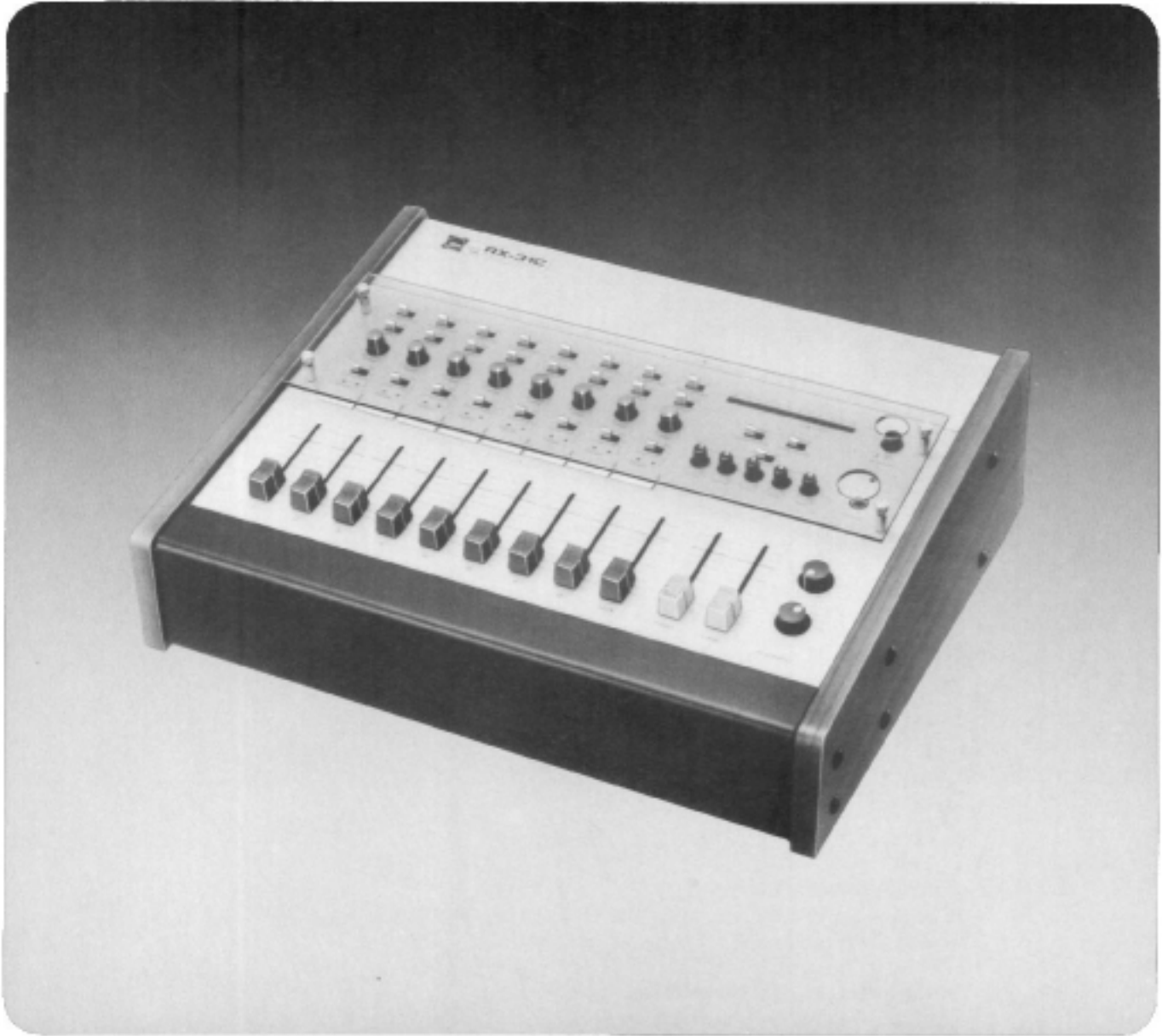




# TOA MIXING CONSOLE

Model RX-31C



**TOA ELECTRIC CO., LTD.**  
KOBE, JAPAN

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### **1. XLR (Cannon) Connector**

XLR Connectors are wired to NAB standards. Pin 1 is ground (shield), Pin 2 is cold (low, minus), Pin 3 is hot (high, plus).

### **2. Descriptions of components and functions**

Various mixing console descriptions are used, depending on individual manufacturer's standards. In our Operating and Instruction Manual, explanation of components and functions is made according to our usage for them.

### **3. Phantom Power Supply**

The RX-31C incorporates a 48V DC Phantom Power circuit. If phantom power is required, the Phantom ON/OFF switch on each input channel for which phantom power is required should be "on". When using phantom power, avoid connecting unbalanced microphones or connecting other circuits in which the center tap of the unit's input transformer is grounded.

