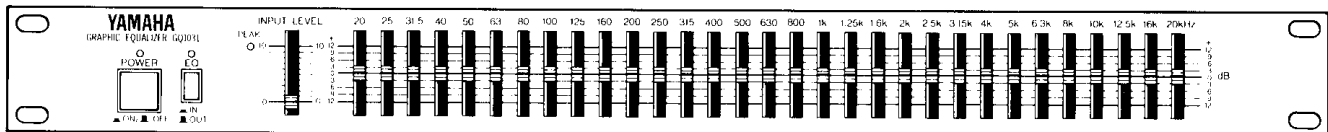


YAMAHA

31-BAND GRAPHIC EQUALIZER

GQ1031

Operation Manual



Congratulations on your purchase of a Yamaha GQ1031 31-Band Graphic Equalizer!

Your GQ1031 is a 1/3-octave graphic equalizer that will give you precise response control over virtually any audio signal for a wide variety of applications.

To ensure that your GQ1031 gives you optimum performance, be sure to read this manual thoroughly before attempting to operate the unit.

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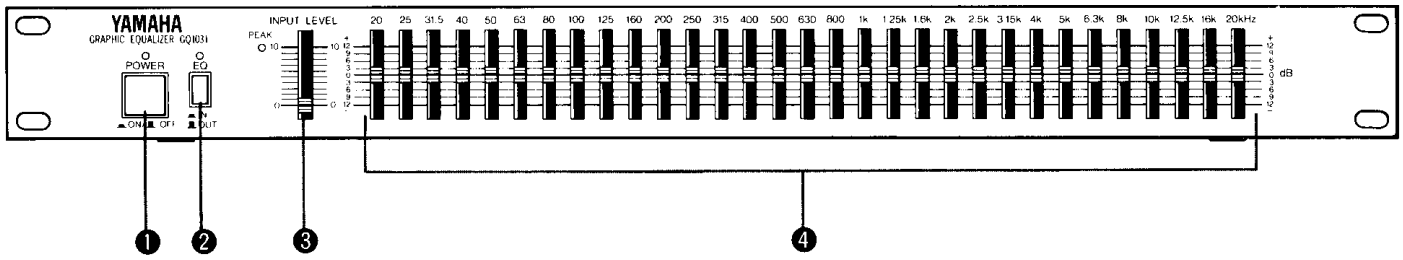
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PRECAUTIONS

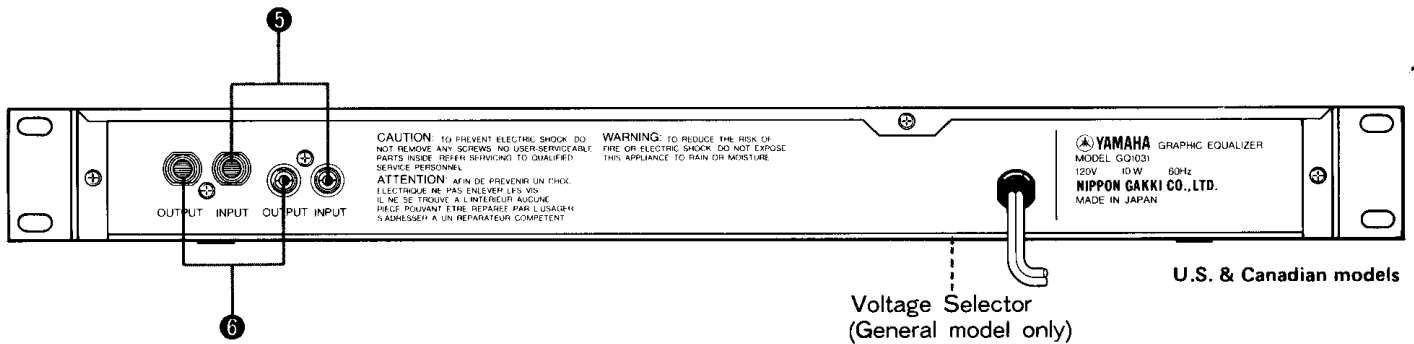
- Avoid placing the unit in locations exposed to direct sunlight or high temperatures, excessively high or low humidity, high dust concentration, or vibration.
- Be sure to connect to an AC power supply that meets the power supply specifications listed on the rear of the unit.
- If there is any danger of lightning occurring nearby, remove the power plug from the wall socket in advance.
- To avoid damaging your speakers and other playback equipment, turn off the power of all related equipment before making connections.
- Do not use excessive force in handling control switches and knobs.
- To avoid broken cords and short circuits, be sure to unplug all connectors by grasping the respective plugs—NOT the cords.
- Remove the power plug from the AC mains socket if the unit is not to be used for an extended period of time.
- Remove all plugs and connections if the unit is to be transported, to prevent damage to the cords and jacks.
- Do not use solvents such as benzene or paint thinner to clean the unit. Do not use insecticides or other pressurized spray products in proximity to the unit. Wipe off the exterior with soft cloth.
- Be sure to have the warranty card for this product filled out by the store at which it was purchased.

