Studiomaster by RSD

PBQ Series

Graphic Equalisers

User Guide

ENGLISH

PBQ Graphic Equalisers.

Introduction

Thank you for buying this Studiomaster product.

There are three models in the Studiomaster PBQ range of graphic equalizers.
PBQ30: dual 15 band 2/3 octave, 60mm sliders, VU meters.
PBQ31: single 31 band 1/3 octave, 60mm sliders, VU meter.
PBQ62: dual 31 band 1/3 octave, 20mm sliders.

All models feature balanced inputs and outputs, high and low pass filters and 6 and 12dB range switching. ISO preferred frequencies have been used and a fail-safe relay by-pass facility incorporated.
The PBQ graphics only use 2 rack spaces and can be used in control rooms, live PA, stage monitoring and sound installations.

Read the operator guide

Despite the sophistication behind the control panel, the PBQ range is very easy to use. To get the best from your new purchase, we recommend you read this operator guide in full before getting down to any serious work. This operator guide contains important safety information as well as practical hints on operating a live sound system.

Unpacking

Remove your Studiomaster PBQ equalizer from its packing and ensure that along with this operator guide you have an AC power cord/mains lead and a warranty card. Retain the packing carton in the eventuality that the unit needs to be returned for service or repair and please complete and return your warranty card. Returning the completed warranty card does not diminish your statutory rights in any way.

Safety instructions

1.Make sure you have the correct product for your local supply Voltage. This will be marked on the rear panel of the PBQ equalizer.
2. Only use the A.C. power cord/mains lead supplied with the product. Replace if it becomes damaged in any way.
3. Never operate without, or remove, the safety ground (earth) from the A.C. power cord/mains lead.
4. Do not attempt to remove screws or panels on your PBQ equalizer. There are no user serviceable parts inside.
5. Do not operate the unit next to heat sources such as radiators.
6. The unit should not be operated or stored near rain or moisture.
7. This equipment must not be exposed to dripping or splashing and no objects filled with liquids should be placed on top of it.
8. Write the serial number in the box provided in the Service Information section for future reference.
9. If the unit gets damaged, has been dropped or appears to have developed a fault refer to the Service Information section for details.
WARNING: THIS APPARATUS MUST BE EARTHED (GROUNDED)

Controls and features.

FRONT PANEL

BY PASS switch: Connects the input signal directly to the output, by-passing the PBQ circuitry. This can be used to compare any changes made by the equalizer to the original sound. A relay is used in this function and in the unlikely event of a problem this switch can be depressed effectively disconnecting the PBQ but allowing the audio signal to continue through and onto the amplifiers.

RANGE switch: the cut and boost of all frequencies can be changed from 6dB to 12dB. The 6dB range is generally used for making precise adjustments as when equalizing the acoustics of a room. The 12dB range doubles the cut and boost available, useful in live sound systems or when used with stage monitors.

HI-PASS filter: reduces sub-sonic or the very low frequency content of the sound source. This can be stage rumble or vibration that can damage the low frequency drivers of a sound system.
PBQ30 and PBQ62 the frequency is fixed at 40Hz.
PBQ31 is variable between 10 add 250Hz. To disable filter, turn control fully anti-clockwise.

LO-PASS filter: reduces the high frequency content of the sound source that generally cannot be heard. In a studio control room this may not be required but in a live sound application it helps control high frequency ‘peaks’ in the sound that could damage compression drivers.
PBQ30 and PBQ62 the frequency is fixed at 16kHz.
PBQ31 it is variable between 3 add 50kHz. To disable filter, turn control fully clockwise.

LEVEL control: controls the overall signal level through the equalizer. If a number of frequencies have been boosted the output level may need reducing. Likewise, when a number of frequencies are cut the output level may need increasing. The control is also useful for increasing or decreasing the system volume. Note that when the control is in the ‘0’ position the output level will also be ‘0’ (zero).

FREQUENCY sliders: will boost or cut the signal at the frequency marked.

CLIP LED: illuminates when the signal inside the equalizer gets close to the circuitry clip point resulting in distortion. If this occurs reduce the signal level using the LEVEL control.

REAR PANEL

Input and output connectors: Balanced xlr (locking) and jack socket inputs and outputs.
Un-balanced RCA phono socket inputs and outputs.
Any combination of input and output connector can be used. Example: a jack socket input and an xlr output or a phono input and a jack socket output.
A balanced TRS jack or an un-balanced TS jack plug can be used.
Note: only use one input and one output connector per channel.

