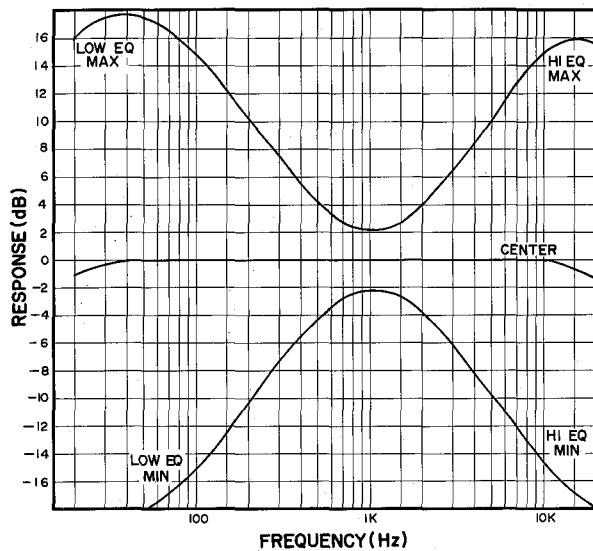
● **Output jacks**

Connection	Actual Source Impedance	For Use With Nominal	Output level (Power)		Connector
			Nominal	Max. before Clip	
SPEAKER OUT (L, R)	0.065 Ω	8 Ω (4 Ω)	75W (100W)		Phone Jack
LINE OUT (L, R)	390 Ω	10K Ω 600 Ω	+ 4dB (1.23V) 0dB (775mV)	+ 18dB (6.2V) + 14dB (3.9V)	Phone Jack
GEQ OUT (L, R)	390 Ω	10K Ω 600 Ω	+ 4dB (1.23V) 0dB (775mV)	+ 18dB (6.2V) + 14dB (3.9V)	Phone Jack
MON OUT (1, 2)	390 Ω	10K Ω 600 Ω	+ 4dB (1.23V) 0dB (775mV)	+ 18dB (6.2V) + 14dB (3.9V)	Phone Jack
ECHO SEND	220 Ω	10K Ω	-20dB (78mV)	- 6dB (0.39V)	Phone Jack
PHONES	130 Ω	8 Ω	+ 2dB (0.98V)		Phone Jack (Stereo)

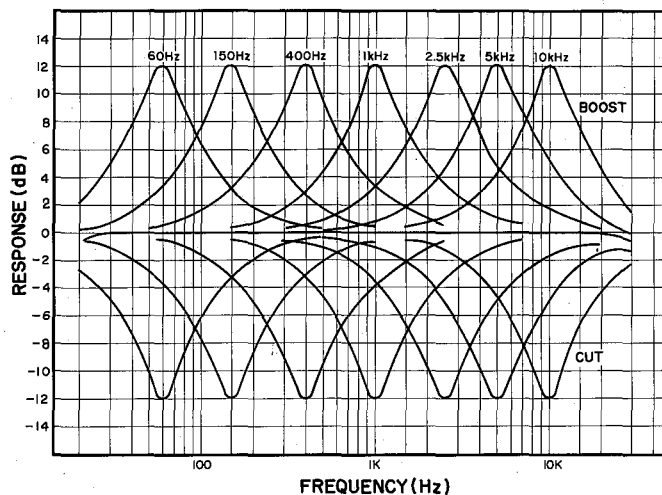
Note: All the inputs and outputs are unbalanced.