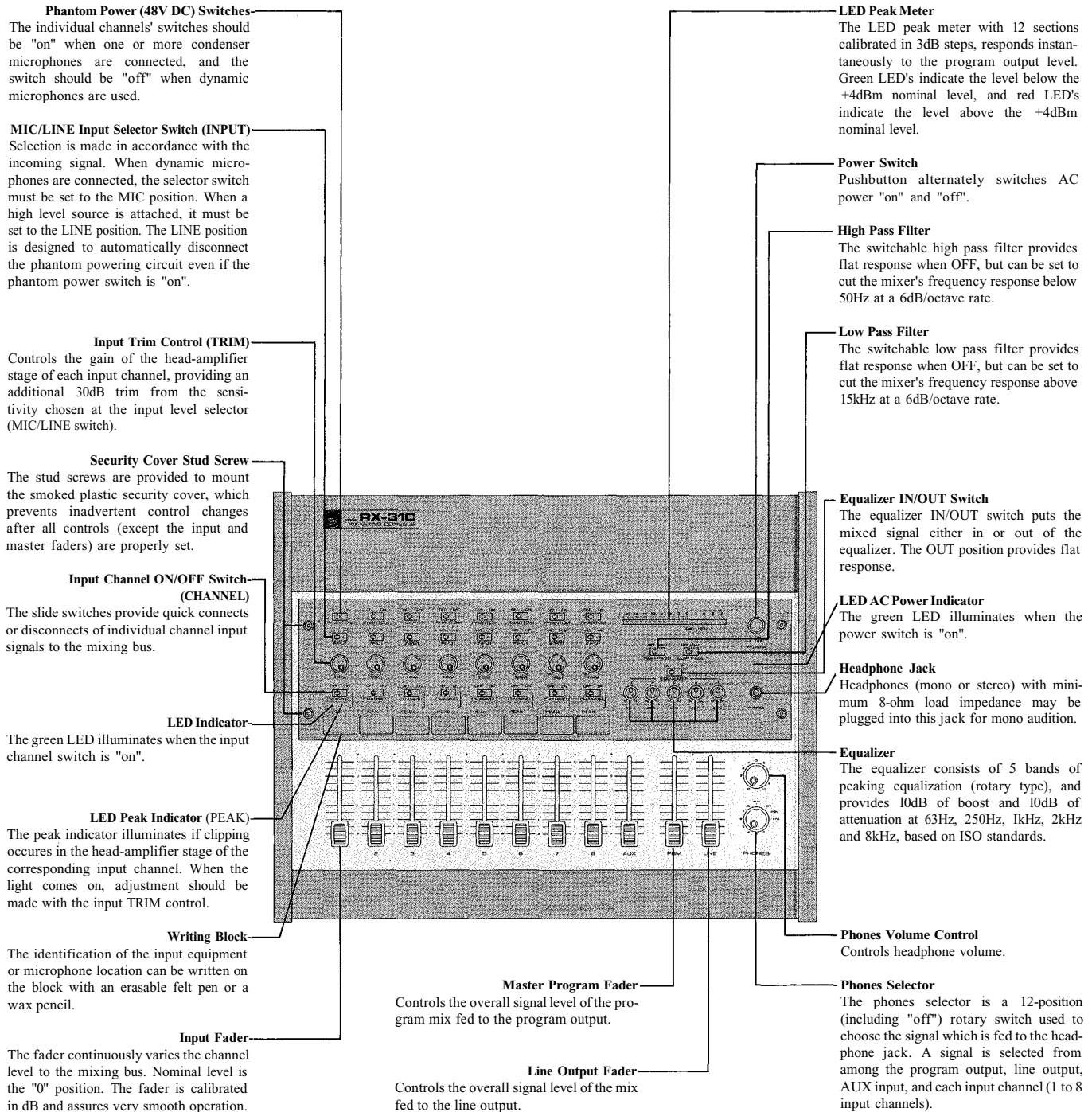
## ● General Description

The RX-31C is an eight input, one program output and one line output mixer, designed especially for sound reinforcement systems in auditoriums, churches and similar applications. Each input channel is transformer isolated and accepts either a low impedance microphone or a high level source. A MIC/LINE selector switch on each input channel permits selection of the type of source. A phantom ON/OFF switch on each input channel applies 48V DC phantom power for condenser microphones. An input TRIM control on each input channel provides 30dB of gain adjustment prior to the main channel fader. A channel ON/OFF slide switch on each input channel connects or disconnects the input signal to the mixing bus. The adjacent green LED illuminates when the channel is "on". An LED bar graph peak meter with 12 sections calibrated in 3dB steps responds instantly to the program output level. Also featured is a 5 band (peaking) equalizer with rotary controls plus switchable high pass/low pass filters for reducing wind and scratch noise. A headphone output enables the operator to audition each input channel, AUX input, program output or line output, depending on the position of the phones selector switch. With an optional bracket, the RX-31C is usable in a rack-mounted configuration.

