

YAMAHA

**GRAPHIC EQUALIZER
EGALISEUR GRAPHIQUE
GRAPHISCHER EQUALIZER
ECUALIZADOR GRAFICO**

**Q2031B
GQ1031C
GQ2015A**

OPERATION MANUAL
MANUEL D'INSTRUCTIONS
BEDIENUNGSANLEITUNG
MANUAL DE INSTRUCCIONES

PRECAUTIONS

1. Avoid Excessive Heat, Humidity, Dust and Vibration

Keep the unit away from locations where it is likely to be exposed to high temperatures or humidity — such as near radiators, stoves, etc. Also avoid locations which are subject to excessive dust accumulation or vibration which could cause mechanical damage.

2. Avoid Physical Shocks

Strong physical shocks to the unit can cause damage. Handle it with care.

3. Do Not Open The Case Or Attempt Repairs Or Modifications Yourself

This product contains no user-serviceable parts. Refer all maintenance to qualified Yamaha service personnel. Opening the case and/or tampering with the internal circuitry will void the warranty.

4. Make Sure Power Is Off Before Making Or Removing Connections

Always turn the power OFF prior to connecting or disconnecting cables. This is important to prevent damage to the unit itself as well as other connected equipment.

5. Handle Cables Carefully

Always plug and unplug cables — including the AC cord — by gripping the connector, not the cord.

6. Clean With a Soft Dry Cloth

Never use solvents such as benzine or thinner to clean the unit. Wipe clean with a soft, dry cloth.

7. Always Use the Correct Power Supply

Make sure that the power supply voltage specified on the rear panel matches your local AC mains supply. Also make sure that the AC mains supply can deliver more than enough current to handle all equipment used in your system.

IMPORTANT NOTICE FOR THE UNITED KINGDOM

Connecting the Plug and Cord

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

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 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.

Making sure that neither core is connected to the earth terminal of the three pin plug.

* This applies only to products distributed by YAMAHA - KEMBLE MUSIC (U.K.) LTD.

FEATURES

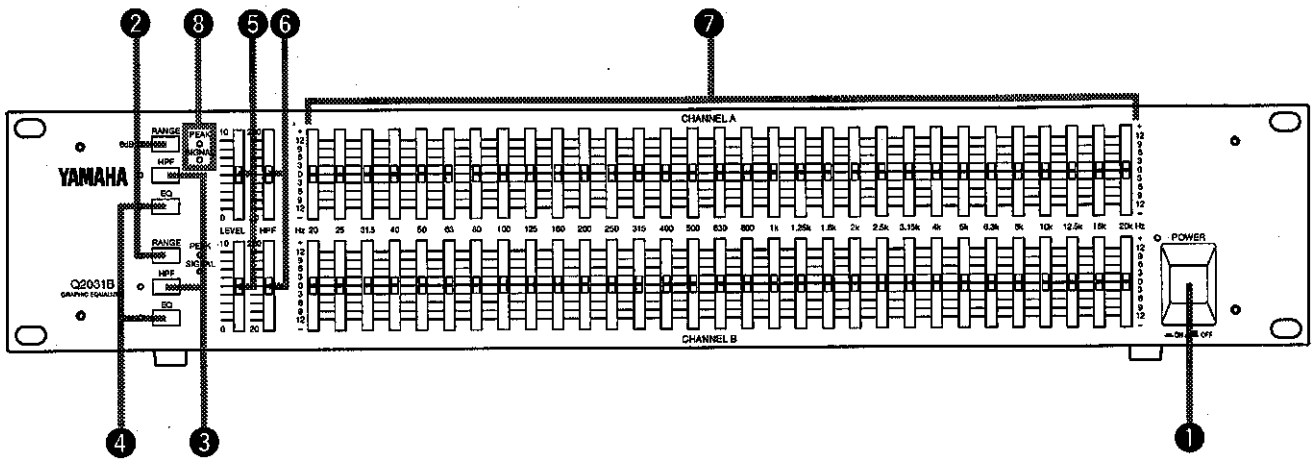
- The two-channel system offers completely independent channel control — from the input all the way to the output. (Q2031B, GQ2015A)
- The Q2031B/GQ1031C offers a narrow, 1/3-octave bandwidth and 31-band control over the entire 20 Hz to 20 kHz range for very precise equalization.
- The 1U-size GQ2015A offers 15-band control on two independent channels.
- Equipped with an EQ switch that bypasses the equalizer section, a RANGE switch that changes the equalization range and a host of other features the equalizer presents itself as a unit carefully designed from both functional and operational perspectives.
- The Q2031B features a high pass filter that allows setting the rolloff frequency using a slider, and the GQ1031C/GQ2015A is equipped with an 80 Hz high pass filter.
- Equipped with transformerless balanced XLR-type and phone jack input and output connectors.
- Suitable for PA and recording applications and a variety of other uses.
- Can be mounted in a standard 19" rack.

