



SR Series Equalizers

Owner's Manual

- **SR 23 I QX**
- **SR 430 QX**
- **SR 43 I QX**
- **SR 830 QX**
- **SR 83 I QX**

H A Harman International Company



These symbols are internationally accepted symbols that warn of potential hazards with electrical products. The lightning flash means that there are dangerous voltages present within the unit. The exclamation point indicates that it is necessary for the user to refer to the owners manual.

These symbols warn that there are no user serviceable parts inside the unit. Do not open the unit. Do not attempt to service the unit yourself. Refer all servicing to qualified personnel. Opening the chassis for any reason will void the manufacturer's warranty. Do not get the unit wet. If liquid is spilled on the unit, shut it off immediately and take it to a dealer for service. Disconnect the unit during storms to prevent damage.

U.K. Mains Plug Warning

A molded mains plug that has been cut off from the cord is unsafe. Discard the mains plug at a suitable facility. **Never under any circumstances should you insert a damaged or cut mains plug into a 13 amp power socket.** Do not use the mains plug without the fuse cover in place. Replacement fuse covers can be obtained from your local retailer. Replacement fuses are 13 amps and **MUST** be ASTA approved to BS1362.

Safety Instructions

Notice for customers if your unit is equipped with a power cord.

Warning: This appliance must be earthed.

The cores in the mains lead are colored in accordance with the following code:

Green and Yellow - Earth Blue - Neutral Brown - Live

As colors of the cores in the mains lead of this appliance may not correspond with the colored markings identifying the terminals in your plug, proceed as follows:

- The core which is colored green and yellow must be connected to the terminal in the plug marked with the letter E, or with the earth symbol, or colored green, or green and yellow.
- The core which is colored blue must be connected to the terminal marked N, or colored black.
- The core which is colored brown must be connected to the terminal marked L, or colored red.

This equipment may require the use of a different line cord, attachment plug, or both, depending on the available power source at installation. If the attachment plug needs to be changed, refer servicing to qualified service personnel who should refer to the table below. The green/yellow wire shall be connected directly to the unit's chassis.

CONDUCTOR		WIRE COLOR	
		Normal	Alt
L	LIVE	BROWN	BLACK
N	NEUTRAL	BLUE	WHITE
E	EARTH GND	GREEN/YEL	GREEN

Warning: If the ground plug is defeated, certain fault conditions in the unit or in the system to which it is connected can result in full line voltage between chassis and earth ground. Severe injury or death can then result if the chassis and earth ground are touched simultaneously.

Warning

For your protection, please read the following:

Water and Moisture: Appliances should not be used near water (e.g. near a bathtub, washbowl, kitchen sink, laundry tub, in a wet basement, or near a swimming pool, etc.) Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings.

Power Sources: The appliance should be connected to a power supply only of the type described in the operating instructions or as marked on the appliance.

Grounding or Polarization: Precautions should be taken so that the grounding or polarization means of an appliance is not defeated.

Power Cord Protection: Power supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the appliance.

Servicing: To reduce the risk of fire or electrical shock, the user should not attempt to service the appliance beyond that described in the operating instructions. All other servicing should be referred to qualified service personnel.

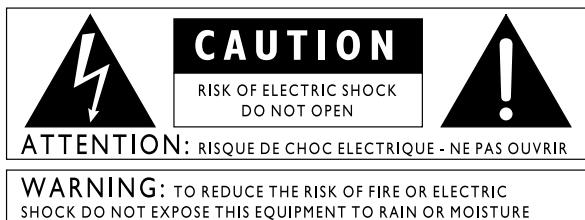
For units equipped with externally accessible fuse receptacle: Replace fuse with same type and rating only.

Electromagnetic Compatibility

Operation is subject to the following conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.
- Use only shielded interconnecting cables.
- Operation of this unit within significant electromagnetic fields should be avoided.

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The symbols shown above are internationally accepted symbols that warn of potential hazards with electrical products. The lightning flash with arrowpoint in an equilateral triangle means that there are dangerous voltages present within the unit. The exclamation point in an equilateral triangle indicates that it is necessary for the user to refer to the owner's manual.

