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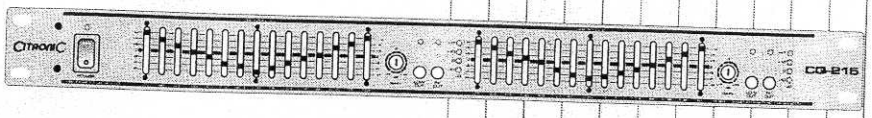
OPERATING INSTRUCTION

CITRONIC®
PROFESSIONAL AUDIO

CQ-215
GRAPHIC EQUALIZERS



INTRODUCTION

Congratulations, and thank you for your purchase of this equalization components. This series 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 CQ 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 12dB 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 a 1/4"tip-ring-sleeve phone plug or unbalanced with a mono 1/4" phone plug or RCA phono connector (XLR connectors are available as an option), making the units readily interface able to any system. Dual channel units may be used as stereo equalizers or as two independent channels of equalization. The units offer either 1/3rd octave or 2/3rds octave resolution, depending on the unit chosen. All the equalizers are solidly built with steel chassis and military-grade circuit boards for years of reliable service.

Most graphic equalizers divide up the audio frequency range into 1/3rd octave or 2/3rds octave pieces. The octave referred to is an eight note musical octave, with the lowest tones beginning in the low range of hearing , at about 20 Hz, while the highest tones begin in the high range of hearing. And end up at about 20 kilo(thousand) Hz. The result is about ten octaves of audible frequencies. If all ten octaves of the audible frequency spectrum are divided into thirds, you get 30 pieces, or bands (for the widest useful range, these 1/3rd octave equalizers have 31 bands). If those tem octaves are divided into two-third pieces, you get 15 bands. The band size is the narrowness of the octave range that the equalizer will boost or cut.

A 1/3rd octave equalizer is the most precise because you' re working with only 3 notes of the octave scale 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 the product RTA1) 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.

A 2/3rds octave equalizer works with 6 notes per band or slider, and thus takes a

bigger bite of each octave. 15 bands of 2/3rds octave resolution will cover the audio spectrum, and two channels can be fit into a single rack space. 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 a real time analyzer is not needed. The 2/3rds octave EQ allows you to quickly and easily modify a sound for use i music, recording, or sound reinforcement.

These graphic equalizers offer both1/3rd and 2/3rds octave band models i mono and stereo versions to meet ay 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 may be left n continuously.

These equalizers generate very little heat during operation and thus d 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.

Only the 1/4"phone plug and the optional XLR connector inputs and outputs can be Used for balanced or Unbalanced connections. The RCA phono plugs are for unbalanced connections only. 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. Use 1/4" tip-ring-sleeve or mono plugs, or RCA phono jack connectors.

FOR BALANCED CONNECTION-WIRE the connectors as follows:

Phone plug	Connection
Tip	:high
Ring	:low
Sleeve	:ground

FOR UNBALANCED CONNECTION-Use 1/4" tip-ring-sleeve or mono phone plug connectors, or RCA phono plug connectors wired as follows:

Phone plug	Connection
T i p	:high
Ring	:no connection
Sleeve	:ground

FOR 1/4" MONO PHONE PLUGS OR RCA PHONO PLUGS:

Phone plug	Connection
Tip	:high
Sleeve	:ground

OPTIONAL XLR CONNECTORS-OPTIONAL XLR type connectors may be ordered installed in the units in the factory. These connectors allow both balanced and unbalanced allow both balanced and unbalanced connection to the equalizers, and are wired as follows:

XLR Connector	Balanced Connection	Unbalanced Connection
Pin1:	ground	ground
pin2:	high	high or hot
pin3:	low	ground

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

APPLICATIONS

These graphic equalizers may 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 main power amplifiers (or crossover), the overall frequency o9f the mix may be altered to do a number

A. Using a real time audio spectrum analyzer (such as our RTA Series II), a calibrated microphone, and a pink noise generator, the audio system may be tuned to make the overall audio spectrum response of the sound system and the room environment flatter in frequency response.

B. Greater gain-before-feedback character-intics may 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 may be accomplished using the LOW CUT feature of the equalizer. Wind noise or dropped microphones 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 may be tailored for better intelligibility and penetration. This is particularly useful for annunciation 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.