CONTENTS

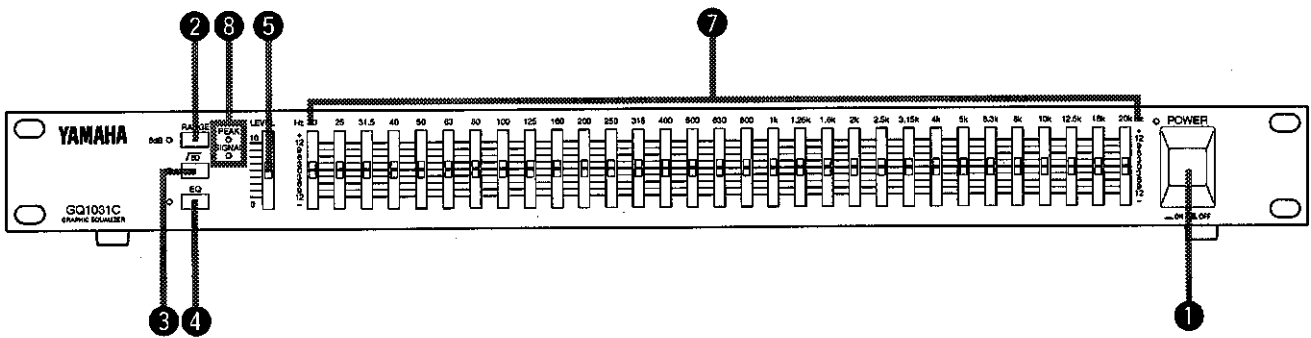
FRONT PANEL	3
REAR PANEL	5
TYPICAL CONFIGURATIONS	6
ACOUSTIC CONTROL	7
SPECIFICATIONS	8
BLOCK DIAGRAM	9
DIMENSIONS	9

FRONT PANEL

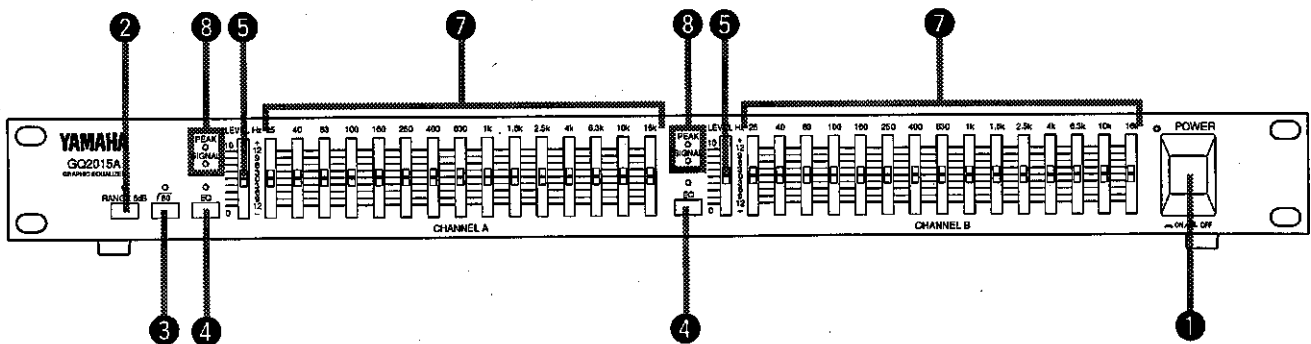
Q2031B



GQ1031C



GQ2015A



1 POWER switch

When this switch is pressed to turn the power on, the POWER indicator LED above the switch will light.

*To prevent click noise, the output is muted for approximately two seconds after the power is turned on.

2 RANGE switch

Allows selection of the boost or cut range for equalization. When this switch is off, the maximum range of +/-12 dB is selected; when on, the +/-6 dB range is selected. Use this switch to select the range suitable for each application. When the switch is on, the LED indicator to its left lights to show that the +/-6 dB range is in effect.

3 HPF switch (Q2031B)

$\sqrt{80}$ switch (GQ1031C/GQ2015A)

Allows switching the high pass filter in or out of the audio path. When the switch is on, the high pass filter is effective and the indicator LED lights. The Q2031B provides 12 dB per octave rolloff below the frequency set with the HPF control 6, while on the GQ1031C/GQ2015A the rolloff is 12 dB per octave below 80 Hz.