These symbols warn that there are no user serviceable parts inside the unit. Do not open the unit. Do not attempt to service the unit yourself. Refer all servicing to qualified personnel. Opening the chassis for any reason will void the manufacturer's warranty. Do not get the unit wet. If liquid is spilled on the unit, shut it off immediately and take it to a dealer for service. Disconnect the unit during storms to prevent damage.

U.K. MAINS PLUG WARNING

A molded mains plug that has been cut off from the cord is unsafe. Discard the mains plug at a suitable disposal facility. **NEVER UNDER ANY CIRCUMSTANCES SHOULD YOU INSERT A DAMAGED OR CUT MAINS PLUG INTO A 13 AMP POWER SOCKET.** Do not use the mains plug without the fuse cover in place. Replacement fuse covers can be obtained from your local retailer. Replacement fuses are 13 amps and **MUST** be ASTA approved to BS1362.

Safety Instructions (European)

Notice For Customers If Your Unit Is Equipped With A Power Cord.

WARNING: THIS APPLIANCE MUST BE EARTHED.

The cores in the mains lead are colored in accordance with the following code:

GREEN and YELLOW - Earth BLUE - Neutral BROWN - Live

As colors of the cores in the mains lead of this appliance may not correspond with the colored markings identifying the terminals in your plug, proceed as follows:

- The core which is colored green and yellow must be connected to the terminal in the plug marked with the letter E, or with the earth symbol, or colored green, or green and yellow.

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- The core which is colored blue must be connected to the terminal marked N or colored black.
- The core which is colored brown must be connected to the terminal marked L or colored red.

These units comply with the European "EMC Directive" for emissions and susceptibility.

The power cord is terminated in a CEE7/7 plug (Continental Europe). The green/yellow wire is connected directly to the unit's chassis. If you need to change the plug, and if you are qualified to do so, refer to the table below.

CONDUCTOR		WIRE COLOR	
		Normal	Alt
L	LIVE	BROWN	BLACK
N	NEUTRAL	BLUE	WHITE
E	EARTH GND	GREEN/YEL	GREEN

WARNING: If the ground is defeated, certain fault conditions in the unit or in the system to which it is connected can result in full line voltage between chassis and earth ground. Severe injury or death can then result if the chassis and earth ground are touched simultaneously.

IMPORTANT! FOR YOUR PROTECTION, PLEASE READ THE FOLLOWING:

Water and Moisture:Appliance should not be used near water (e.g. near a bathtub, washbowl, kitchen sink, laundry tub, in a wet basement, or near a swimming pool, etc). Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings.

POWER SOURCES:The appliance should be connected to a power supply only of the type described in the operating instructions or as marked on the appliance.

GROUNDING OR POLARIZATION:Precautions should be taken so that the grounding or polarization means of an appliance is not defeated.

POWER CORD PROTECTION:Power supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the appliance.

SERVICING:The user should not attempt to service the appliance beyond that described in the operating instructions. All other servicing should be referred to qualified service personnel.

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INTRODUCTION

Congratulations, and thank you for your purchase of DOD equalization components. DOD equalizers are versatile, cost-effective equalization tools for the musician, performer, studio engineer, and sound contractor. Each equalizer allows the user to see a graphic representation of the equalization applied to the audio spectrum, and offers the flexibility to provide solutions to many EQ problems. The units offer up to 12 dB of cut or boost per band with a switchable low cut filter for each channel. Electronic switching of these functions minimizes switching transients (loud pops or clicks when the switch is depressed), and up to ± 12 dB of level control is available to compensate for gain changes due to equalization. This feature makes A/B comparisons of the equalized signal to the original signal quick and easy. Connection to the equalizer may be either balanced with an XLR connector or with optional unbalanced 1/4" phone plug making the units readily interfaceable to any system. Dual channel units may be used as a stereo equalizer or as two independent equalizers. The units offer either 1/3rd octave or 2/3rds octave resolution, depending on the unit chosen. All DOD equalizers are solidly built with steel chassis and CSA standard circuit boards for years of reliable service.

WHY A 1/3RD OCTAVE OR A 2/3RD OCTAVE EQUALIZER?