GROUND LIFT switch: This disconnects the circuit ground from the A.C. ground. In an audio system where various pieces of equipment share the same ground an audible hum (hum loop) can occur. By switching to the LIFT position this loop is broken reducing or removing hum.

Applications

General sound system equalizing: connect to the output of a DJ or mixing console before the main power amplifiers. Boosting the low and high frequencies can enhance the sound.

Control room equalization: the PBQ31 or PBQ62 is ideal for this application where fine adjustments are required to add or remove parts of the sound spectrum.

PA and stage monitoring: it can be difficult in some venues getting a balanced sound due to poor room acoustics or unavoidable placement of the sound system. By controlling each frequency band the sound can be adjusted or equalized resulting in better clarity.

General hints

Avoid using extreme frequency settings as this can degrade the overall sound quality and can result in damage to the speaker system.

Use the LEVEL control and BY PASS facility to ‘match’ the graphic to your system: Once the graphic is adjusted for the desired sound, press the BY PASS switch and compare the volume level with the original sound. Depress the BY PASS switch and adjust the volume using the LEVEL control.

For live sound applications always use the HI and LO pass filters. Set the filters on the PBQ31 to approximately 30-40Hz (HI PASS), 15-16kHz (LO PASS).

Always use (if possible) balanced wiring to and from the graphic as this reduces interference in long cable runs.

Trouble Shooting

No power on LED.....
Check A.C. power cord/mains lead is connected to wall supply and switched on.
Check A.C. power cord/mains lead is fully pushed into the rear panel socket.
Check the unit is switched on.
Check the A.C. fuse (on rear panel, inside the power inlet connector). Always replace with the same type and rating.
UK only - Check fuse in the 'mains' plug

No sound.....
Check the amplifier and speaker system is connected and switched on.
Check the LEVEL control is not at the '0' (fully down) position.
Check for a signal on the meters (Not PBQ62).

Service Information
If you have a problem with your Studiomaster product or think it has developed a fault you should first carefully check the Trouble Shooting section in this guide. If this does not solve the problem or if the product is physically damaged, contact your local dealer or distributor for service details. Should it be recommended you return the product to your nearest Studiomaster Service Centre you must first contact them.

You will be asked for the product type and serial number. You will then be given a Returns Authorisation (RA) number.

Pack the unit in its original carton to protect it from shipping damage.

You must have the Return Authorisation number clearly marked on the outside of the carton or we may refuse the delivery. Studiomaster cannot be held responsible for damage resulting from the equipment being packed incorrectly.

Label the equipment clearly with your name and address and include a clear description of the fault.

Please write your Serial number here for future reference....

Specification

Frequency response +-0.5dB:	12 – 40kHz
Distortion:	0.0026%
Signal to noise ratio, ref 6dB range:	85dB
HI PASS filter	
PBQ30, PBQ62	40Hz
PBQ31	Variable 3 to 50kHz.
LO PASS filter	
PBQ30, PBQ62	16kHz
PBQ31	Variable 10 to 250Hz.
CLIP LED:	illuminates @ +16dB
Maximum input level:	+18dB
Maximum output level:	+26dB
Power requirements:	230V +-10% A.C., 50/60Hz
PBQ30	9 Watts
PBQ31	7 Watts
PBQ62	12.5 Watts
Fuse:	
PBQ30	T100mAL 250V, 20 x 5mm
PBQ31	T100mAL 250V, 20 x 5mm
PBQ62	T315mAL 250V, 20 x 5mm
Size w x h x d net:	480mm x 88mm x 220mm 18.9” x 3.5” x 8.7”
Size w x h x d shipping:	535mm x 132mm x 270mm 21.1” x 5.2” x 10.6”
Weight net/shipping:	
PBQ30	3.7kg / 4.6kg, 8.1lb/10.1lb
PBQ31	3.6kg / 4.8kg, 7.9lb/10.6lb
PBQ62	4.1kg / 5.0kg, 9lb/11lb

The manufacturer reserves the right to change features and specification without notice.