When the switch is off, the input signal goes directly to the equalizer section, bypassing the HPF.

On the GQ2015A the $\sqrt{80}$ switch turns the HPF on/off for channels A and B simultaneously.

4 EQ switch

This switch determines whether the signal is routed through or bypasses the equalizer section. When the switch is off, the equalizer is bypassed and the settings of the equalizer controls 7 are ineffective, providing a flat frequency response. When the switch is on, its indicator lights and the equalizer is switched into the audio path. The equalized signal can be compared with the un-equalized signal simply by alternately turning the EQ switch on and off.

5 LEVEL control

Allows precise control of the optimum input sensitivity. When the control is at the top of the scale, the input level remains unchanged (+4 dB).

This control can be used to restore the output level when the overall level has been changed during the equalization process. This, however, will also change the input level. Equalization methods which do not change the LEVEL control setting will yield a better signal-to-noise ratio and wider dynamic range.

Example: The settings in Fig. A will provide a better result than the settings in Fig. B.

● Boost/cut settings centered around the 0 dB point



Fig. A

● Boost/cut settings off the 0 dB point

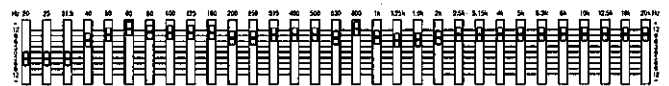


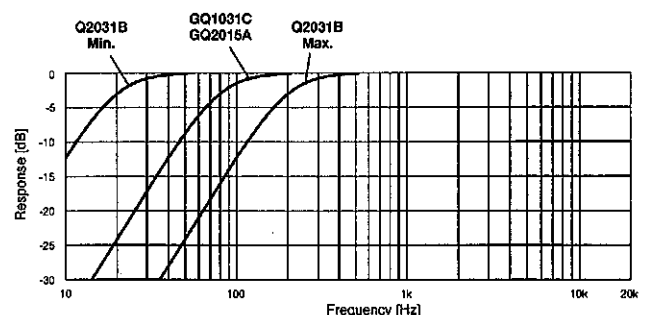
Fig. B

6 HPF control (Q2031B)

The HPF control sets the rolloff frequency for the built-in high pass filter. The control allows continuous adjustment over the range of 20 Hz to 200 Hz. Below the selected frequency there will be a 12 dB per octave cut.

The filter is turned on/off using the HPF switch 3.

The HPF can be adjusted to eliminate low-range standing waves, a resonance phenomenon that sometimes occurs in small indoor environments, vocal "pops" and wind noise in microphones and AC hum.



FRONT PANEL

7 Equalizer controls

Q2031B/GQ1031C :

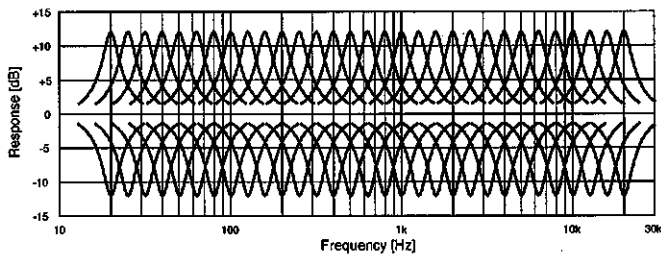
The 20 Hz to 20 kHz spectrum is divided into 31 bands (1/3 octave steps), and each of these bands is equipped with an equalizer control that allows boosting/cutting the corresponding center frequency.

GQ2015A :

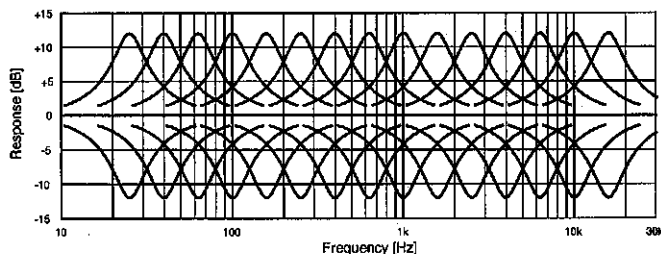
The 25 Hz to 16 kHz spectrum is divided into 15 bands (2/3 octave steps), and each of these bands is equipped with an equalizer control that allows boosting/cutting the corresponding center frequency.

The scales on either side of the controls are calibrated to indicate the correct setting values when the RANGE switch is off (+/-12 dB range). When the RANGE switch is on (+/-6 dB range), the true values are one-half of the calibrated values.

