

# SOUND REINFORCEMENT MIXER OWNER'S MANUAL PM-210



<b>Contents</b>	
Features .....	2
Precautions & Connections .....	3
Front Panel .....	4
Rear Panel .....	5
Specifications .....	7
Block & Level Diagrams .....	8

## **Congratulations!**

You have just joined the large and growing family of satisfied users of Yamaha products. You have chosen wisely when you picked model PM-210 as your mixer. Years of dependable service await you.

Please read this OWNER'S MANUAL carefully before connecting your mixer. The few minutes spent with this manual will help you understand its operation and high performance. You will also learn how to connect the mixer properly and how to really get the most out of all the features Yamaha has incorporated into this mixer.

If you need any special help or service, see your Yamaha dealer. He knows what to do and will be happy to help you. You've made a good choice. We are confident you'll be satisfied with the performance and versatility of PM-210.

# FEATURES

The PM-210 is a professional 8-channel input, mono output mixer that meets the requirements of fixed or portable sound reinforcement, as well as sophisticated disco, broadcast production and recording applications. Check the features here and study the explanations of the front and rear panels. You'll see immediately that the PM-210 has the flexibility, performance and reliability you need in your work.

## Top Electrical Performance

This mixer is designed for top professional performance. It offers flat frequency response, low distortion and inaudible noise. Each sound is maintained at its original purity, or is controlled exactly as desired.

## 8-Channel Inputs

The PM-210 has 8-channel inputs with unbalanced phone jacks. Each channel has its own individual FADER, LOW/HIGH-EQ, MONITOR REVERB/ECHO controls and INPUT level switches.

## Switchable Input Level

All eight input channels have 3-position switches to change the input attenuation so the full range of the FADER controls can be used with varying microphone or instrument sensitivities.

## FADER Controls

The smooth sliding FADER controls for Input, Program Master and Monitor Master have a positive feel and give an excellent visual indication of the relative volume of each channel.

## Wide Choice of Inputs and Outputs

This wide choice offers great flexibility for use with a wide range of equipment. In addition to the 8 low impedance INPUT channels, the PM-210 has AUX IN and FROM ECHO inputs. Outputs include PROGRAM OUT A & B, AUX OUT, MONITOR OUT and TO ECHO.

## Sturdy, Portable Construction

This unit has a hard protective cover which enables it to withstand rough handling on the road. Even with the cover it is lightweight. All solid state circuitry increases portability.



# PRECAUTIONS & CONNECTIONS

## Precautions

The PM-210 is rugged and durable, but not indestructible. It has been designed to stand up to tough handling but certain precautions must be taken. The most frequent cause of trouble is improper use due to incomplete understanding of exactly what the mixer can and cannot do. You can easily avoid these mistakes by following the precautions listed here before plugging in or attempting to operate your mixer.

Be sure the POWER switch is off before plugging in the power cord.

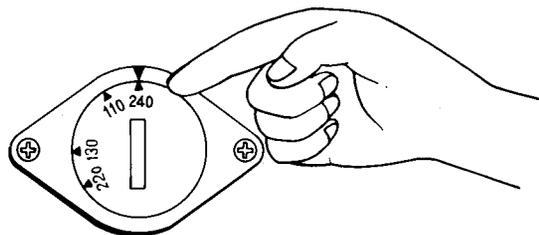
Unplug the POWER cord, or at least make sure the POWER switch is off before connecting or disconnecting any cords.

If a fuse blows, be sure that the replacement is exactly the same type and rating. Repeated fuse failures indicate a problem with the amplifier or power lines. If you have regular fuse failures, consult your Yamaha dealer.

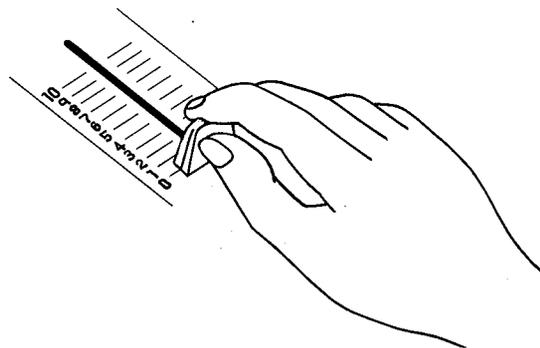
Do not expose the mixer to direct sunlight and other sources of excessive heat, humidity, dust or shock.