## ● Features

1. Phantom power switches, each channel
2. MIC/LINE selector switches, each channel
3. Individual input level Trim controls, each channel
4. Channel ON/OFF switches
5. Peak indicator, each channel
6. LED peak meter with 12 sections calibrated in 3dB steps
7. High pass and Low pass filters
8. Five band (peaking type) equalizer (rotary type)
9. Headphone jack
10. AUX IN and REC (recording) OUT jacks
11. Rack-mountable with an optional bracket, occupies 7 spaces

# Front Panel



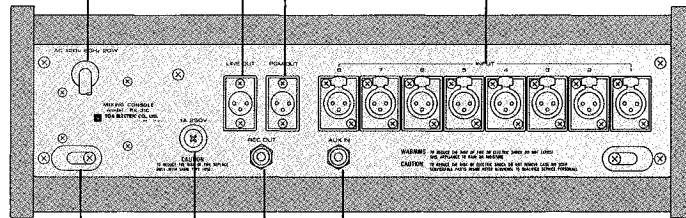
**Program Output Connector (PGM OUT)**  
 The Program Output Connector is balanced and transformer isolated. The nominal signal level and impedance are +4dB and 600 ohms, respectively.

**Line Output Connector (LINE OUT)**  
 The Line Output Connector is balanced and transformer isolated. The nominal signal level and impedance are +4dB and 600 ohms, respectively. The output signal is derived prior to the equalizer section.

**Input Channel Connector(s) (INPUT)**  
 The XLR connectors are balanced, transformer isolated, and accept either low or high impedance sources, depending on the position of the MIC/LINE selector switch on the front panel, the nominal signal level and impedance in the MIC position are -64dBm and 1.5k ohms, respectively. In the LINE position, the nominal signal level and impedance are -24dBm and 1k ohms, respectively.

**AC Power Cord**

**Cord Hanger**



**AC Fuse (1A)**

The fuse should be replaced only with one of identical value and type.

**AUX Input Jack (AUX IN)**

This jack is unbalanced and accepts low or high impedance sources at nominal -20dB level. The AUX input will accept feeds from a tape player, wireless tuner or other high level devices.

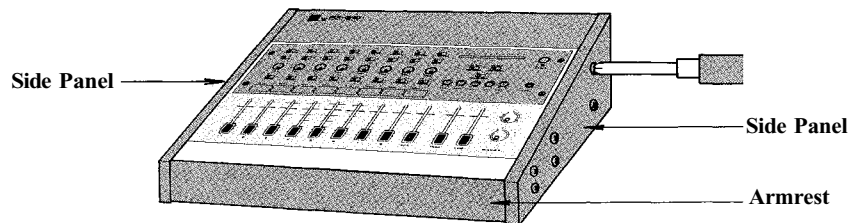
**Recording Output Jack (REC OUT)**

This is a high level, high impedance (nominal 10k ohms) unbalanced output jack (nominal level -10dB). This signal is pre equalizer and suitable for feeding a tape recorder or other high level devices, devices.

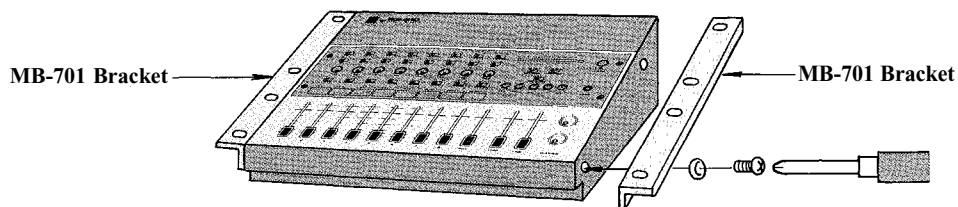
## Rack Mounting Instructions

The RX-31C is designed to be used either console style or to be rack-mounted, using a pair of optional brackets (model MB-701). The following procedure should be followed to rack-mount the mixer using the MB-701.

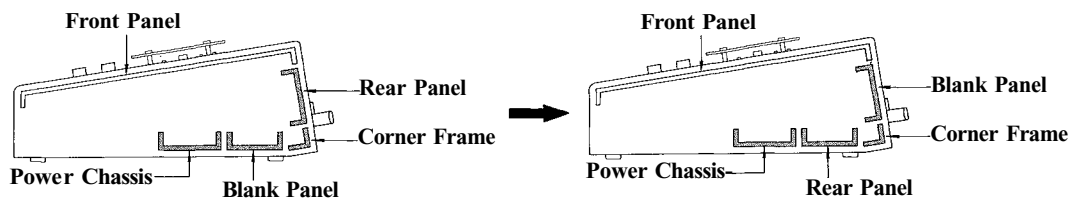
1. Remove both side panels and armrest. (Remove 6 screws securing each side panel).