Q2031B, GQ1031C

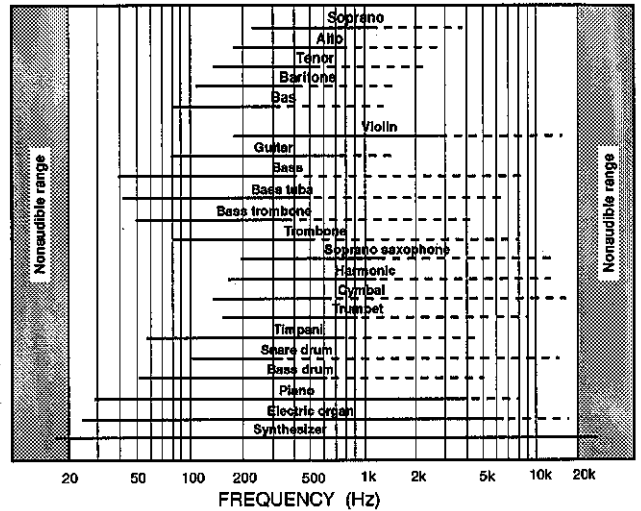


GQ2015A



To get the best performance from your equalizer, it is important that you understand the frequency components that make up the sounds of each musical instrument. The following graph is provided to aid this understanding.

You should also bear in mind, that besides fundamental frequencies harmonics also can have a significant impact on timbre.



8 SIGNAL and PEAK indicators

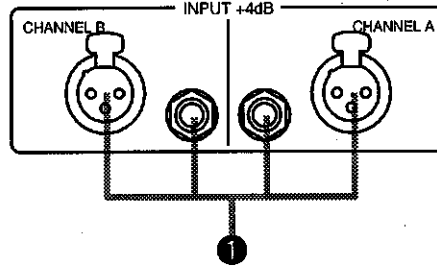
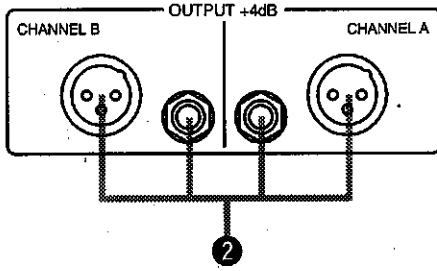
This SIGNAL indicator LED lights up when the output signal level is within 13 dB below nominal level. The indicator confirms that the current signal level settings are suitable.

The PEAK indicator LED lights up when the output signal level reaches 3 dB below clipping level. If the PEAK indicator LED lights continuously, the overall level is too high and must be reduced using one of the two following methods:

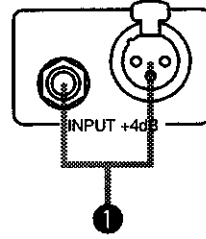
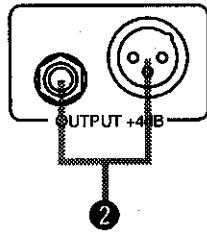
- (1) By reducing the overall level with the LEVEL control
- (2) By reducing the levels of each equalizer band

REAR PANEL

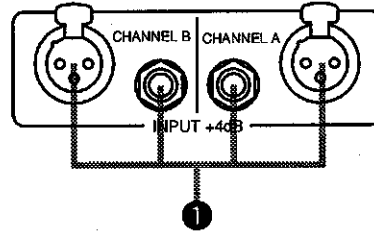
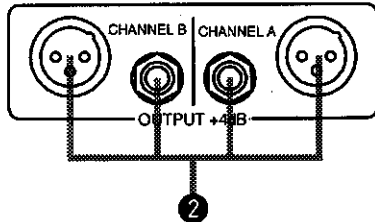
Q2031B



GQ1031C



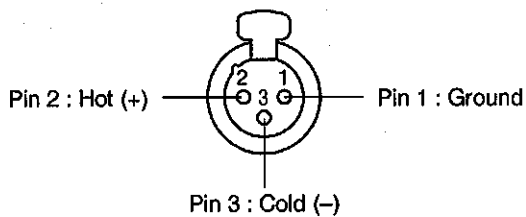
GQ2015A



1 INPUT connectors

The equalizer is equipped with balanced XLR-type and 1/4" phone jack input connectors. For both a 600 Ω line should be used. The rated input level is +4 dB.