## Connecting Up

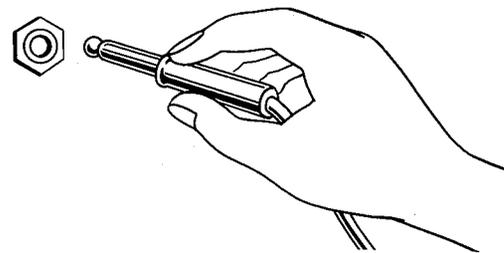
1. Before plugging in the power cord, make sure the VOLTAGE SELECTOR on the rear panel is properly set for your locality. (U.S., Canadian and Australian models are preset and thus don't have this feature.) For the British Standard model, please refer to the instructions on page 6.



2. Set the front panel FADER controls to "zero" and make sure the POWER switch is OFF.

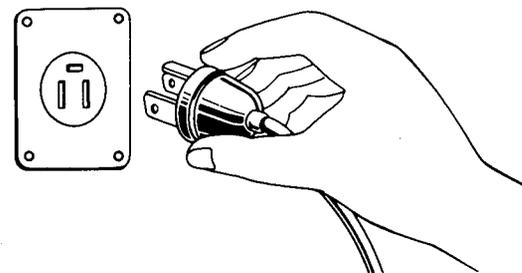


3. Connect your power amp, etc. to the output jacks.



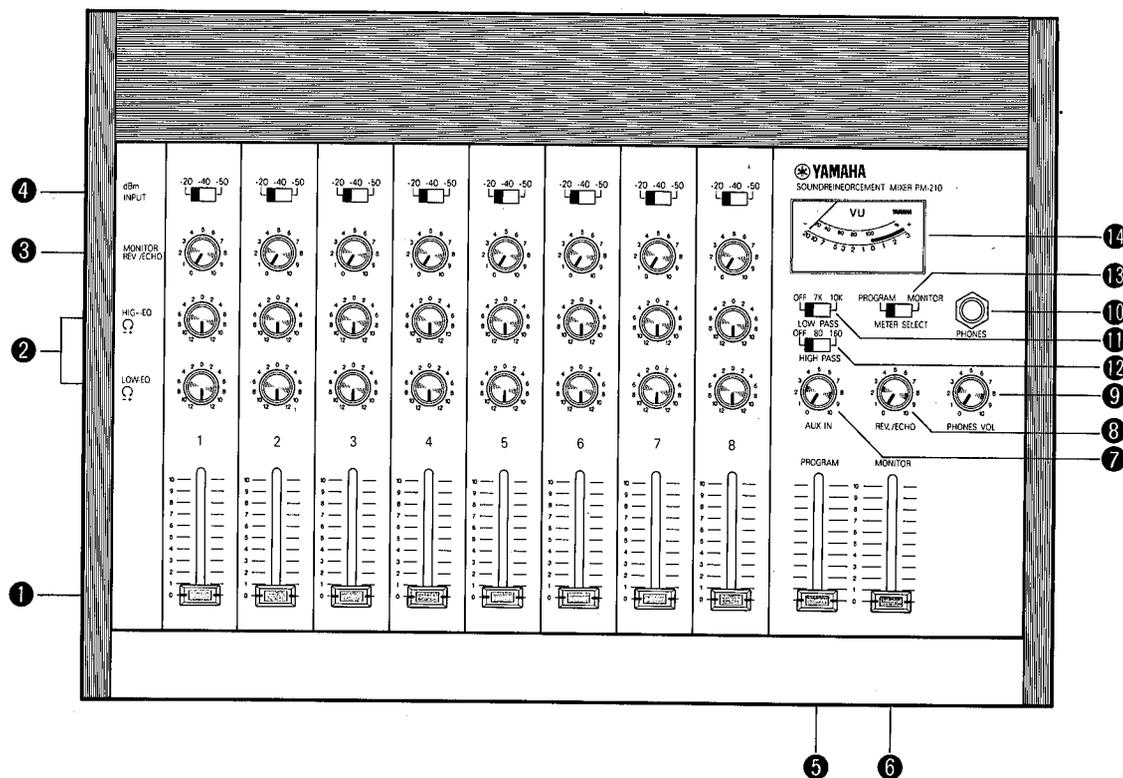
4. Connect the input cords from your instruments and/or mics to the INPUT, AUX IN, and FROM ECHO jacks.