2. Mount the MB-701 brackets on both sides of the chassis. (Use the screws removed from the side panel to secure the brackets).



3. The rear panel and blank panel should now be changed in position to easily accept equipment connections on the RX-31C in the rack.
4. Reverse the positions of the rear panel and blank panel, as shown below.



- a. Remove the rear panel, corner frame and blank panel,
- b. Put the rear panel in the original position of the blank panel,
- c. Put the corner frame back in place.
- d. Put the blank panel in the original position of the rear panel and take off the rubber feet.

## ● Input Connections

Generally speaking, there are two rules to follow when connecting equipment outputs to the inputs of other equipment.

1. Properly match the impedances of the outputs and inputs.
2. Connect low impedance outputs to high impedance inputs.

It goes without saying that not only input and output impedance matching but also level matching should be taken into consideration. Each input channel of the RX-31C is provided with an input TRIM control, so the usable signal level range is very wide. Input impedances and levels are shown in the following table.

**INPUT SPECIFICATIONS**

CONNECTION	INPUT SELECTOR	ACTUAL LOAD IMPEDANCE	FOR USE WITH NOMINAL	TRIM POSITION	SENSITIVITY (AT MAX GAIN)	INPUT LEVEL		CONNECTOR
						NOMINAL	*MAX. BEFORE CLIP	
INPUT (1-8)	MIC	1.5k $\Omega$	50 TO 250 $\Omega$ MICROPHONES OR 600 $\Omega$ LINES	0	-84dBm (0.049mV)	-64dBm (0.49mV)	-35dBm(13.8mV)	XLR TYPE
				-30	-54dBm (1.55mV)	-34dBm (15.5mV)	-5dBm(436mV)	
	LINE	11k $\Omega$	11k $\Omega$ OR LOWER IMP. LINES	0	-44dBm (4.9mV)	-24dBm (49mV)	+ 5dBm (1.38V)	XLR-3-31
				-30	-14dBm (155mV)	+ 6dBm (1.55V)	+ 35dBm (43.6V)	
AUX		80k $\Omega$	80k $\Omega$ OR LOWER IMP. LINES		-40dBm (7.75mV)	-20dBm (77.5mV)	+ 9dBm (2.18V)	PHONE JACK

\*Sensitivity is the level required to produce a program out level of +4dBm.

\*0dBm is referenced to 0.775V RMS.

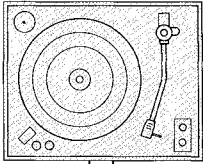
\*All XLR type connectors are floating (balanced) and transformer isolated. Phone jack is unbalanced.

If the line going from one piece of equipment to another is long (more than 5m), we recommend that balanced outputs be connected to balanced inputs.

As is described in the beginning of the Operating Instructions Manual, the connectors of the RX-31C are wired in accordance with NAB standards: Pin 1 is ground (shield), Pin 2 is cold (low, minus), Pin 3 is hot (high, plus).

# ● Connection Examples

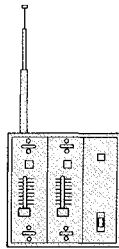
**DISK PLAYER WITH A MM CARTRIDGE**



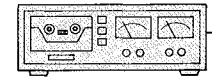
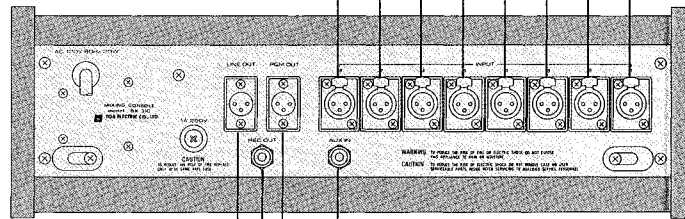
**RIAA EQUALIZER**



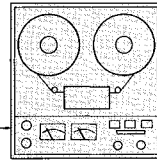
**WIRELESS TUNER SUCH AS WT-02, WT-06**



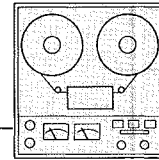
Input channels 1-8 should be connected with low impedance (50-ohm-600-ohm) microphones when the MIC/LINE selector switch is set to the MIC position. At LINE position the impedance of the inputs changes to 11k ohms, so that associated equipment with an output impedance of less than 11k ohms should be connected to the inputs. The inputs are balanced, transformer isolated no matter what the position of the MIC/LINE selector switch.