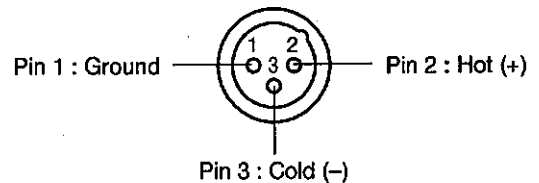
● XLR-3-31 type connector



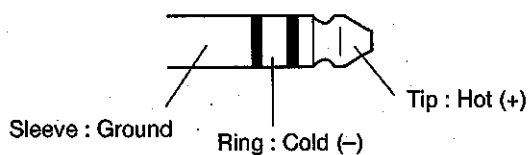
2 OUTPUT connectors

The equalizer is equipped with balanced XLR-type and 1/4" phone jack output connectors. For both a line with the matching load impedance of 600 Ω should be used. The rated output level is +4 dB.

● XLR-3-32 type connector

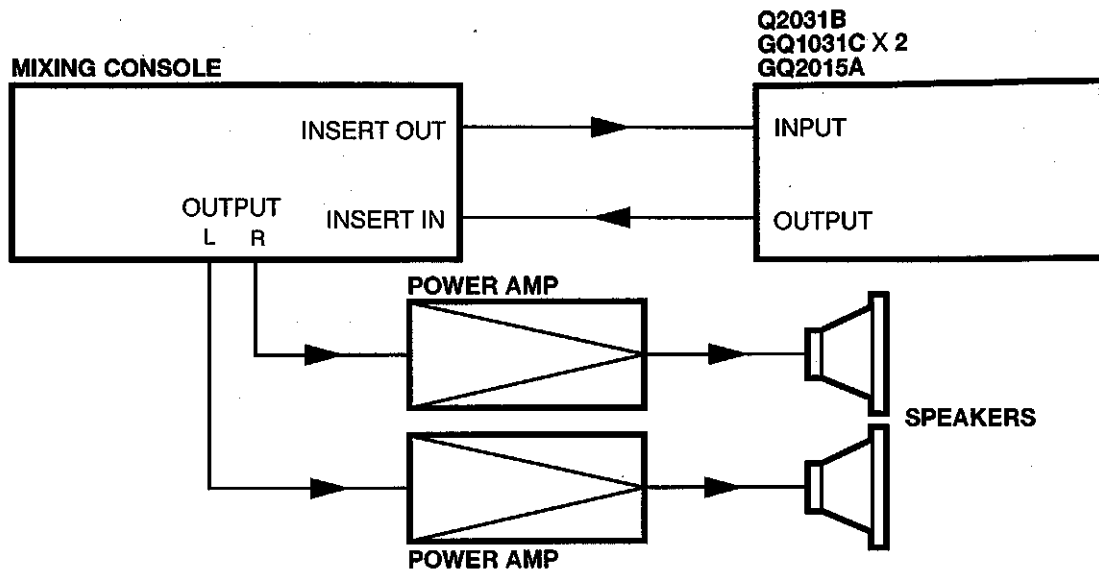


● TRS phone connector

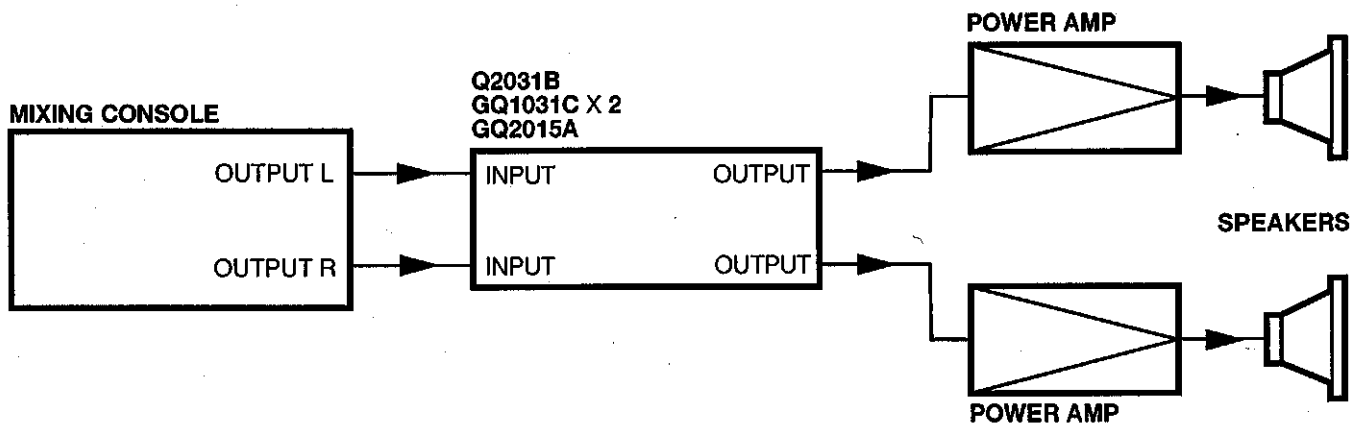


TYPICAL CONFIGURATIONS

● Insertion between the channel (master) insert out/in



● Insertion in the main line of the output system



ACOUSTIC CONTROL

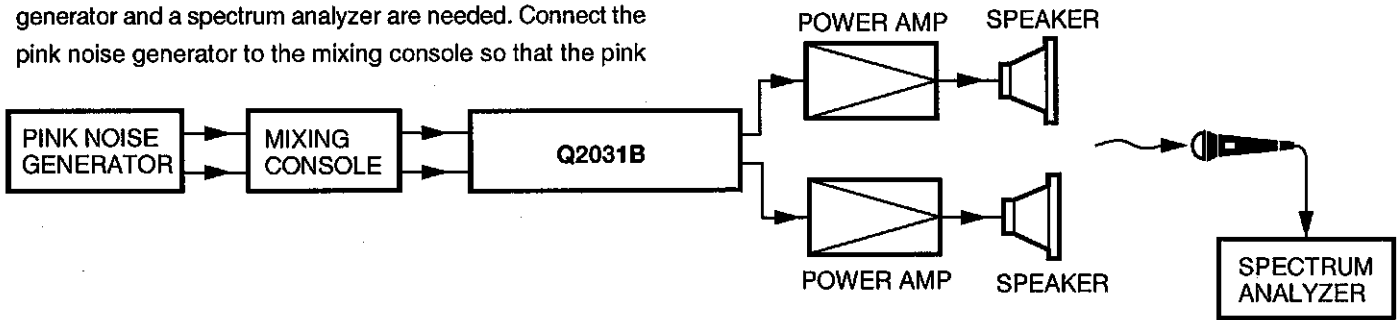
The diagrams show the connection method for the Q2031B. The GQ2015A is connected in the same way. In case of the GQ1031C you will need two units for a two-channel setup.

● Maintaining Ideal Indoor Propagation Characteristics

Speaker systems that demonstrate flat responses in anechoic rooms may have irregular responses in a concert hall due to acoustic conditions. The Q2031B equalizer can be used to minimize these irregularities.

For smoothing of the playback system response a pink noise generator and a spectrum analyzer are needed. Connect the pink noise generator to the mixing console so that the pink