CHARACTERISTICS FIGURES

Channel equalizer frequency response



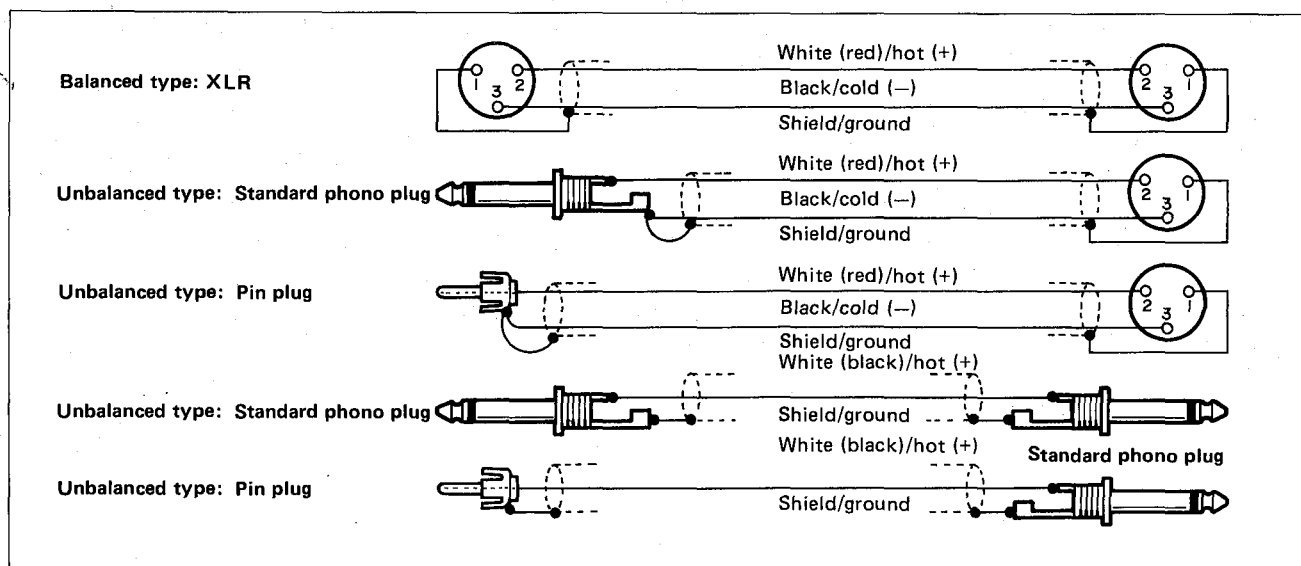
Graphic equalizer frequency response



CABLE CONNECTIONS

There are many types of connecting cables for PA recording. This allows a choice in accordance with the intended application. Such cables are sold on the market but they are costly and there is no great variety. When using the cables, the established procedure is either to make them

yourself, bearing in mind the required length of the cables, or order them from a specialist manufacturer. The types of connecting cables required for general sound systems are indicated below.



OVERALL SPECIFICATIONS

Channel controls (CH1 ~ CH6)	PAN POT MONITOR 1 (REV/ECHO) MONITOR 2 HIGH-EQ LOW-EQ INPUT LEVEL switch (-20/-35/-50dB) Channel volume
Master controls	AUX IN controls, (L, R) REVERB/ECHO controls MONITOR master volume (1, 2) PROGRAM master volume (L, R) GRAPHIC EQUALIZER (L, R)
Others	VU meters
(Speaker out) Power out	100W per channel (4 Ω, 1kHz, T.H.D. 0.5%) 75W per channel (8 Ω, 1kHz, T.H.D. 0.5%) 65W per channel (8 Ω, 20Hz ~ 20kHz, T.H.D. 0.5%)
Frequency response	20Hz ~ 20kHz, 0 + 1dB (35W, 8 Ω) - 3dB
Total harmonic distortion	Less than 0.2% (1kHz, 65W, 8 Ω) Less than 0.5% (20Hz ~ 20kHz, 65W, 8 Ω)
Intermodulation distortion	Less than 0.5% (70Hz : 7kHz = 4 : 1, 35W, 8 Ω)
Hum and noise level	* -118dB (Equivalent Input Noise) -44dB (MASTER VOLUME → Max.) (ALL INPUT VOLUME → Min.) * -38dB (MASTER VOLUME → Max.) (ONE INPUT VOLUME → Max.)
(Monitor out) Maximum output levels	+18dB (10kΩ, 1kHz, T.H.D. 1%)
Frequency response	20Hz ~ 30kHz, +4dB, +1dB -3dB
Total harmonic distortion	Less than 0.2% (1kHz, +10dB, 10kΩ) Less than 0.5% (20Hz ~ 15kHz, +10dB, 10kΩ)
Hum and noise level	* -118dB (Equivalent Input Noise) -71dB (MASTER VOLUME → Max.) (ALL INPUT MONITOR VOLUME → Min.) * -64dB (MASTER VOLUME → Max.) (ONE INPUT MONITOR VOLUME → Max.)
Maximum gain	
SPEAKERS (L, R)	* 80dB (CH IN → SPEAKER OUT)
MON OUT (1, 2)	* 54dB (CH IN → MON OUT)
ECHO SEND	* 30dB (CH IN → ECHO SEND)
LINE OUT (L, R)	* 54dB (CH IN → LINE OUT)
G-EQ OUT (L, R)	* 54dB (CH IN → G-EQ OUT)
AUX IN (L, R)	* 50dB (AUX IN → SPEAKER OUT)
ECHO RETURN	* 60dB (ECHO RETURN → SPEAKER OUT)
Equalizer	
LOW-EQ	* ±15dB (100Hz)
HIGH-EQ	* ±15dB (10kHz)
GRAPHIC-EQ	* ±12dB (60/150/400/1k/2.5k/5k/10k)Hz
Channel separation	Less than -55dB, 1kHz
Power supply	U.S.A. MODEL AC120V, 170W, 50/60Hz CANADIAN MODEL AC120V, 2A, 50/60Hz GENERAL MODELS AC220/240V, 500W, 50/60Hz
Dimensions (W x D x H)	560(W) x 508(D) x 214(H)mm (22 x 20 x 8-1/2")
Weight	24.5kg (54 lbs)

* Nominal Value
Specifications subject to change without notice.

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