Most graphic equalizers divide up the audio frequency range into 1/3rd octave or 2/3rds octave pieces. One octave covers a 2-to-1 range of frequencies. For example, the frequency range from 50 to 100 Hertz is one octave. The audio frequency range covers 10 octaves from 20 Hz to 20 kilo (thousand) Hz. If each of the ten octaves is divided into thirds, you get 30 pieces, or bands, of frequency. (The 31 bands on DOD equalizers result from including both 20 Hz and 20 kHz bands on the ends of the audio frequency range). A 1/3 octave equalizer means that 3 bands span 1 octave, while a 2/3 octave equalizer means that 3 bands span 2 octaves. Therefore, one band on a 2/3 octave equalizer is twice as wide as one band on a 1/3 octave equalizer. So, boosting or cutting any band will affect a wider range of frequencies on the 2/3 octave equalizer.

A 1/3rd octave equalizer is the most precise because you're working with a narrower frequency range per band or slider on the equalizer. To cover the entire audio range, you need 31 bands or sliders, which normally take up the entire width of a rack panel, and take some time to adjust properly. A high-resolution real time audio spectrum analyzer (such as DOD's SR Series RTA) is a very useful tool when setting up a 1/3rd octave graphic equalizer to compensate for poor room acoustics, poor speaker response, or the deficiencies of an audio system.

While the 2/3rds octave is not as precise as a 1/3rd, it takes far less time to equalize a signal with this unit, and allows more channels of EQ to be reached. The 2/3rds octave EQ allows you to quickly and easily modify a sound for use in music, recording, or sound reinforcement.

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DOD graphic equalizers offer both 1/3rd and 2/3rds octave models in stereo and 1/3 octave models in mono to meet any need.

INSTALLATION

Install the equalizer in a rack with the provided rack screws. Route the AC power cord to a convenient power outlet away from audio lines. The unit may be turned on and off using the front panel power switch. Since the units draw a relatively small amount of current during idle, they can be left on continuously.

DOD equalizers generate very little heat during operation and thus do not need to be specially ventilated or cooled. The units should not, however, be subjected to high temperatures for extended periods. Although the unit's chassis is shielded against radio frequency and electromagnetic interference, extremely high RF and EMI fields should be avoided.

The XLR inputs and outputs are for balanced connections. Only the 1/4" phone plug inputs and outputs can be used for unbalanced connections. Use only one input/output connector pair at a time. Using more than one input/output connector pair at a time can unbalance balanced lines, cause phase cancellation, short a conductor to ground, or cause damage to other equipment connected to the equalizer.

FOR BALANCED 1/4 " TRS PHONE PLUG CONNECTION - Wire the connectors as follows:

Phone Plug	Connection
tip	: high
ring	: low
sleeve	: ground

FOR 1/4" MONO PHONE PLUG CONNECTION:

Phone plug	Connection
tip	: high
sleeve	: ground

XLR CONNECTORS - XLR type connectors are wired as follows:

XLR Connector	Balanced Connection	Unbalanced Connection
pin 1:	ground	ground
pin 2:	high	high or hot
pin 3:	low	ground

Once the graphic equalizer has been installed and adjusted for the required equalization and level, an optional security panel can be installed to keep unauthorized persons from changing settings.

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APPLICATIONS

DOD graphic equalizers can be used wherever modification of the frequency contour of a sound or sound system is needed. A graphic equalizer offers a solution to many common sound problems, both large and small. Also, creative experimentation on the part of the user can produce some nice results.

SOUND REINFORCEMENT APPLICATIONS

By routing the signal from the mixer to the SR Equalizer, and then to the main power amplifiers (or crossover), the overall frequency of the mix can be altered to do a number of things.

A. Using a real time audio spectrum analyzer (such as DOD's SR Series RTA), a calibrated microphone, and a pink noise generator, the audio system can be tuned to make the overall audio spectrum response of the sound system and the room environment equal in frequency response.

B. Greater gain-before-feedback characteristics can be achieved by turning up the sound system to the feedback point and attenuating the oscillating (ringing) frequency. 1/3rd octave resolution is best for this application. Turn the system up to feedback again and attenuate the second oscillating frequency. Repeat the process again for the third oscillating frequency.