noise is radiated from the speaker. While measuring the pink noise at strategic listening positions in the room using the spectrum analyzer, adjust the Q2031B until the preferred response is obtained.



● Ensuring Adequate Feedback Margins in Stage Monitor Systems

Depending on the room characteristics feedback can result in howling or ringing being generated at specific frequencies. In such cases the equalizer can be used to reduce levels at the affected frequencies and thereby to control the feedback, but a pink noise generator and a spectrum analyzer are again required.

Set the equipment up just as for an actual performance, and connect the pink noise generator to a spare input connector of the mixing console and the spectrum analyzer to a spare output connector. After ensuring that pink noise is being properly radiated from all PA speakers and monitor speakers, gradually raise the output level until it is evident at which frequencies feedback will occur. Use the Q2031B to reduce the levels of these specific frequencies.

Proper adjustment will provide a safety margin against feedback when the output level is raised.

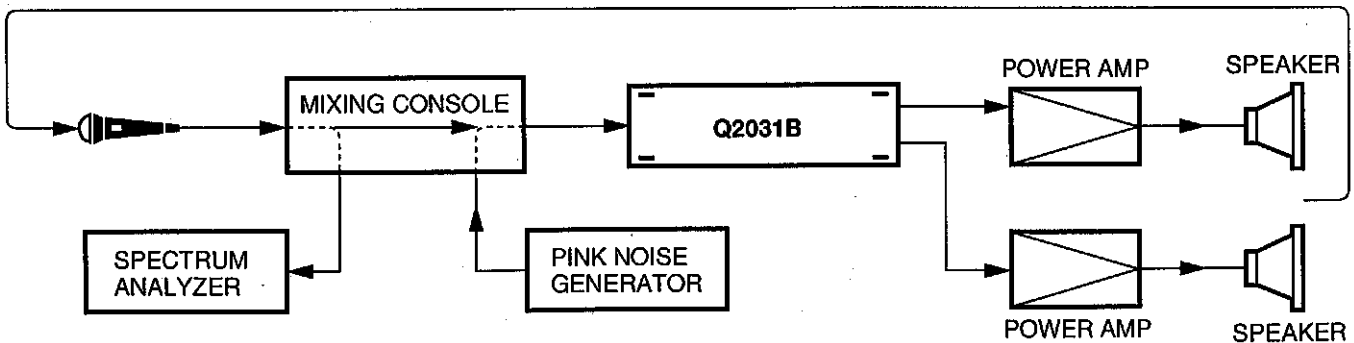
NOTE : Measuring instruments can only provide basic sound realism. After you have completed the indoor propagation and feedback compensation adjustments, make the final adjustments using the ultimate judge, your trained ears.