5. Plug in the power cord.



6. Turn on the POWER switch. Pick the ON position which has the lower hum level. (European and Australian models have only one ON position.)
7. Adjust the FADER and other controls. Now you are ready to mix sound sources as you like.

# FRONT PANEL



## FRONT PANEL

### 1 CHANNEL FADER (INPUT FADER)

The straight-line Fader provides continuously variable adjustment of the channel's output to the PROGRAM and the MONITOR mix buses.

### 2 HIGH/LOW-EQUALIZER

Two controls alter the frequency response of the channel input, allowing you to achieve a variety of tonal characteristics. The LOW and HIGH controls provide  $\pm 12$ dB of continuously variable shelving equalization at 100Hz and 10KHz respectively. Centering

the controls provides flat audio response by defeating the equalization.

### 3 MONITOR REVERB/ECHO VOLUME

The rotary control assigns the post-equalizer, post-fader signal to the MONITOR mixing bus. Used for monitoring when changes in the balance of the program mix must be heard in the monitor mix, this control also regulates the signal of each channel to the TO ECHO jack, wired in parallel with the MONITOR OUT, and to the built-in reverberation unit.

### 4 INPUT LEVEL SWITCH

This switch changes the input attenuation to accommodate nominal levels of  $-50$ ,  $-40$  or  $-20$ dB (0dB = 0.775V). These sensitivities correspond to low-output dynamic microphones, medium-output condenser microphones, electric instrument preamps or lines, and low-level (hi-fi) line sources. When properly set, the INPUT level switch provides the best combination of maximum headroom and minimum noise characteristics; at the same time, it maintains the fullest range of fader travel.

### 5 PROGRAM MASTER FADER

The same type of Yamaha Fader used on the input channels also sets the overall level of the mono mix which is fed to the PROGRAM A & B outputs.

### 6 MONITOR MASTER FADER

This also is the same Yamaha Fader used elsewhere in the PM-210. This Fader sets the overall level of the mixes which feed the MONITOR and TO ECHO outputs. (TO ECHO is the same mix as the MONITOR.)

### 7 AUXILIARY INPUT VOLUME

This rotary control assigns the incoming AUX IN signal. AUX IN Volume permits the AUX IN signal to be balanced with the level on the PROGRAM mix bus.

### 8 REVERB/ECHO VOLUME

This rotary control assigns the signal from the FROM ECHO jack, where the external devices such as echo machine etc. are connected to the PROGRAM mix bus. Or it sets the overall level of the signal through the REVERB unit from the MONITOR mix bus.

### 9 PHONES VOLUME

This rotary control sets the volume in the headphone output, assuring adequate monitoring regardless of mixing levels or loud environments.

### 10 HEADPHONE OUTPUT JACK

This stereo phone jack is for connection of any stereo headphones of 8 ohm or higher impedance. It is actually a mono output with identical right and left signals derived from the program mix bus before the filters.

# REAR PANEL

## 11 LOW-PASS FILTER

This switch-actuated 6dB-per-octave LOW-PASS filter assigns the mixed signal from the PROGRAM mix bus and can be used to "roll off" unwanted high frequency response without appreciably changing the nature of the mix. The filter can improve many vocals by removing some breathing noises and can cut out unwanted tape hiss, scratch noise and so forth. There are three positions: OFF bypasses the filter entirely, 7KHz is a mild filter, 10KHz yields the most pronounced filter effect.

