



EQ-27

OPERATING GUIDE

WARNING:
TO PREVENT ELECTRICAL SHOCK OR FIRE HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE. BEFORE USING THIS APPLIANCE, READ BACK COVER FOR FURTHER WARNINGS.

GENERAL DESCRIPTION

The Peavey EQ-27 is a 27-band equalizer with the band centers spaced 1/3 octave apart throughout the audio range. Each of the 27 filters has been designed using the latest computer-assisted design techniques and constructed of precision components to yield outstanding performance without the use of trimmers or other internal adjustments that often cause problems under rugged field conditions. Each of the 27 bands features a separate slider with center detent and a rugged metal actuator instead of the more common plastic shaft. The selected frequencies conform to ISO standards, thereby making this equalizer fully compatible with most professional real time analyzers and other associated response analyzing equipment. This equalizer is impedance and level compatible with most commercial, sound reinforcement, industrial and consumer type equipment. The inputs include both balanced XLR and balanced 1/4" phone jacks. All outputs have a source impedance of 600 ohms or less and a full transformer balanced output is available. All outputs and inputs have transient, over-voltage, and short-circuit protection for maximum field reliability. The rugged state-of-the-art voltage regulator circuitry will provide a stable power source even under extreme power (mains) voltage variations, as well as provide transient-free power up and power down conditions. The EQ-27's circuitry provides for an extremely wide range of input signal levels. The level control allows +/- 15 dB of gain to readjust average signal levels which usually have changed due to the equalization process. A bypass switch allows the equalizer to be removed from the circuit. Because of the high level transformer balanced output circuitry, this unit has the capability of providing greater than +16 dBm into 600 ohms at the XLR balanced output connector.

The EQ-27 is housed within a rugged steel chassis with a massive die-cast bezel and integral cast handles to provide a functional as well as a durable package to withstand the rigors of continuous commercial use.

The extreme flexibility afforded by the EQ-27's inputs and outputs and its overall compatibility with an extremely wide range of signal and impedance levels, coupled with its exceptional performance make up a unit that is hard to beat on today's market.

INSTALLATION AND ADJUSTMENT

The EQ-27 is designed to be mounted in a standard rack space (5 1/4" x 19") and its mounting holes are placed in accordance with accepted 19" rack standards. The unit must be secured by the use of four mounting screws to the rack frame for optimum mechanical stability. The EQ-27 does not contain components that generate appreciable heat and is not adversely affected by externally generated fields from power transformers since the EQ-27 is fully contained within a metal enclosure. For maximum reliability and useful service life, the unit should not be subjected to excessive heat such as being mounted directly over a high power vacuum tube power amp or other high operating temperature equipment. Heat developed by this type of equipment could degrade performance and shorten component lifetime. Neither should this unit be exposed to the elements or be utilized in a system where it may be exposed to liquids spilled into the slider openings.

NOTE

ALL SIGNAL CONNECTIONS MADE TO THE GRAPHIC EQUALIZER MUST BE MADE USING SHIELDED CABLES.

The graphic equalizer has electronically balanced XLR and 1/4" phone inputs. In most professional applications, the XLR input should be used as a matter of installation convenience and a means of correctly terminating professional equipment. If the XLR connectors are not available at the mixer, either of the parallel 1/4" phone jack inputs (approximately 20K ohms) can be used. To achieve a balanced input using the 1/4" phone jack, a stereo plug (ring, tip and sleeve) must be used. If a standard phone plug (tip and sleeve) is used, the input automatically converts to an unbalanced configuration. Most modern electronic equipment has outputs that are characterized as having a very low output impedance. This impedance is typically 600 ohms or less. This means that connecting cables may be quite long without any noticeable loss in signal quality. If, however, you have a hum or radio frequency (R.F.) problem after using the unbalanced 1/4" jack system, it may be necessary to use the balanced configuration using the stereo plug. Generally, a completely balanced system is superior.

The graphic equalizer outputs are low impedance (600 ohms or less) and are capable of driving low impedance loads to 16 dBm or greater. A transformer balanced output is provided from a standard XLR male type connector. This type of output allows the use of very long cables in critical commercial sound reinforcement applications. Several hundred feet of twisted pair cable can be used with very little signal degradation or hum and noise pickup.

In a recording studio or home stereo application, there is little need to use a completely balanced output system. The two parallel 1/4" phone jacks are provided for these applications. There is no requirement to terminate any output from the graphic equalizer.

A potential ground loop problem could be encountered in interfacing the equalizer in sound reinforcement applications. This note of caution exists for all equipment used in this type of application. Whenever you feed a stereo or split monaural signal to stage right and stage left, it is possible to create a ground loop between the mixing console and the power amplifiers located at the stage or between the power amps themselves. If a 60 Hz hum results when the equalizer is connected in this configuration, the best cure is to eliminate the ground loop by taking your A.C. feed for the console, equalizer and power amps from the same point. If at all possible, run an A.C. feed for the console and all associated equipment from the stage power amplifier feed point. Also, feed both power amplifiers from the same box.