CONTROLS & CONNECTIONS

FRONT PANEL



REAR PANEL



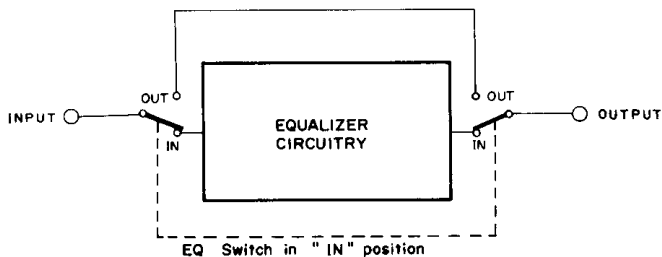
1 POWER Switch

Press this switch to turn AC power to the equalizer ON. The POWER indicator lamp located above the POWER switch will light to indicate that power is ON. Press a second time to turn power OFF.

NOTE: The GQ1031 incorporates a special power-on surge protection system which bypasses the equalizer circuitry for approximately 2 seconds after power is turned ON, even if the EQ switch is ON (see "EQ Switch" below).

2 EQ Switch

This switch determines whether the equalizer circuitry is on or bypassed—that is, whether the input signal is routed through the EQ circuitry or directly to the output, "bypassing" the equalizer circuitry.



The EQ indicator LED above the EQ switch will light when the EQ circuitry is ON. This switch is useful for comparing the equalized and unequalized signal.

3 INPUT LEVEL Control and PEAK Indicator

This control sets the sensitivity of the equalizer's input stage, permitting optimum level matching with a wide range of sources. With the INPUT LEVEL control set at maximum its position ("10" on the scale) the nominal input level of the GQ1031 is -10 dB — this produces a -10 dB output level — and the maximum input level is $+20$ dB, producing a $+20$ dB output. The INPUT LEVEL control can be used to increase or decrease the equalizer's input sensitivity, permitting input of signals that are higher or lower than the rated level. The maximum output level of the GQ1031 is $+20$ dB, however, the PEAK indicator LED lights when the equalizer's output level reaches or exceeds $+17$ dB, warning of overload distortion. Since equalizing a signal can also affect its overall level, the INPUT LEVEL control can also be used to match the levels of the equalized and bypassed (unequalized sound). With proper equalization technique, however, this should not be necessary.

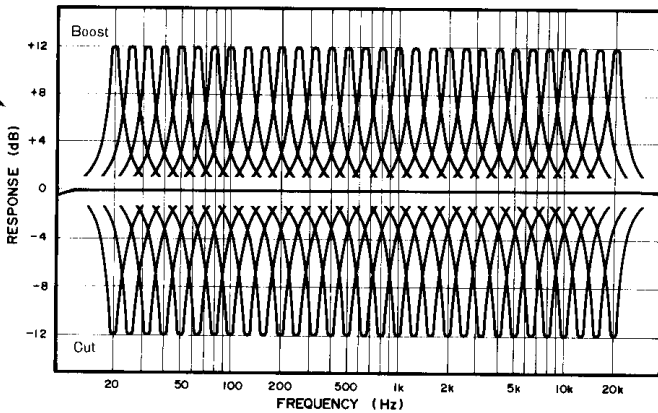
④ Equalization Controls

These are the actual equalization controls.

31 bands of equalization are provided at standard ISO 1/3-octave frequencies:

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, and 20 kHz. Each band can be boosted or cut by up to 12 dB.

“Boosting” a band by moving its control toward the “+” end of the scale increases the level of the selected frequency band, while “cutting” or “attenuating” a band by moving its control toward the “-” end of the scale decreases the level of the selected frequency band.



⑤ INPUT Connectors

Both a standard mono 1/4" phone jack and RCA pin jack are provided. These connectors are internally paralleled, and present a load impedance of 22 k-ohms to the input signal.

⑥ OUTPUT Connectors

Both a standard mono 1/4" phone jack and RCA pin jack are provided. These connectors are internally paralleled, and have a source impedance of 1 k-ohms.

APPLICATIONS

The GQ1031 offers a full 31 bands of equalization, permitting extremely fine control over the frequency response of any audio signal. This capability is particularly useful in various applications.

A few of the possibilities are as follows:

1. Room Equalization

The sound of any playback system—be it a home stereo or a huge sound reinforcement system—will vary greatly when used in different “rooms”. Of course, the “room” could be a living room, recording studio, theater, concert hall or colosseum. This is because each room has its own characteristic acoustic properties which affect the sound. Some parts of the room will reflect sounds at certain frequencies, while others will absorb specific parts of the audio spectrum in varying degrees. The result is that even though the frequency response of your playback system may be quite flat, the sound that reaches the listener’s ears may not be. A graphic equalizer like the GQ1031 can compensate for this problem, producing a flat acoustic response in any environment.