## 12 HIGH-PASS FILTER

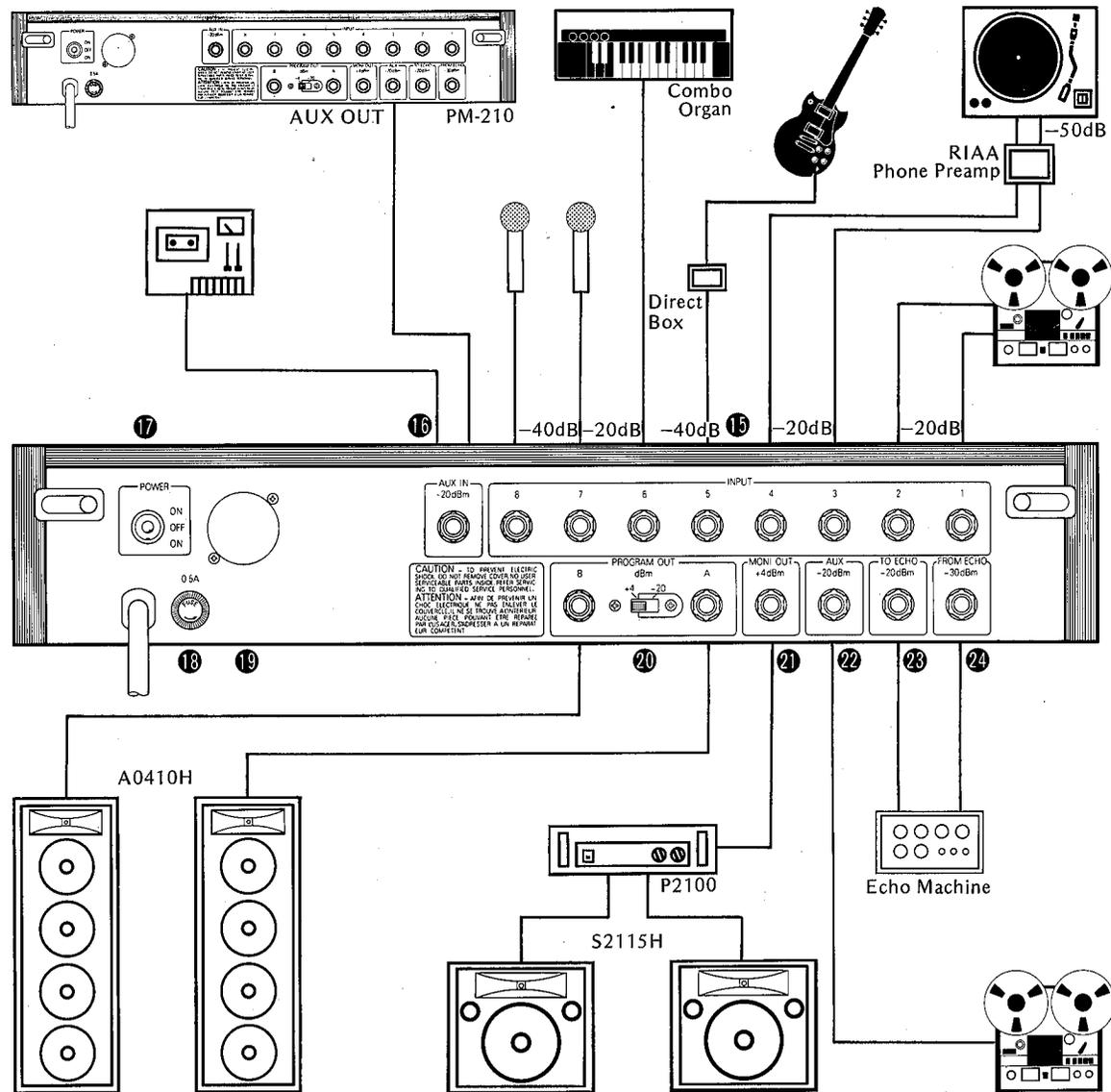
This switch-actuated 6dB-per-octave HIGH-PASS filter assigns the mixed signal from the PROGRAM mix bus and can be used to "roll off" unwanted low frequency response without appreciably changing the nature of the mix, Rumble, wind noise, and dangerous "dropped mic" transients can be blocked from the mixer output. The filter can improve many vocals by removing "P-pops" and certain breathing noises. In addition, the filter avoids "bumpy" low frequency response caused when extreme bass leakage enters microphones and creates phase-dependent peaks and dips. There are three positions: OFF bypasses the filter entirely, 80Hz is a mild filter, 160Hz yields the most pronounced filter effect.