CAUTION

DO NOT REMOVE THE THIRD WIRE GROUND PIN FROM YOUR A.C. LINE CORDS. THIS IS NOT A SAFE FIX FOR A.C. GROUND LOOPS. IF NECESSARY, USE A SUITABLE PLUG ADAPTOR AND GROUND THE GREEN WIRE.

In all cases, total hum and noise elimination is only possible if a completely balanced system is employed at each end of the distribution system.

OPERATION

Operation of the EQ-27 is more or less straightforward and should present no major difficulty to the user. Generally, one should set up the various components in the audio chain and adjust the inputs and outputs of these devices to provide proper matching of impedances and levels. During the initial setup, the EQ-27 should be connected into the system with the individual filter sliders in the center (detent) position. Once the mixers, power amps, etc., are plugged in and the EQ-27's gain control is set to unity gain, the equalizer filters can be activated by moving the "IN/OUT" switch from the bypass position to the in position. ALL EQUALIZATION SHOULD START WITH THE SLIDERS IN THE +0 CENTER OR DETENTE POSITION.

The proper settings of the EQ-27 may be arrived at in several different ways, with the most preferable being through the use of a properly designed and utilized real time frequency response analyzer. Most real time analyzers utilize standard ISO frequency centers as does the EQ-27 and will generally provide the most accurate settings. The individual sliders controlling the 27 filters should be set to produce the desired response on the scale of the real time analyzer. Should a real time analyzer and noise generator not be available, the EQ-27 may be set experimentally by first matching the gains between the various elements of the system and adjusting each of the 27 frequencies until the proper balance is found that will allow maximum gain before acoustic feedback or to correct deficiencies in the room/speaker systems. Again, all adjustments should be begun from the center or detent position. As the equalization process continues, relative loudness levels can be restored using the level control.

It is always wise to avoid excessive cutting of large segments of the audio passband since this tends to reduce the overall dynamic range of the system. Also, it is better to raise the input level control slightly rather than use a majority of the equalizer sliders in the boost position since a better signal-to-noise ratio will result.

NOTE

IF YOU ARE USING THE EQUALIZER IN AN APPLICATION WITH MARGINAL HEADROOM (INADEQUATE POWER CAPABILITY), IT IS QUITE POSSIBLE THAT YOU WILL FORCE YOUR POWER AMPLIFIER INTO CLIPPING WHEN LARGE AMOUNTS OF EQUALIZATION ARE USED. PLEASE REMEMBER THAT 15 dB OF BOOST IS EQUIVALENT TO MULTIPLYING A VOLTAGE BY A FACTOR OF 5.62 OR A POWER BY A FACTOR OF 31.62. AS AN EXAMPLE, IF YOU ARE USING A POWER AMPLIFIER THAT IS DELIVERING 100 WATTS AT A FREQUENCY OF 120 Hz AND YOU BOOST THAT FREQUENCY 15 dB, THE POWER AMPLIFIER WILL BE CALLED UPON TO DELIVER A POWER OUTPUT OF OVER 3,100 WATTS!

SPECIAL NOTE: There is no "cookbook" method that will be totally satisfactory in the adjustment of the EQ-27 to correct room and/or system response deficiencies. As with any reasonably sophisticated device, a good understanding and some degree of experience and experimentation are necessary to achieve the proper results. Extreme caution should be used in overboosting or overcutting any range segment of the overall audio range since this can lead to many problems with signal-to-noise ratio, headroom, etc..

DANGER	
EXPOSURE TO EXTREMELY HIGH NOISE LEVELS MAY CAUSE A PERMANENT HEARING LOSS. INDIVIDUALS VARY CONSIDERABLY IN SUSCEPTIBILITY TO NOISE INDUCED HEARING LOSS, BUT NEARLY EVERYONE WILL LOSE SOME HEARING IF EXPOSED TO SUFFICIENTLY INTENSE NOISE FOR A SUFFICIENT TIME.	
THE U.S. GOVERNMENT'S OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) HAS SPECIFIED THE FOLLOWING PERMISSIBLE NOISE LEVEL EXPOSURES:	
DURATION PER DAY IN HOURS	SOUND LEVEL dBA, SLOW RESPONSE
8	90
6	92
4	95
3	97
2	100
1 1/2	102
1	105
3/4	110
1/2	115

ACCORDING TO OSHA, ANY EXPOSURE IN EXCESS OF THE ABOVE PERMISSIBLE LIMITS COULD RESULT IN SOME HEARING LOSS.