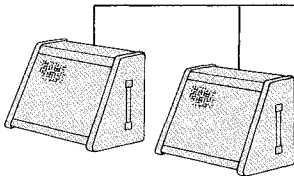
**CASSETTE TAPE DECK for recording**



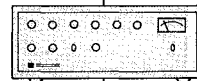
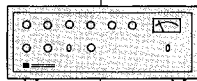
**TAPE-DECK**



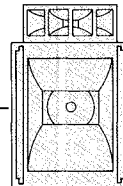
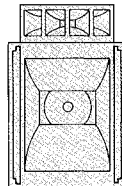
**PLAYBACK DECK**



**STAGE MONITOR WITH A BUILT-IN POWER AMPLIFIER**



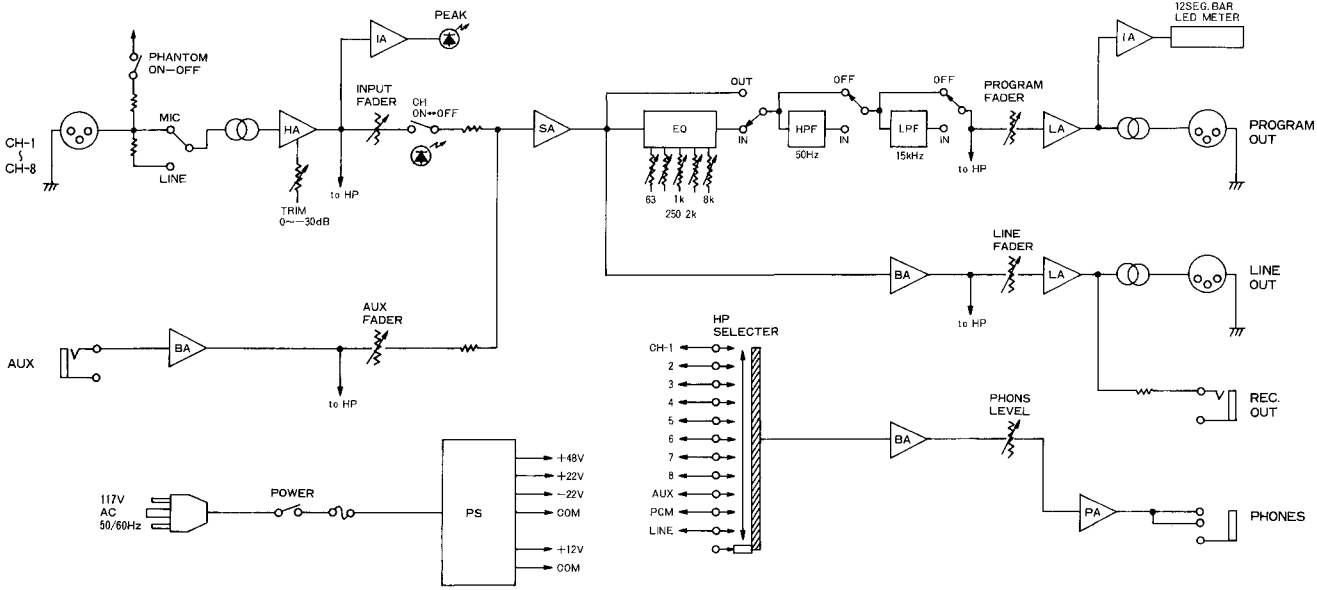
**POWER AMPLIFIER A-906**



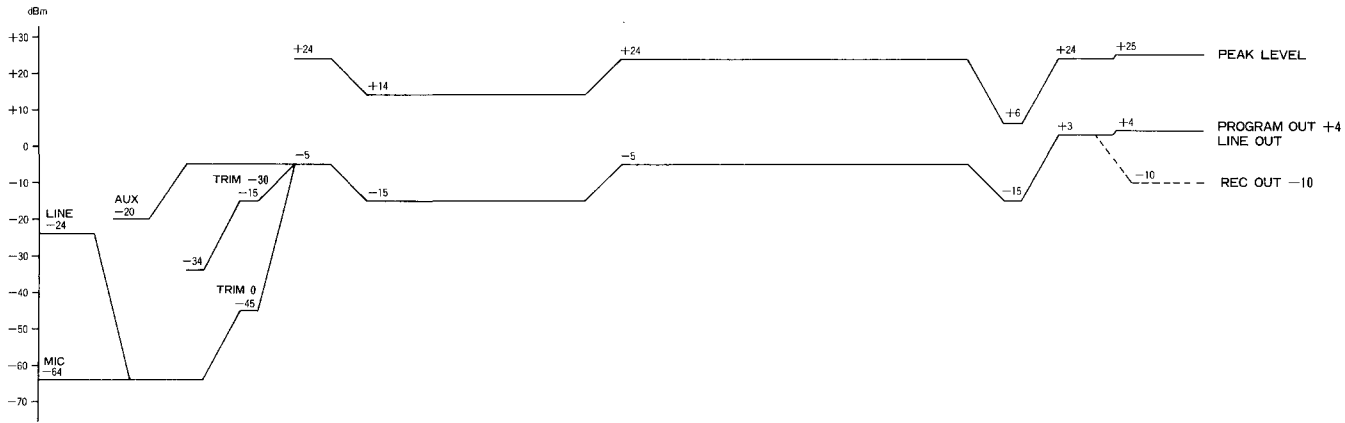


# Block and Level Diagrams

## RX-31C BLOCK DIAGRAM



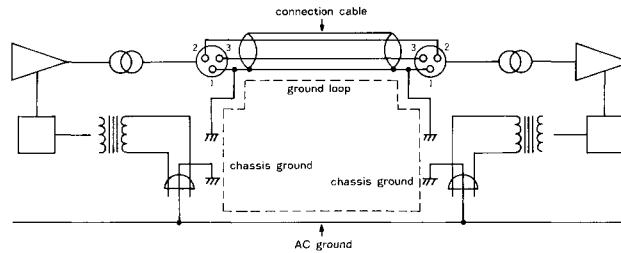
## LEVEL DIAGRAM



## ● Avoiding Ground Loops

AC ground is provided to the RX-31C and all associated equipment, and this can sometimes cause an increase in hum noise. This is because a ground loop is made through the shields of the connection cable and the AC line as shown Fig. 1.

**Fig. 1**

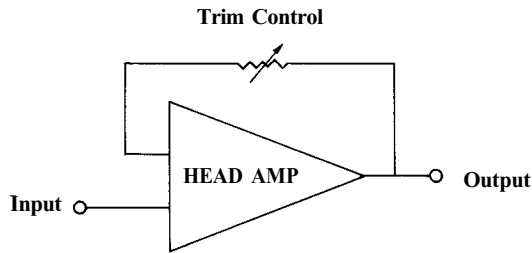


To solve this problem, either the chassis ground of the signal line should be disconnected at either piece of equipment, or disconnect the chassis earth ground, so that the ground loop is eliminated. However, it is highly dangerous to disconnect the AC ground, as microphones and other equipment connected to the mixing console are often touched directly