## 13 METER SELECTOR SWITCH

This slide switch assigns the VU meter. It can be switched to display the level at the PROGRAM output or the MONITOR output.

## 14 VU METER

The VU meter provides a visual indication of the average audio output level of the PROGRAM or MONITOR channels (depending on the setting of the Meter Selector switch). 0 VU is equal to a +4dB (1.23V) nominal level at the PROGRAM or MONITOR outputs.



## REAR PANEL

### 15 CHANNEL INPUTS

The unbalanced phone jack inputs to channels 1 through 8 accept audio from any source of  $-50\text{dB}$  ( $2.5\text{mV}$ ) to  $-20\text{dB}$  ( $78\text{mV}$ ) nominal level. Higher levels may be accommodated by turning down the FADER. Alternately, to accommodate higher levels without loss of headroom, use external attenuation pads.

### 16 AUXILIARY INPUT

The AUX INPUT is an unbalanced phone jack, and is high impedance, so it accepts low or high impedance sources. With a nominal input sensitivity of  $-20\text{dB}$  ( $78\text{mV}$ ), this jack is suitable for connection of hi-fi tape machine, echo machine or one more mixer.

### 17 POWER SWITCH

Equipped with two ON positions to minimize hum without having to reverse the power cord (except for Australian and European models).

### 18 FUSE HOLDER

This fuse protects the primary (AC line) side of the power supply. If a fuse blows, be sure to replace it with one of the same type and rating as noted on the chassis.

### 19 VOLTAGE SELECTOR

Not provided in certain areas.

### 20 PROGRAM A & B OUTPUTS

These unbalanced phone jacks, connected in parallel, carry the program output of the mixer. The outputs are low impedance and have a nominal  $+4\text{dB}$  ( $1.23\text{V}$ ) output level, making them suitable for driving 600 ohm or higher impedance inputs. Alternately, the PROGRAM outputs may be switched to  $-20\text{dB}$  ( $78\text{mV}$ ) nominal level, making them suitable for driving medium-level (hi-fi or semi-professional) line inputs.

### 21 MONITOR OUT JACK

This standard phone jack carries the MONITOR output, and is an unbalanced, low-impedance circuit with a nominal  $+4\text{dB}$  ( $1.23\text{V}$ ) level. MONITOR is a post-fader, post-equalizer mix. The output is suitable for feed to stage monitor (fold-back), tape machine or accessory device.

### 22 AUX OUT JACK

This standard phone jack carries the program output, but derives the program before the PROGRAM Master Fader or HIGH & LOW filters. The output is unbalanced, low-impedance, with a nominal  $-20\text{dB}$  ( $78\text{mV}$ ) level. AUX OUT is excellent for submixed feed to the on-stage monitor mixer, where the output level may differ from the main house mix. AUX OUT is also useful for feed to tape recorder, power amp, broadcast remote and echo or delay unit.

### 23 TO ECHO JACK

This standard phone jack carries the same signal as the MONITOR output, but at  $-20\text{dB}$  ( $78\text{mV}$ ). TO ECHO is well suited for feed to echo chamber or tape delay unit since changes in the program mix will be accompanied by corresponding changes in echo composition. TO ECHO is also suitable for making monaural tape recordings, for a spare stage monitor feed (provided the amplifier has adequate input sensitivity), or for a submixed feed to certain monaural mixer.

### 24 FROM ECHO JACK

This standard phone jack is unbalanced and accepts low or high impedance sources at nominal  $-30\text{dB}$  ( $25\text{mV}$ ) levels. FROM ECHO applies a monaural echo return signal directly to the program mix bus. This jack is also suitable for playing monaural pre-recorded background music during intermissions (i.e. from a portable cassette recorder).