C. Protection of amplifiers and speakers can be accomplished using the LOW CUT feature of the equalizer. Wind noise or sub sonic frequencies can cause damage to the amps and/or speakers. However, by rolling off the extreme low frequencies, a measure of protection is added to the system without severely affecting the overall sound quality.

D. In noisy environments, the audio signal can be tailored for better intelligibility and penetration. This is particularly useful for paging systems.

E. Creative use of the equalizer allows shaping of the signal for a more pleasing sound or for special effects. The only limits are those of taste and imagination.

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MUSICAL INSTRUMENT APPLICATIONS

A. Putting an equalizer in line with a musical instrument allows you to modify the sound of the instrument. You can brighten the sound, add body to a thin sounding instrument, or you can give the sound a totally different character.

B. An equalizer allows you to eliminate unwanted sounds, such as the 60 cycle hum from a badly grounded sound source.

STUDIO APPLICATIONS

A graphic equalizer is one of the most useful tools in the sound engineer's bag. DOD equalizers offer the features and the flexibility to deliver uncompromising quality in the studio.

A. Fix a track that doesn't sound quite right. Put the equalizer in a channel insert.

B. Create an artificial stereo image by splitting a monaural signal and equalizing the split signals differently. Pan one signal to the right and the equalized signal to the left.

C. Shape the sound by changing the frequency response of the track.

D. Special effects like telephone sounds are done by cutting off the low end at 200 Hz and the high end at 6 kHz.

Also, when used with other pieces of equipment, you can do some real signal processing magic. Emphasizing the high frequencies of a signal and feeding the modified signal to the side chain of a compressor creates a de-essing effect. By emphasizing the low frequencies and feeding the signal to the side chain creates a de-thumper. You can also reduce unwanted frequency-dependent noise in a signal by cutting the offending frequencies with an equalizer and letting a noise gate "key" on the modified signal while letting the original signal pass, gating the unwanted sounds.

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OPERATION

FRONT PANEL FUNCTIONS DESCRIPTION

POWER SWITCH: Turns the power to the equalizer on or off.

EQUALIZER SLIDERS: Each one of these linear potentiometers will boost or cut its noted frequency by ± 12 dB. When all the sliders are in the center detented position, the output of the equalizer is said to be flat. The numbers marked over the top of each slider represent the center frequency that each band will control.

INPUT LEVEL CONTROL: This control sets the signal level to the equalizer. It is capable of ± 12 dB of gain. The level is indicated on the INPUT LEVEL BAR GRAPH. This control is used to compensate for variations in volume due to gain changes caused by equalizing individual frequencies.

LOW CUT FILTER SWITCH: This switch electronically inserts a filter into the signal path, which cuts the low frequencies at 12 dB per octave ($-3\text{dB @}50$ Hz). The LED indicator lights when the switch is depressed and the filter is in the circuit.

IN/OUT BYPASS SWITCH: This switch inserts or removes the equalizer channel from the signal path. An LED indicator lights when the switch is depressed and the equalizer channel is in the circuit path. The bypass function is FET switched to prevent switching transients when inserting the equalizer into the circuit.

LED LEVEL INDICATOR: The LED level indicator shows the signal level to the unit.

REAR PANEL FUNCTIONS

BALANCED INPUT: Accepts a standard XLR type connector [see section on installation for wiring connections]. The $1/4"$ phono jack may also be used for balanced inputs when used with a TRS connector. Maximum allowable input level is $+18$ dBu. Input impedance for a balanced connection is $80\text{ k}\Omega$.

UNBALANCED INPUT: Accepts an $1/4"$ plug (see section on installation for wiring connections). Connections are unbalanced. Maximum allowable input is $+18$ dBu. Input impedance for the unbalanced connection is 40Ω .

BALANCED OUTPUT: Accepts a standard XLR type connector [see section on installation for wiring connections]. A $1/4"$ TRS jack may be used to achieve an impedance balanced output. Maximum balanced output level is $+21$ dBu. Balanced output impedance is 102Ω .

UNBALANCED OUTPUT: Accepts a $1/4"$ plug (see section on installation for wiring connections). Connections are unbalanced. Maximum unbalanced output level is $+21$ dBu. Output impedance is 51Ω unbalanced.