Glossary of terms

ASSIGN	To switch or route a signal to a specific signal path.
ATTENUATE	To reduce or make quieter.
AUX / AUXILIARY	An additional means of sending a signal to external equipment generally without affecting what is going on in the main mix.
BALANCE	The relative level of signals. Also refers to the left / right position in a stereo mix.
BALANCED	A 3 wire system for connecting audio which has 2 wires for the audio (HOT and COLD) and a totally separate connection for the screen. Balanced circuitry is widely used in audio equipment from inexpensive dynamic microphones to top quality studio devices. The balanced system is used as it cancels interference in the connecting cables resulting in a clearer signal.
BANDWIDTH	Bandwidth is the range of frequencies that will pass through a piece of equipment. Audio signals typically contain frequencies from 20Hz to 20kHz.
BUS	A common conductor that carries a signal, or number of signals, through a mixing console.
CLIPPING	Distortion caused by a signal exceeding the maximum level that the equipment can accommodate.
COLD	The negative phase of a signal. With a simple unbalanced two wire signal one wire is positive (HOT) and the other is negative (COLD).
COMPRESSOR	An electronic device used to control the rate that the level of a sound increases above a set threshold point. A compressor can usually also be used as a limiter to keep signal levels from overloading the input of a piece of equipment.
D.I.	Direct Injection. Often a small 'D.I. box' is used to send a signal directly from a guitar or bass into the mixer to avoid the need for a microphone to capture the sound. It also ensures a high quality signal into the mixer.
DECIBEL (dB)	A logarithmic ratio used to represent voltage or power gain. The reference to which the ratio is made is usually stated. 0dB means that the input and the output are at the same level.
DECIBEL (dBA)	A logarithmic measure of sound intensity. In this case 0dB is the lower threshold of human hearing. 100+dBA is 'loud'. Long term exposure to high level sound can ultimately cause hearing damage. Normal speech, such as in a quiet office is typically around 60dBA. 120dBA is normally quoted as the threshold of pain.
DELAY	An effect – now normally produced by digital means e.g. DDL (Digital Delay Line) or DSP (Digital Signal Processing). The effect unit 'samples' the signal and 'replays' it later. The delay time can be adjusted to give widely different effects.
DETENT	A soft 'click' in the travel of a rotary control usually indicating the centre point.
DRY	A signal which has not been processed by an effects unit.
ECHO	The effect produced when sound is reflected off hard surfaces. Often reproduced artificially using electronic equipment (see DELAY).

EFFECTS SENDS	Any outputs from a channel or console that can be connected to external equipment for extra sound processing. Usually effects sends are post fader so any level changes to the main mix also affect the signal sent for processing.
EFFECTS	Any device that alters a sound. Can be anything from a simple foot pedal to a sophisticated studio effects processor.
E.I.N.	Equivalent Input Noise. A technical specification used to measure the noise of a gain stage, usually the microphone preamplifier.
EQUALISATION (E.Q.)	Tone controls. Also in the case of analogue tape recording and vinyl records, frequency dependent gain used to correct limitations of the recording / playback process.
FADER	Volume control, often a linear or slider type volume control.
FEEDBACK	The deafening squealing sound produced when a microphone picks up its own amplified sound from a loudspeaker.
F.O.H.	Front Of House. The speaker system which is used to project the sound from the stage to the audience. It is also used to describe the position in the venue, where the main mixing console is situated.
FLAT (E.Q.)	When the signal has not been adjusted using the equaliser (e.q.) controls.
FOLDBACK	Sound which is sent from the main mixing position back to the stage so that performers can hear it. Often with a large sound system a totally separate foldback (or monitor) system with a dedicated console is located on one side of the stage so the performers can communicate easily with the operator.
GRAPHIC	Graphic equaliser. An equaliser that uses a row of slider controls to adjust the sound. Each of the sliders will adjust one part of the frequency spectrum giving a visual display of which areas have been cut or boosted.
GROUND	Earth.
HIGH PASS FILTER (HPF)	A filter that cuts only the sound below a pre-determined frequency. Usually used where the only contribution that sound below that point will make is rumble or hum.
HOT	The positive phase of a signal. With a simple unbalanced two wire signal one wire is positive (HOT) and the other is negative (COLD). Also a ‘hot’ signal is a term used to indicate a signal with an unusually large level.
HERTZ (Hz)	A measurement of frequency. 1Hz =1 cycle per second.
HEADROOM	The amount of level (above the nominal operating level) that the equipment can accommodate before distortion occurs.
IMPEDANCE	Similar to resistance, but includes the effect of circuit capacitance and inductance which affects A.C. signals like audio.
INSERT	A point in the signal chain where external equipment can be attached or ‘inserted’. A basic send/return on a single socket uses a cable with a three-pole (stereo) TRS jack split off to a pair of two-pole (mono) TS jacks, often called a Y-cable (see Appendix for wiring details).A signal can be sent to the input of a processor and returned to the channel before it is routed to the main mix. Processors connected to insert points tend to be ‘serial’ devices such as graphic equalisers or compressors.