by hand. This may cause an electric shock, in the case of electricity leakage, if any other connected equipment is touched. Therefore the chassis ground line should be disconnected. Whether or not to disconnect the chassis ground line of other equipment depends on various conditions. Therefore, this should be checked and determined for each installation. Care must be taken that when the RX-31C is mounted in a metal cabinet, the chassis ground line of other equipment is connected through the cabinet.

# Effective Mixing

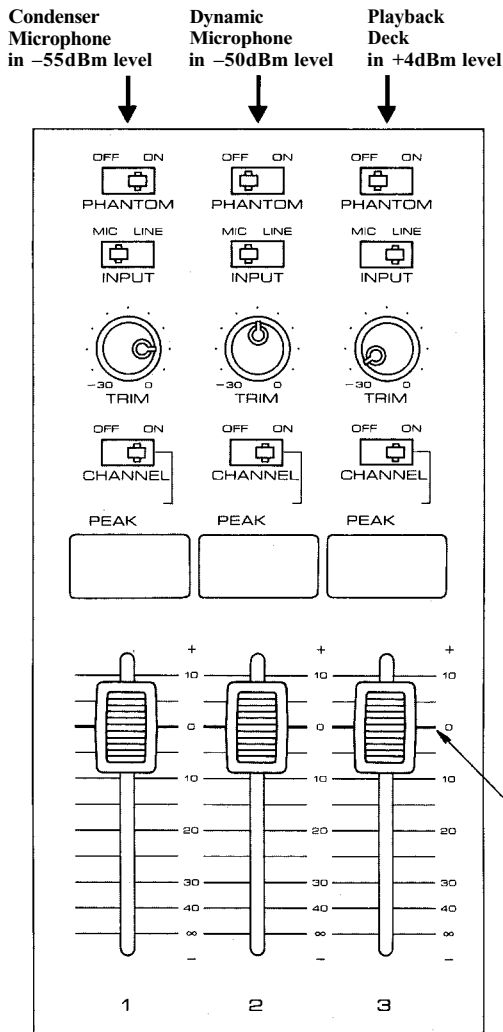
Before connecting other equipment to the mixing console, check the impedances and levels of both. If the impedances and levels do not match, mixing will be very difficult and the S/N ratio will also be adversely affected.

Each input channel of the RX-31C is provided with a TRIM control. Thorough understanding of the function of a TRIM control will make mixing easily.



The function of the TRIM control is to control the negative feedback volume of the head-amp so that the gain of the head-amp can also be changed. Because of this, enough dynamic range, even for high level signals is ensured. Also, the S/N ratio will be better by decreasing the gain of the head-amp.