## FOR THE BRITISH STANDARD MODELS

As the colours of the wires in the mains lead of the 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  $\perp$  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.

### IMPORTANT:

The wires in the mains lead are coloured in accordance with the following code.

GREEN-and-YELLOW . . . . . Earth  
BLUE . . . . . Neutral  
BROWN . . . . . Live

### WARNING:

This apparatus must be earthed.

# SPECIFICATIONS

## PM-210 GENERAL SPECIFICATIONS

Inputs	8xChannel Inputs, 1xAux In, 1xFrom Echo
Input Channel Controls	Channel Fader, Input Level Switch (-20/-40/-50dB), Low & High EQ, Monitor Reverb/Echo Volume
Mixing Buses	1xProgram, 1xMonitor
Master Controls	Program Master Fader equipped with Low-Pass Filter Selector (10KHz/7KHz/Off) and High-Pass Filter Selector (160Hz/80Hz/Off), Monitor Master Fader, Reverb/Echo Master Volume, Aux In Volume, Phones Volume
Outputs	Program Out A & B, 1xMonitor Out, 1xAux Out, 1xTo Echo, 1xHeadphones
Reverb and Echo	Built-in Accutronics spring-type reverberation unit; provisions for external echodelay or other effect devices
Level Indicator	Illuminated VU meter equipped with Pro- gram Master/Monitor Master selector switch
Frequency Response	0±1dB (30Hz ~ 15KHz), +0, -3dB (15Hz ~ 30KHz)
Total Harmonic Distortion	Less than 0.1% at +18dB (6.2V) (20Hz ~ 20KHz)

Hum and Noise* (20Hz ~ 20KHz)	-118dBm equivalent input noise (150Ω termination) -64dB (0.4mV) Output Noise (Master Fader & one Input Fader at nominal level)
Maximum Voltage Gain	PGM 66dB, MON 72dB, AUX IN 36dB, TO ECHO 46dB
Maximum Input Level	+10dB (2.5V) (Input Level Switch at -20dB at 100Hz) -20dB (78mV) (Input Level Switch at -50dB at 10KHz)
Maximum Output Level	+21dB (8.7V) (at less than 0.1% T.H.D.)
Equalization	LOW: ±12dB shelving at 100Hz, HIGH: ±12dB shelving at 10KHz
High-Pass Filter	6dB per octave roll-off below 80Hz or 160Hz
Low-Pass Filter	6dB per octave roll-off above 7KHz or 10KHz
Power Requirements	110, 117, 130, 220 or 240V AC, 50/60Hz, 11W
Finish	Black Panel, Rosewood Grain Trim, Black Leatherette Covered Hard Case with Removable Cover
Dimensions (WxHxD)	542x160x437.5mm (21-3/8x6-1/4x17-1/4")
Net Weight	12Kg (26.5lbs.)

## INPUT SPECIFICATIONS

Connection	Level Switch	Actual Load Impedance	For Use with Nominal	Sensitivity** (at Max. Gain)	Input Level		Connector** in Mixer
					Nominal	Max. before Clip	
INPUT (1 ~ 8)	-50dB -40dB -20dB	10KΩ	150Ω ~ 3KΩ Mics & Lines	-62dB (0.6mV) -52dB (2mV) -32dB (20mV)	-50dB (2.5mV) -40dB (7.8mV) -20dB (78mV)	-20dB (78mV) -10dB (250mV) +10dB (2.5V)	Phone Jack
AUX IN		30KΩ	5KΩ Lines	-36dB (12mV)	-20dB (78mV)	-	Phone Jack
FROM ECHO		30KΩ	5KΩ Lines	-42dB (6.2mV)	-30dB (25mV)	-	Phone Jack