MUSICAL INSTRUMENT APPLICATIONS

A. Putting an equalizer in line with a musical instrument allows you 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 amplifier.

STUDIO APPLICATIONS

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

A. Fix a track that don't sound quite right. Put the equalizer i an effects send and return it to the mix bus.

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 to 200 Hz and the high end to 6 KHz

Also, when used with other pieces of equipment, you can do some real signal Magic. Emphasizing the high frequencies of a signal and feeding the modified signal to the side chain of a compressor makes the compressor a de-esser. By emphasizing the low frequencies and feeding the signal to the side chain makes the compressor a de-thumper. You can also reduce unwanted frequency-depen-dent 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.

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 +/-12dB. When all the sliders are in the center depended position, the output of the equalizer is said to be flat. The numbers marked over the top of each slider represent the center of frequency that each band will control.

INPUT LEVEL CONTROL: This control sets the signal level to the equalizer. It is capable of +/-12dB of gain. Its effect is indicated on the INPUT LEVEL BAR GRAPH. This control is used to adjust for variations in input level to the equalizer channel, and to compensate for the equalization applied to the input signal.

LOW CUT FILTER SWITCH: This switch electronically inserts a filter into the signal path, which cuts the low frequencies at 12 dB per octave (-3dB@ 50Hz). 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 1/4" tip-ring-sleeve phone plug or a 1/4" mono phone plug (or optional XLR connectors) [see section on installation for wiring connections]. Connections may be either balanced or unbalanced. Maximum allowable input level is +18 dBu (ref: 0.775Vrms). Input impedance for a balanced connection is 80 kohms, and 40 kohms for an unbalanced connection.

UNBALANCED INPUT: Accepts an RCA phono plug (see section on installation for wiring connections). Connections are unbalanced. Maximum allowable input is +18dBv (ref: 0.775Vrms). Input impedance for the unbalanced connection is 40 kohms.

BALANCED OUTPUT: Accepts a 1/4 ' tip-ring-sleeve or 1/4 ' mono phone plug (or optional XLR connectors) [see section on installation for wiring connections]. Connections may be either balanced or unbalanced. Maximum balanced output level is 18dBm into 600 ohms or higher impedance (ref: 1mW/600ohms). Maximum unbalanced output level is 18 dBu (ref.: 1mW/600ohms). Output impedance is 1360 ohms balanced and 680 ohms unbalanced.

UNBALANCED OUTPUT: Accepts an RCA phono plug (see section on installation for wiring connections). Connections are unbalanced. Maximum unbalanced output level is 18dBv (ref.: 1mW/600ohms). Output impedance is 680 ohms unbalanced.

ATTENTION: DO NOT USE POTH THE BALANCED AND UNBALANCED INPUT/OUTPUT JACKS TO A CHANNEL AT THE SAME TIME. Using mor 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.

SELECTABLE SWITCH: This switch is used for changeing the voltage between 115V and 230V.

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 these 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 for the warranty to remain in service.

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

WARRANTY

1. The warranty registration card must be mailed within ten days after purchase date to validate this warranty.

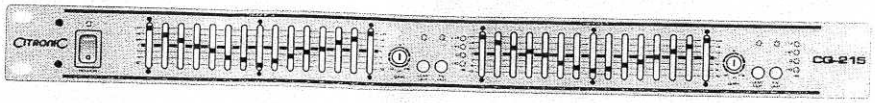
2.This warrants this product, when used solely within the US., to be free from defects in material and workmanship under normal use and service.

3.Our 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 one year, 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.Our 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 our 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 our 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.



CQ-215

Technical Specification

Model	CQ215
Structure	Double 1 5 bands
Frequency response	20Hz~20KHz, +0 / -0, 5dB
Constant-Q gain	±12dB
Low-frequency cut filter	12dB/0tc@50,Switch on/off
Work level	-10dBu~+12dB
Input impedance	40kΩ balance;20kΩ unbalance
Maximum output level	+21dBu
Input level gain	-12dB~+12dB
Output impedance	51kΩ balance;120kΩ unbalance
Output level display	LED,-10dB,0dB,+10dB and +17dB
THD	>0.003%@1KHZ
SNR	>85dB
Switch	In/out and Filter(FET)
Power	AC~240V,18W