For example, a condenser microphone, a dynamic microphone and a playback deck with output levels of  $-55\text{dBm}$ ,  $-50\text{dBm}$  and  $+4\text{dBm}$ , respectively are connected to the mixing console.



The Phantom Power Switches, MIC/LINE Selector switches, TRIM Controls and Channel ON/OFF switches are set as shown in figure at left.

The TRIM controls should be properly adjusted depending on the signal level of the other equipment connected, so that each input channel fader will be horizontally lined up, as this will make operation easier.

TRIM controls must also properly set, so that the peak indicator will not be lit. In general, each input channel fader is adjusted around the nominal position, and the master fader is also set at a nominal position.

# Specifications

**Frequency Response:** +0dB, -3dB. 15Hz~ 30kHz (Measurement of B&K Type 2010 output imp. 5  $\Omega$ )

**Total Harmonic Distortion:**  
0.1%, +4dBm at 1kHz

**Ham and Noise (Rg = 150 ohms):**  
 —130dBm Equivalent Input Noise (20Hz~ 20kHz)  
 —132dBm Equivalent Input Noise (IHF A Weighted)  
 —88dBm ALL FADERS DOWN (IHF A Weighted)  
 —73dBm PGM FADER AT NOMINAL AND ALL INPUT FADERS DOWN (IHF A Weighted)  
 —63dBm (67dB S/N) PGM FADER AND ONE INPUT FADER AT NOMINAL (IHF A Weighted)

**Maximum Voltage Gain (Input Trim at "0" position):**  
 PROGRAM 88dB: INPUT to PGM OUT  
 LINE 88dB: INPUT to LINE OUT  
 REC OUT 74dB: INPUT to REC OUT  
 AUX IN 44dB: AUX IN to PGM OUT

**Equalization:** 63Hz  $\pm$  10dB Peaking 250Hz  $\pm$  10dB Peaking 1kHz  $\pm$  10dB Peaking  
 2kHz  $\pm$  10dB Peaking 8kHz  $\pm$  10dB Peaking

**High Pass Filter:** —6 dB/OCT roll-off below 50Hz at —3dB points

**Low Pass Filter:** —6 dB/OCT roll-off above 15kHz at —3dB points

**Peak Indicators:** Red LED on each input channel  
 LED's turn on at 10dB below clipping

**Channel ON/OFF Indicators:**  
 Green LED on each input channel

**Phantom Power:** Phantom powering (48V DC) switch on each input channel

**Dimension:** 17.99(W) X 15.65(D) X 6.22(H) inch 457(W) X 397.5(D) X 158(H)mm

## INPUT SPECIFICATIONS

CONNECTION	INPUT SELECTOR	ACTUAL LOAD IMPEDANCE	FOR USE WITH NOMINAL	TRIM POSITION	SENSITIVITY (AT MAX GAIN)	INPUT LEVEL		CONNECTOR
						NOMINAL	*MAX. BEFORE CLIP	
INPUT (1-8)	MIC	1.5k $\Omega$	50 TO 250 $\Omega$ MICROPHONES OR 600 $\Omega$ LINES	0	—84dBm (0.049mV)	—64dBm (0.49mV)	—35dBm (13.8mV)	XLR TYPE
				—30	—54dBm (1.55mV)	—34dBm (15.5mV)	—5dBm (436mV)	
	LINE	11k $\Omega$	11k $\Omega$ OR LOWER IMP. LINES	0	—44dBm (4.9mV)	—24dBm (49mV)	+ 5dBm (1.38V)	XLR-3-31
				—30	—14dBm (155mV)	+ 6dBm (1.55V)	+ 36dBm (48.9V)	
AUX		80k $\Omega$	80k $\Omega$ OR LOWER IMP. LINES		—40dBm (7.75mV)	—20dBm (77.5mV)	+ 9dBm (2.18V)	PHONE JACK

## OUTPUT SPECIFICATIONS

CONNECTION	FOR USE WITH NOMINAL	OUTPUT LEVEL		CONNECTOR
		NOMINAL	MAX. BEFORE CLIP	
PROGRAM OUT	600 $\Omega$ OR HIGHER IMP. LINES	+ 4dBm (1.23V)	+ 25dBm (13.8V)	XLR TYPE XLR-3-32
LINE OUT		+ 4dBm (1.23V)	+ 25dBm (13.8V)	
REC OUT	10k $\Omega$ OR HIGHER IMP. LINES	—10dBm (245mV)	+ 10dBm (2.45V)	PHONE JACK
(HEAD) PHONES	8 $\Omega$ OR HIGHER IMP. LINES	—10dBm (245mV)	—5dBm (436mV)	PHONE JACK