For really accurate response compensation in this type of application some measuring equipment will be necessary—a spectrum analyzer with a pink noise signal source, or sound level meter with a warble-tone signal source. If your equalization requirements are critical—as they would be in a recording studio control room—we recommend that you acquire the necessary equipment (such equipment can often be rented at a nominal charge). But for general sound reinforcement and many other situations, the equalization can be carried out by ear. The only requirement is that you have a familiar source—a record or tape—that can function as a reference. You know how your reference source should sound, and you adjust the equalizer until you achieve that sound. Listening with a pair of top-quality headphones can also be a useful guide to how the source should sound without the affects of room acoustics. This type of equalization requires some practice since you’ll need to be able to roughly evaluate response by ear.

2. Feedback Control

This is primarily a sound reinforcement application, since it is in this field that feedback problems generally occur. Feedback normally occurs when the sound from a speaker finds its way back into the amplification system via a microphone. The sound picked up by the mic is re-amplified and picked up by the mic again, causing the electro/acoustic “feedback” system to oscillate at its natural resonance frequency. A microphone too close to a stage monitor or house speaker can cause feedback, and the most effective solution is the relocate the microphone or speaker so that the feedback path is lengthened so that the signal picked up at the mic is too small to cause feedback. If relocation of the sound source and pickup does not solve the problem, however, graphic equalization can do the trick. Simply, if the gain of the system at the feedback frequency is reduced, the feedback can be stopped.

Start by applying maximum cut (attenuation) to the frequency bands at which the feedback is likely to be occurring—one band at a time. Eventually you’ll find the control that stops the feedback. Now, gradually increase the level of that band until the feedback starts again, then decrease the level to about 2 or 3 dB below the level at which the feedback stops—this is the optimum feedback control setting. You might find that feedback is occurring at two or more frequencies in a complex setup. In this case each frequency must be treated in the same way.

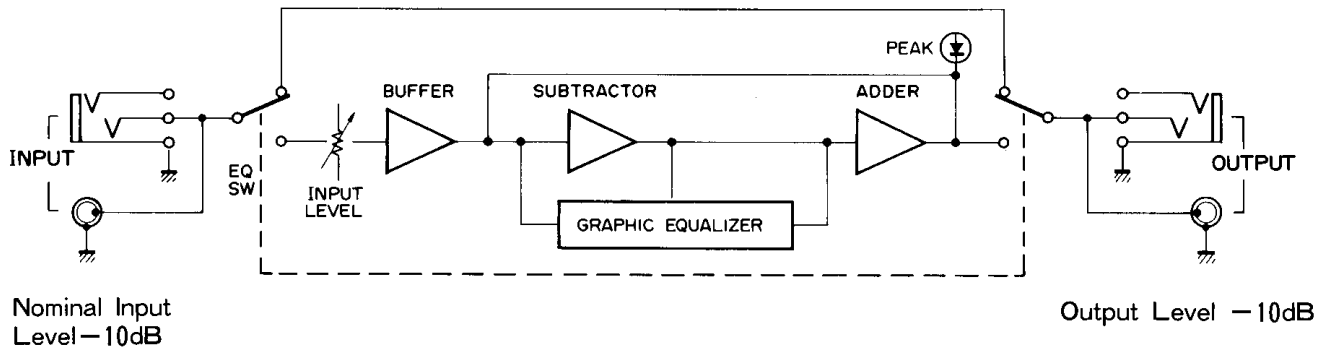
3. Sound Reinforcement Monitor Equalization

A GQ1031 inserted between the line-level feed from each monitor output of a sound reinforcement mixer and the corresponding monitor amplifiers can be useful in providing the most effective monitor sound. Particularly when a lot of amplified instruments are being used on-stage, the monitor sound can become muddy and unintelligible. The equalizer can be used to tailor the monitor response so it cuts through all the on-stage noise. A vocalist is generally able to hear him- or herself better, for example, if the response above 3 kHz and below about 500 Hz is rolled off, leaving mainly the vocal frequency spectrum. The best EQ in this application, however, is generally arrived at by trial-and-error during the pre-performance sound check.