## OUTPUT SPECIFICATIONS

Connection	Level Switch	Actual Source Impedance	For Use with Nominal	Power Output Level		Connector*** in Mixer
				Nominal	Max. before Clip	
PROGRAM OUT (A, B)	+4dB -20dB	5Ω 100Ω	600Ω	+4dB (1.23V) -20dB (78mV)	+21dB (8.7V) -3dB (550mV)	Phone Jack
MONITOR OUT		5Ω	600Ω	+4dB (1.23V)	+21dB (8.7V)	Phone Jack
AUX OUT		100Ω	10KΩ	-20dB (78mV)	+15dB (4.4V)	Phone Jack
TO ECHO		100Ω	10KΩ	-20dB (78mV)	-3dB (550mV)	Phone Jack
HEADPHONES		4.7Ω	8Ω	-10dB (250mV)	+4dB (1.23V)	Stereo Phone Jack

\*Measured with 6dB/octave filter @12.47KHz equivalent to a 20KHz filter with infinite dB/octave attenuation.

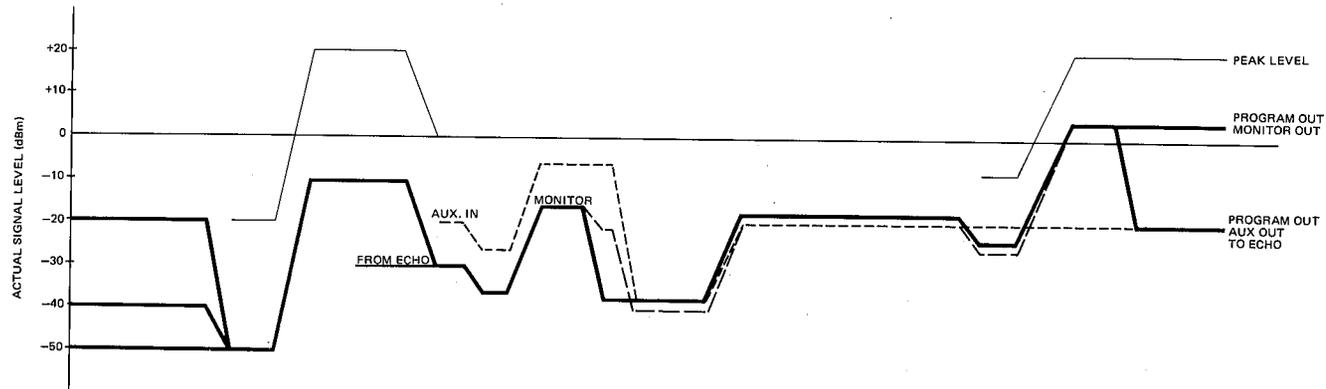
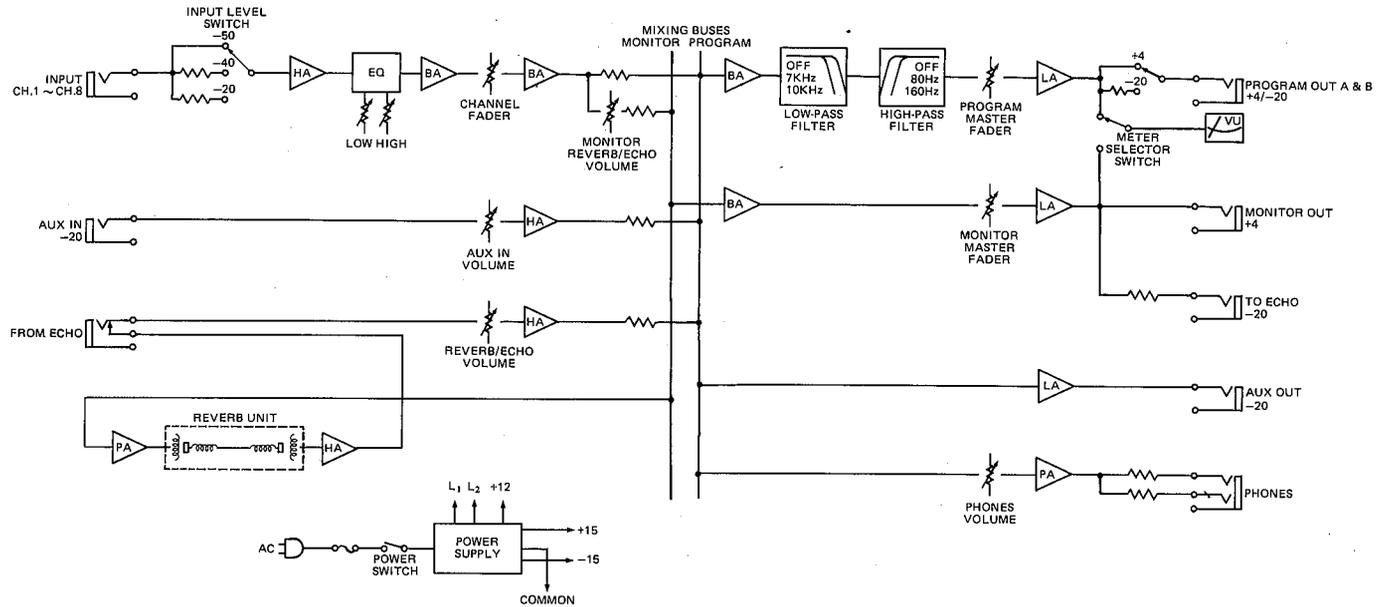
\*\*This is the level required to produce an output of +4dB (1.23V).