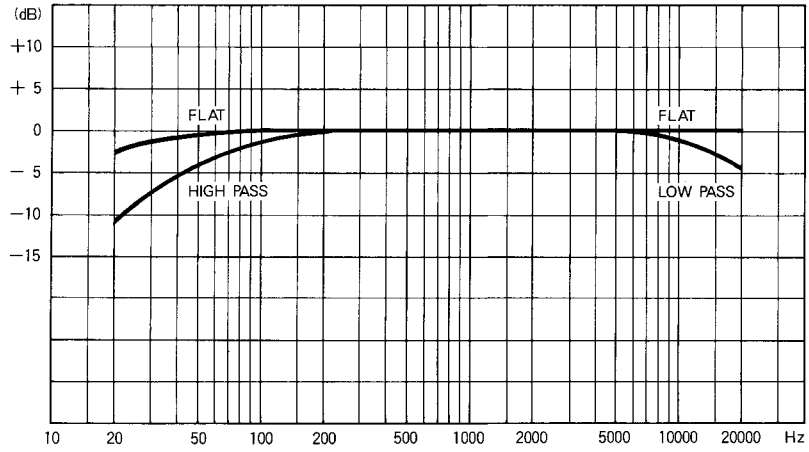
\*0dBm is referenced to 0.775VRMS

\*Sensitivity is the lowest level that will produce an output of +4dBm (1.23V), or the nominal input level when the unit is set to maximum gain.

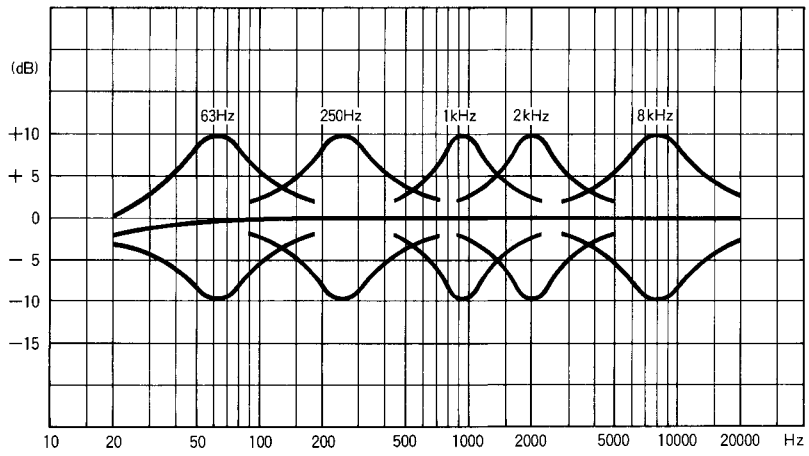
\*All XLR type connectors are floating ("balanced") and transformer-isolated. Phone jacks are unbalanced (except head phone jack, wire Tip = Hot, Ring = Hot, Sleeve = Common)

# Characteristic Diagrams

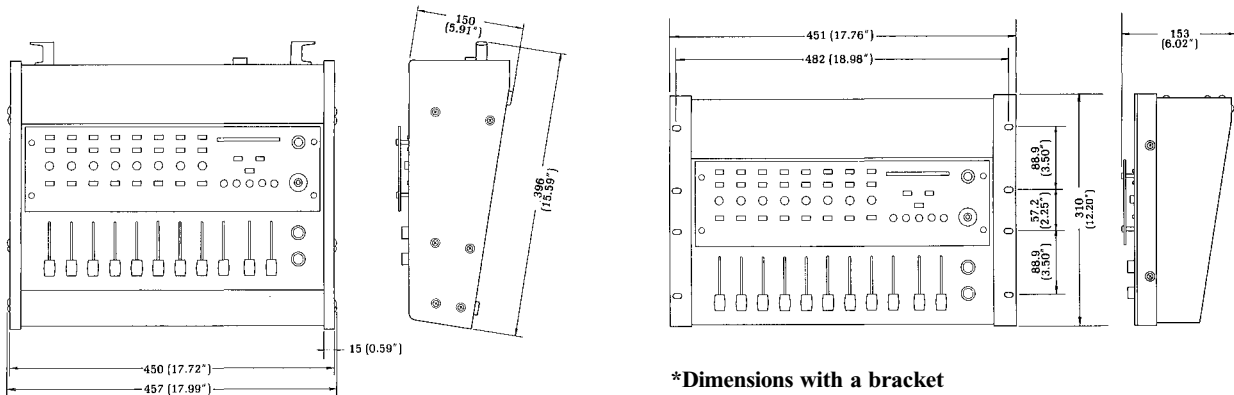
## FREQUENCY RESPONSE HPF & LPF CHARACTERISTICS



## OUTPUT EQ CHARACTERISTIC



# Appearance





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