A Pink Noise Generator

generates a uniform level of random noise throughout the audio spectrum. (Equal Energy per octave)

A Spectrum Analyzer

divides the audio spectrum into ranges and indicates the sound pressure for each range.



SPECIFICATIONS

	Q2031B	GQ1031C	GQ2015A
FREQUENCY RESPONSE	20 Hz ~ 20 kHz $\pm 0.5\text{dB}$ @ +4dB* 600 Ω		
TOTAL HARMONIC DISTORTION	Less than 0.05% (THD+N), 20 Hz ~ 20 kHz @ +4 dB* 600 Ω , Equalizer...all flat (0dB)		
HUM & NOISE (Average, Rs=600 Ω BPF: 20Hz ~ 20kHz)	-96 dB*	-94 dB*	-96 dB*
MAXIMUM VOLTAGE GAIN	0 dB, Input Level ... Max.		
EQUALIZER CONTROLS Center Frequencies:	31 band (1/3 octave) 20, 25, 31.5, 40, 50, 63, 80, 100, 125, 160, 200, 250, 315, 400, 500, 630, 800, 1k, 1.25k, 1.6k, 2k, 2.5k, 3.15k, 4k, 5k, 6.3k, 8k, 10k, 12.5k, 16k, 20kHz	15 band (2/3 octave) 25, 40, 63, 100, 160, 250, 400, 630, 1k, 1.6k, 2.5k, 4k, 6.3k, 10k, 16kHz	
Variable Range:	$\pm 12\text{dB} / \pm 6\text{dB}$		
HIGH PASS FILTER (Rolloff Frequency)	12dB/octave (20 ~ 200Hz at -3dB point.)	12dB/octave (80Hz at -3dB point.)	
PEAK LED INDICATOR	Red LED on each channel turns on when post-EQ signal reaches the level 3 dB below clipping.		
SIGNAL LED INDICATOR	Green LED on each channel turns on when post-EQ signal reaches the level 13 dB below nominal level.		
POWER REQUIREMENTS	U. S. & Canadian Models : AC120V, 60Hz General Model : AC230V, 50Hz		
POWER CONSUMPTION	20W	13W	15W
DIMENSIONS (W x H x D)	480 x 93.4 x 230mm		480 x 49.4 x 230mm
WEIGHT	4.0kg	2.8kg	3.0kg

* 0 dB is referenced to 0.775V RMS.

● INPUT SPECIFICATIONS

INPUT Connectors	Input Impedance	Source Impedance	Input Level			Connectors **
			Sensitivity *	Nominal Level	Maximum Before Clipping	
INPUT (A, B)	15 k Ω	600 Ω Lines	+4 dB (1.23V)	+4 dB (1.23V)	+24 dB (12.3V)	XLR-3-31 Type Phone Jack (TRS)

● OUTPUT SPECIFICATIONS

OUTPUT Connectors	Output Impedance	Load Impedance	Output Level		Connectors **
			Nominal Level	Maximum Before Clipping	
OUTPUT (A, B)	150 Ω	600 Ω Lines	+4 dB (1.23V)	+24 dB (12.3V)	XLR-3-32 Type Phone Jack (TRS)

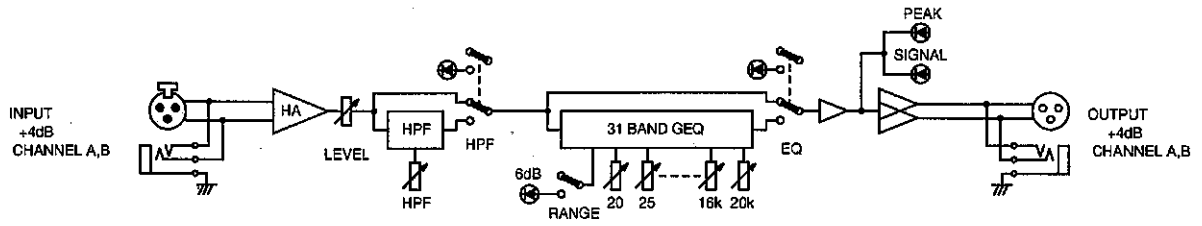
* The input level required to obtain the nominal output level.