EAR PLUGS OR PROTECTORS IN THE EAR CANALS OR OVER THE EARS MUST BE WORN WHEN OPERATING THIS AMPLIFICATION SYSTEM IN ORDER TO PREVENT A PERMANENT HEARING LOSS IF EXPOSURE IS IN EXCESS OF THE LIMITS AS SET FORTH ABOVE. TO INSURE AGAINST POTENTIAL, Y DANGEROUS EXPOSURE TO HIGH SOUND PRESSURE LEVELS IT IS RECOMMENDED THAT ALL PERSONS EXPOSED TO EQUIPMENT CAPABLE OF PRODUCING HIGH SOUND PRESSURE LEVELS SUCH AS THIS AMPLIFICATION SYSTEM BE PROTECTED BY HEARING PROTECTORS WHILE THIS UNIT IS IN OPERATION.

CAUTION

THIS GRAPHIC EQUALIZER HAS BEEN DESIGNED AND CONSTRUCTED TO PROVIDE ADEQUATE POWER RESERVE FOR PLAYING MODERN MUSIC WHICH MAY REQUIRE OCCASIONAL PEAK POWER TO HANDLE OCCASIONAL PEAK POWER. ADEQUATE POWER "HEADROOM" HAS BEEN DESIGNED INTO THIS SYSTEM. EXTENDED OPERATION AT ABSOLUTE MAXIMUM POWER LEVELS IS NOT RECOMMENDED SINCE THIS COULD DAMAGE THE ASSOCIATED LOUDSPEAKER SYSTEM. PLEASE BE AWARE THAT MAXIMUM POWER CAN BE OBTAINED WITH VERY LOW SETTINGS OF THE GAIN CONTROLS IF THE INPUT SIGNAL IS VERY STRONG.

1. Read all safety and operating instructions before using this product.
2. All safety and operating instructions should be retained for future reference.
3. Obey all cautions in the operating instructions and on the back of the unit.
4. All operating instructions should be followed.
5. This product should not be used near water, i.e. a bathtub, sink, swimming pool, wet basement, etc.
6. This product should be located so that its position does not interfere with its proper ventilation. It should not be placed flat against a wall or placed in a built-in enclosure that will impede the flow of cooling air.
7. This product should not be placed near a source of heat such as a stove, heater, radiator or another heat producing amplifier.
8. Connect only to a power supply of the type marked on the unit adjacent to the power supply cord.
9. Never break off the ground pin on the power supply cord. For more information on grounding write for our free booklet "Shock Hazard and Grounding."
10. Power supply cords should always be handled carefully. Never walk or place equipment on power supply cords. Periodically check cords for cuts or signs of stress, especially at the plug and the point where the cord exits the unit.
11. The power supply cord should be unplugged when the unit is to be unused for long periods of time.
12. Metal parts can be cleaned with a damp rag. The vinyl covering used on some units can be cleaned with a damp rag, or an ammonia based household cleaner if necessary.
13. Care should be taken so that objects do not fall and liquids are not spilled into the unit through the ventilation holes or any other openings.
14. This unit should be checked by a qualified service technician if:
 - A. The power supply cord or plug has been damaged.
 - B. Anything has fallen or been spilled into the unit.
 - C. The unit does not operate correctly.
 - D. The unit has been dropped or the enclosure damaged.
15. The user should not attempt to service this equipment. All service work should be done by a qualified service technician.

SPECS:

GAIN:

Balanced or unbalanced input to balanced or unbalanced output.

EQ IN: +15 dB, unity gain at 0 dB level setting

EQ OUT: Unity gain, unaffected by level control

INPUT IMPEDANCE:

20K ohms unbalanced at phone jack

30K ohms balanced at XLR connector

INPUT DYNAMIC RANGE:

18 volts RMS, +25 dBv maximum

OUTPUT SOURCE IMPEDANCE:

100 ohms unbalanced

600 ohms balanced

OUTPUT LEVEL:

7 volts RMS into 10K ohms, +17 dBv

5 volts RMS into 600 ohms, +16 dBm

EQUALIZATION:

+12 dB at 40 Hz, 50 Hz, 63 Hz, 80 Hz, 100 Hz, 125 Hz, 160 Hz, 200 Hz, 250 Hz, 315 Hz, 400 Hz, 500 Hz, 630 Hz, 800 Hz, 1 KHz, 1.25 KHz, 1.6 KHz, 2 KHz, 2.5 KHz, 3.15 KHz, 4 KHz, 5 KHz, 6.3 KHz, 8 KHz, 10 KHz, 12.5 KHz, and 16 KHz

THE FOLLOWING SPECIFICATIONS MEASURED AT 1 VOLT RMS, EQ IN, ALL CONTROLS FLAT:

FREQUENCY RESPONSE:

+1 dB, 20 Hz — 30 KHz

TOTAL HARMONIC DISTORTION:

Less than .008%, 20 Hz — 20 KHz at unbalanced output, typically less than .005% at 1 KHz

Less than .05%, 20 Hz — 20 KHz at balanced output, typically less than .005% at 1 KHz

HUM AND NOISE:

Greater than 90 dB below 1 volt RMS output, at either output, 20 Hz — 20 KHz, unweighted, input unterminated, typically 95 dB below 1 volt RMS



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711 A Street / Meridian, MS 39301 / U.S.A.

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Printed in U.S.A.

80361050 7/82

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