\*\*\*Phone jacks are unbalanced.

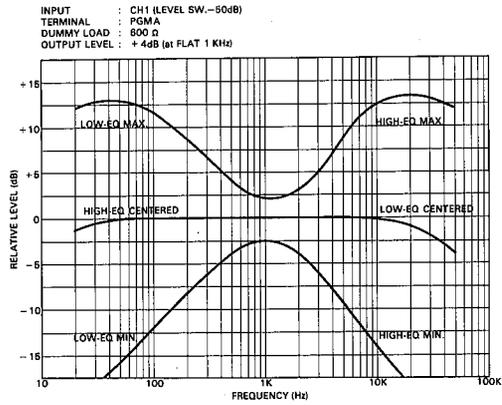
NOTE: Unless the circuit impedance is 600 ohms, we use the term "dB", rather than "dBm". This is because, since it is a power expression, the value of "dBm" changes with impedance. The "0dB" reference is 0.775 volts rms, just like 0dBm. However, the level in "dB" denotes voltage instead of power, and so is less misleading than "dBm" at impedances other than 600 ohms.

# BLOCK & LEVEL DIAGRAMS

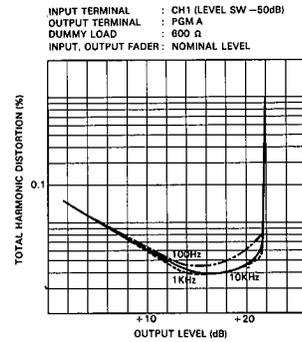
## PM-210 Block & Level Diagrams



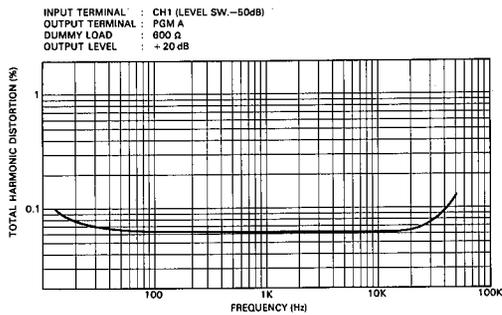
## FREQUENCY RESPONSE



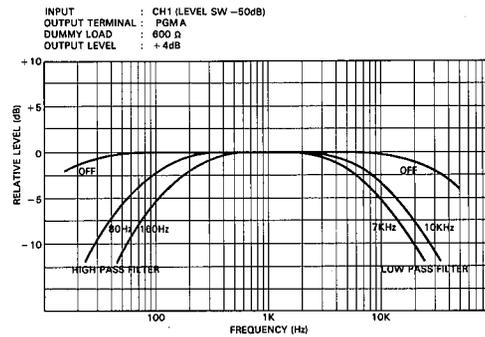
## TOTAL HARMONIC DISTORTION



## TOTAL HARMONIC DISTORTION



## LOW/HIGH-PASS FILTER FREQUENCY RESPONSE



Specifications subject to change without notice.

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