** XLR-type connectors are balanced. 1=Ground, 2=+, 3=-
Phone jacks are balanced. T=+, R=-, S=Ground

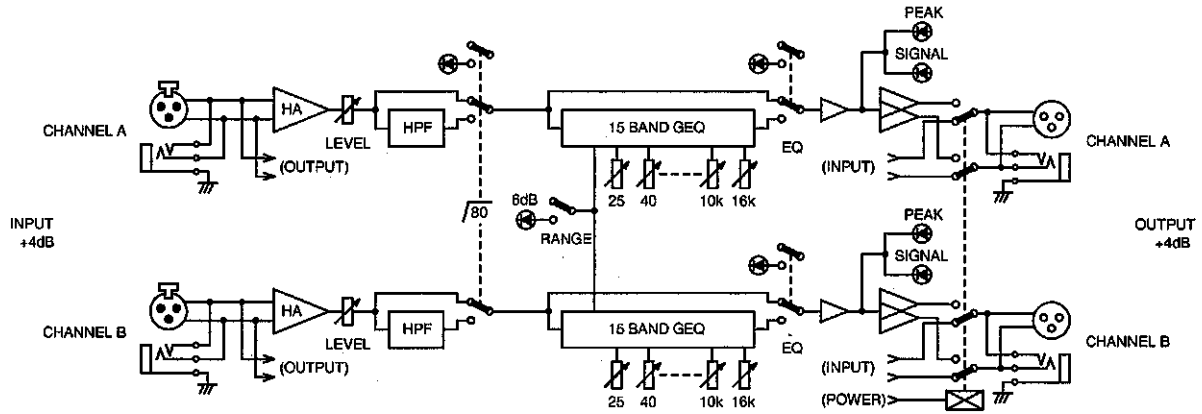
● Specifications subject to change without notice.

BLOCK DIAGRAM

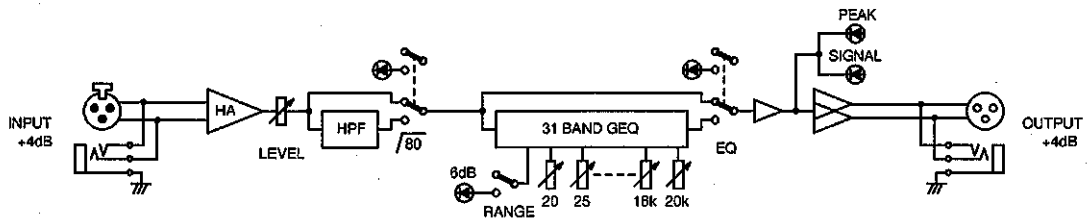
Q2031B



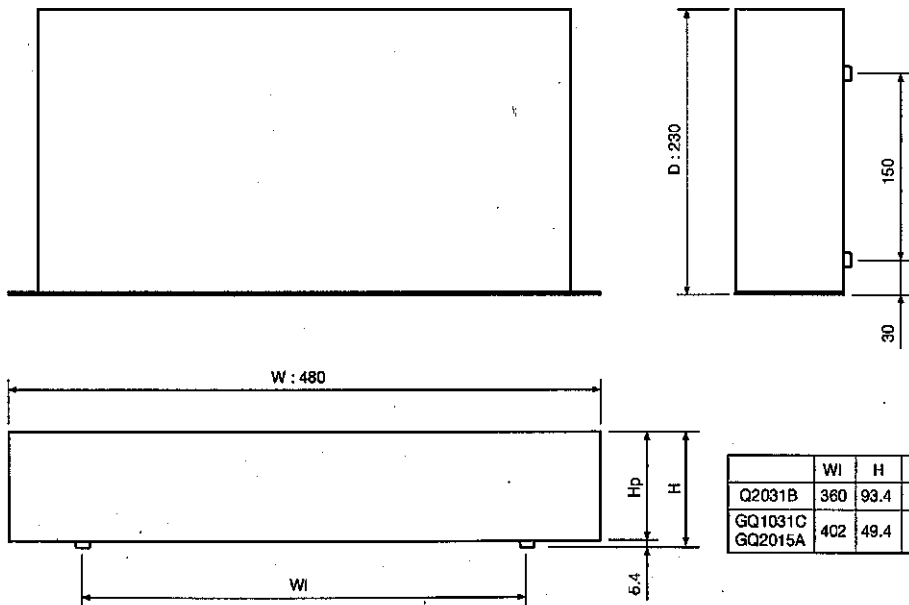
GQ2015A



GQ1031C



DIMENSIONS



Units : mm