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ATTENTION: DO NOT USE BOTH THE BALANCED AND UNBALANCED INPUT/OUTPUT JACKS TO A CHANNEL AT THE SAME TIME. Using more than one connector at a time for the input/output pair can unbalance balanced lines, cause phase cancellation, short a conductor to ground, or cause damage to other equipment connected to the equalizer.

Maintenance and service

Other than keeping the unit clean and occasionally checking the connectors and cables to the unit for integrity, there is no maintenance necessary for DOD equalizers.

There are NO user serviceable parts inside the units. Opening the chassis will void the warranty. All service and repair must be performed by the factory or an authorized service center for the warranty to remain in service.

Should a problem arise with the equalizer, please contact your authorized DOD Electronics dealer for return/repair procedures.

Specifications

Frequency Response: 20Hz to 20kHz, ± 0.5 dB

Low Cut Filter: 12 dB/ octave roll-off, 3 dB down at 50 Hz switchable in or out.

Frequency Center Tolerance: 5%

Control Range: 12 dB cut/ boost

Recommended Operating Level: -10 dBV to +4 dBu

Input Impedance: 40k Ω balanced, 20k Ω unbalanced

Maximum Output Level: +21 dBu (balanced or unbalanced)

Input Level Control: ± 12 dB

Input Level Indicator: LED bar graph; -10, 0, +10, and +17

Harmonic Distortion: .006% @ 1 kHz

S/N Ratio: Greater than 90 dB (ref. 0.0775Vrms)

Electronic Switching: In/Out and Filter switches (FET type)

Power Requirements: 100/120/220-230/240 VAC, 50/60 Hz @ 18 watts

Dimensions 430 and 431: 1.75"x6"x19"

Dimensions 231, 830, and 831: 3.5"x6"x19"

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DOD WARRANTY

1. The warranty registration card must be mailed within ten days after purchase date to validate this warranty.
2. DOD warrants this product, when used solely within the U.S., to be free from defects in material and workmanship under normal use and service.
3. DOD Electronics liability under this warranty is limited to repairing or replacing defective materials that show evidence of defect, provided the product is returned through the original dealer, where all parts and labor will be covered up to a period of three (3) years. The company shall not be responsible for any consequential damage as a result of the products use in any circuit or assembly.
4. Proof of date of purchase is considered to be the burden of the consumer.
5. DOD reserves the right to make changes in design or make improvements upon this product without incurring any obligation to install the same on PRODUCTS PREVIOUSLY MANUFACTURED.
6. The foregoing is in lieu of all other warranties, either expressed or implied, and DOD neither assumes nor authorizes any person to assume for it any obligation or liability in connection with the sale of this product. In no event shall DOD or its dealers be liable for special or consequential damages or from any delay in the performance of this warranty due to causes beyond their control.

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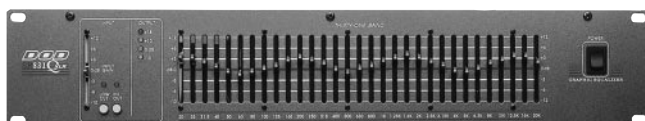
SR 430QX



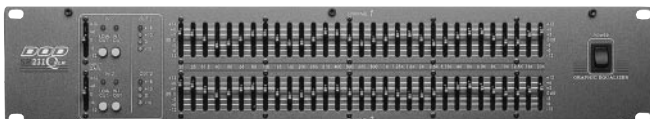
SR 431QX



SR 830QX



SR 831QX



SR 231QX

DECLARATION OF CONFORMITY

Manufacturer's Name: DOD Electronics Corporation

Manufacturer's Address: 8760 S. Sandy Parkway
Sandy, Utah 84070, USA

declares that the products:

Product Name: SR Series Equalizers

Product Options: All

conform to the following product specifications:

Safety: EN 60065 (1993)
IEC65 (1985) with Amendments 1,2,3

EMC: EN 55013 (1990)
EN 55020 (1991)

Supplementary Information:

The products herewith comply with the requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC as amended by directive 93/68/EEC.

DOD Electronics Corporation
President of DOD
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Sandy, Utah 84070, USA

Effective: 11/24/97

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