JACK PLUG (SOCKET)	Probably the most widely used connector for audio signals (see TS and TRS). ¼" (6.35mm) jacks are used for 'professional' applications, 3.5mm and 2.5mm jacks are often found on 'consumer' equipment.
KILOHERTZ (kHz)	A measurement of frequency. 1Hz = 1cycle per second, 1kHz = 1000Hz
LEVEL	The size or 'amplitude' of a signal, at any given point, in an audio system.
LIMITER	A device used to prevent the signal level exceeding a set threshold. Most compressors can do this when their 'ratio' control is set to infinity (maximum). Good quality amplifiers often incorporate internal limiters to prevent excessive distortion (clipping) caused if they are overdriven.
LINE LEVEL	A standard reference level (voltage) used to simplify the interconnection of equipment. Typically semi pro equipment is –10dBV (100mV) whilst pro equipment is +4dBu (1.23V) and often balanced. Line level can be anything from 100mV to 4V (-15dBu to +15dBu).
MIDI	Musical Instrument Digital Interface. An industry standard which allows suitably equipped instruments and equipment to communicate with each other. Often used to play a sound module from a separate keyboard or sequencer.
MIC LEVEL	The very small output level of a microphone, typically around 1-30 millivolts (mV). A millivolt is 1/1000 of a volt.
MIC PREAMP	A very high quality 'pre-amplifier' that increases the tiny voltage from a microphone up to the internal operating level of the mixer.
MONO	Single channel sound source reproduction (short for monaural, meaning 'one ear').
MONITOR	Either the ability to hear signals within a console or the speakers used by performers to hear on-stage.
NOISE	Any sound you didn't want. Usually refers to the 'hiss' produced by high gain settings or poor quality equipment.
OHM ?	A unit of electrical resistance. 1000ohms = 1k ohm (or 1000? = 1k?)
PAN	The PAN control is used to set the Left / Right balance of a sound in stereo mix. Derived from the film industry term (panorama) where a camera would swing round to follow the action and the sound recordist had to pan the sound to follow the camera.
PARAMETRIC	A type of equalisation where the frequency and range (the 'Q factor') of the control is variable in addition to the cut and boost.
PFL	Pre Fade Listen. A function which allows the operator to monitor (usually on headphones and on meters) a signal even when the channel output fader is at its minimum level position.
PHANTOM POWER	Some types of microphone, known as condenser or capacitor microphones, need external power to operate. Although some use a battery, the majority draw this power from the mixing console to which they are connected. A switchable +48V supply is provided by Studiomaster consoles which covers all types of condenser mics. DO NOT use phantom power when working with unbalanced

	microphones or any other unbalanced equipment plugged into the XLR sockets. If in doubt check with the microphone manufacturer.
PHONES	Headphones (also known as 'cans').
PHONO (RCA JACK)	A simple, unbalanced two-pole connector used for connecting hi-fi and other line level equipment including some multitrack recorders.
POST FADE	Signal taken after (post) the fader.
PRE FADE	Signal taken before (pre) the fader.
REVERB	Reverberation. A series of very closely spaced echoes which continue after the original sound has finished. Probably the most widely used effect in modern recorded music. Clap your hands in a room and listen to the way the sound fades away; that is reverberation. Reverb as an effect is generally produced by electronic devices. Churches and concert halls are often specifically designed to be highly reverberant to enhance the type of music usually performed there.
REGEN	Regeneration. The control used to increase the amount of artificial echo that continues after a sound has finished.
RETURN	The connectors and controls used to bring a signal which has been processed externally back into the mixer.
SEND	The connectors and controls used to send a signal, to be used externally, out of the mixer.
SIGNAL TO NOISE	The ratio used to describe the relationship between the level of a signal and the background noise that accompanies it.
SHELVING	The characteristic of a type of equalisation where all frequencies above (or below) the quoted figure are unaffected.
STEREO	Two channel sound reproduction where the two signals are sent to separate left and right speaker systems.
SWEEP EQ	An EQ system which allows the centre frequency of the cut and boost control to be adjusted over a wide range to achieve the most effective result.
TRS	Tip, Ring, Sleeve, ¼" three pole jack plug. Often referred to as a stereo jack plug. Used for balanced line signals, insert (send / return) points and stereo headphones.
TS	Tip, Sleeve, ¼" two pole jack plug. Often referred to as a mono jack. Used for unbalanced signals.
UNBALANCED	Two wire connection protocol using one signal and one screen conductor.
WET	A signal which has been processed using an effects processor.
XLR	Extra Low Resistance connector - a three pin connector widely used for balanced microphones. They are also used for line level balanced signals and are sometimes used for high power amplifier speaker outputs. 4, 5, and 6 pin XLRs also exist for specialist applications.