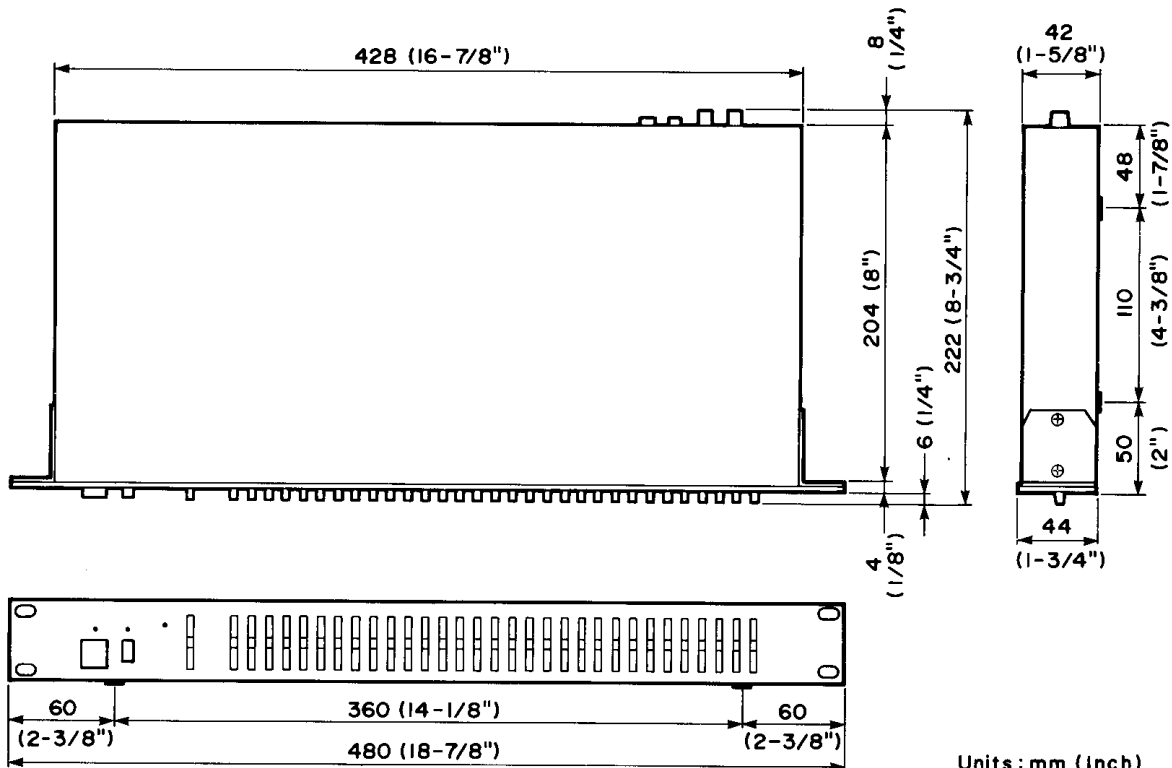
4. Creative Equalization

In this application the equalizer is actually used as a creative tool, rather than for compensation or control. The GQ1031 can be used with musical instruments to emphasize certain tonal qualities they possess, or to create a totally new sound. The graphic equalizer is extremely versatile in recording situations, as well. Some careful equalization can make the sounds of different instruments blend together more smoothly, or create a number of different tonal “moods”. If this is you’re main application, you’ll find that the ways you can use a versatile equalizer like the GQ1031 are virtually unlimited.

BLOCK DIAGRAM



DIMENSIONS



SPECIFICATIONS

FREQUENCY RESPONSE	+1dB, -1dB, 20Hz~20kHz @ -10dB (all Equalization Controls at flat)
TOTAL HARMONIC DISTORTION	Less than 0.005% @ 1kHz, 0dB (all Equalization Controls at flat)
NOISE LEVEL	Less than -100dB @ IHF-A, 0dB (all Equalization Controls at flat)
GAIN	0dB (INPUT LEVEL Control at maximum and all Equalization Controls at flat)
MAXIMUM OUTPUT LEVEL	More than 20dB @ 1kHz, 0.01% THD
INPUT IMPEDANCE	22k ohms
OUTPUT IMPEDANCE	600 ohms

EQUALIZATION CONTROL	31 band (1/3 octave)
Center Frequencies	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
Range of Boost/Cut	0 ~ +12dB / 0 ~ -12dB
PEAK INDICATOR	Turn ON when the output level reaches 3dB below 20dB clipping level.
POWER REQUIREMENTS	
U.S. & Canadian models	120V, 60Hz
General model	110-120/220-240, 50/60Hz
POWER CONSUMPTION	
U.S. & Canadian models	10W
General model	9W
DIMENSIONS (W x H x D)	480mm x 44mm x 222mm (18-7/8" x 1-3/4" x 8-3/4")
WEIGHT	2.9 kg (6.4 lbs.)

- 0dB is referenced to 0.775V RMS.
- Specifications subject to change without notice.

SERVICE

The GQ1031 are supported by Yamaha's worldwide network of factory trained and qualified dealer service personnel. In the event of a problem, contact your nearest Yamaha dealer.

SINCE 1887



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