

JBSYSTEMS

ELECTRONIC CROSSOVER

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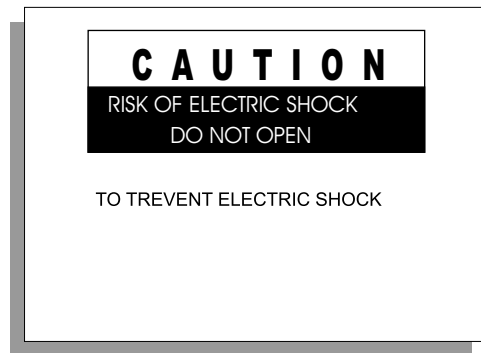
EC102



XO210

OWNER'S MANUAL

SAFETY INFORMATION AND PRODUCT REGISTRATION



Magnetic Field
CAUTION! DO not locate sensitive high-gain equipment such as preamplifiers or tape decks directly above or below the unit. Because this amplifier has a high power density, it has strong magnetic field which can induce hum into unshielded devices that are located nearby. The field is strongest just above and below the unit. If an equipment rack is used, we recommend locating the amplifiers in the bottom of the rack and the preamplifier or other sensitive equipment at the top.



WARNING
TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE

WATCH FOR THESE SYMBOLS:



The lightning bolt triangle is used to alert the user to the risk of electric shock.



The exclamation point triangle is used to alert the user to important operating or maintenance instructions.

WARRANTY

1. The warranty registration card that accompanies this product must be mailed within 30 days after purchase date to validate this warranty. Proof-of-purchase is considered the burden of the consumer.
2. Warrants this product, when bought and used solely within the U.S.A., to be free from defects in materials and workmanship under normal use and service.
3. Liability under this warranty is limited to repairing or, at our discretion, replacing defective materials that show evidence of defect, provided the product is returned to WITH RETURN AUTHORIZATION from the factory, where all parts and labor will be covered up to a period of two years. A Return Authorization number must be obtained from by telephone. The company shall not be liable for any consequential damage as a result of the product's use in any circuit of assembly.
4. Reserves the right to make changes in design or make additions to or improvements upon this product without incurring any obligation to install the same additions or improvements on products previously manufactured.
5. The foregoing is in lieu of all other warranties, expressed or implied, and neither assumes nor authorizes any person to assume on its behalf any obligation or liability in connection with the sale of this product. In no event shall 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.

CROSSOVER FREQUENCIES:

Stereo Mode:	
Low/High:	45 to 960 Hz or 450 Hz to 9.6 kHz (x10 setting)
Mono Mode:	
Low/Mid:	45 to 960 Hz or 450 Hz to 9.6 kHz (x10 setting)
Mid/High:	45 to 960 Hz or 450 Hz to 9.6 kHz (x10 setting)
Filter Type:	Linkwitz-Riley, 24 dB/octave, state-variable
FUNCTION SWITCHES:	
Front Panel:	
Low Cut:	Activates 40 Hz Butterworth, 12 dB/octave high-pass filter, one switch per channel.
Phase invert:	inverts the phase at the output, one switch per output.
Rear panel:	
X10:	Multiplies crossover frequency range by 10, one switch per channel.
Mode :	Selects stereo/mono and 2/3-way operation.
LF sum:	Selects normal(stereo) or mono-summed low frequency operation.

INDICATORS:

Stereo Operation:	Green LED
Mono Operation:	Yellow LED
Low Cut:	Red LED per channel
X10:	Green LED per channel
Phase Invert:	Red LED per output (3 per channel)

POWER SUPPLY:

Operating Voltage:	AC220V / 50-60 Hz,
power Consumption:	15 watts
Mains connection:	IEC 320 recaptacte

TROUBLESHOOTING No SOUND

If there appears to be no power:

- Check that either the stereo or mono LED on the front panel of the EC102/XO210 is lit
- Check that the power cord is seated properly in the back panel of the crossover and that it is plugged into an active AC power source.

If there appears to be power, but no audible signal:

- Confirm that active audio lines are connected to the crossover's inputs and outputs.
- Check that both the input and output gain controls are advanced sufficiently.
- Check to make sure that you have turned up the amplifiers' outputs.

ABNORMAL AUDIO OUTPUT

- Ensure that the proper mode for your setup has been selected via the rear panel mode switches.
- Check the LF Sum switch.
- Check the x10 switch, this changes the range of the crossover frequency from 45-960Hz to 450 Hz-9.6 kHz.

WEAK AND /OR DISTORTED AUDIO

- Check that a clean signal is being fed to the crossover.
- Confirm that the input wiring is correct.
- Check that the grounds of the audio signal path and the chassis and power line of all units in the system are connected.

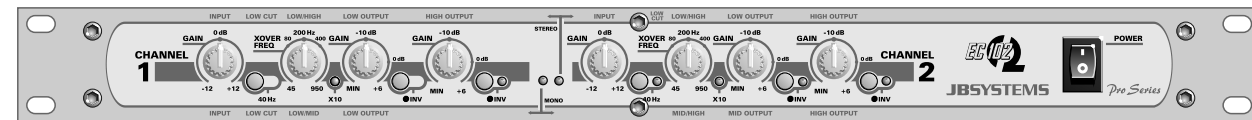
HUM AND/OR Buzz

If you suspect that the hum is caused by a ground loop:

- Systematically remove and /or connect the audio grounds of the devices in the signal path.
- Remember, for safety you must maintain connection to chassis ground. Never lift a safety ground.
- If you suspect the hum is not caused by a ground loop.
- Check the audio at an earlier stage in the audio chain.
- Low level equipment should be mounted away from power amplifiers to avoid induction of this type of hum.
- Be certain that all audio wiring except for loudspeaker lines is well shielded, and that low level wiring is not run parallel to and /or in close proximity to AC power wiring.

INTERMITTENT AUDIO

- Check the other equipment and the wiring to make certain that the signal is not intermittent earlier in the chain.
- Check the integrity of all cables using a cable tester.



STEREO 2-WAY-MODE

In 2-way stereo mode the controls are marked BELOW the horizontal blue line.

Channel one and Channel Two functions are identical in the stereo mode. LEDs are disabled for controls which are non-functional in this mode.

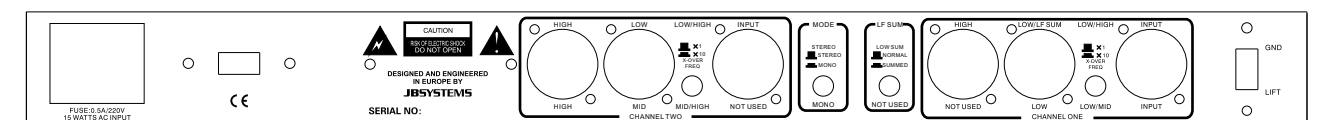
[1]&[5]	INPUT GAIN	Controls the INPUT level with +/- 12dB of gain.
[9]&[15]	LOW CUT	Switch for selecting the 40 Hz high pass filter. An LED indicates the selection.
[2]&[6]	LOW/HIGH	Selects crossover point between the LOW and HIGH output
[10]&[16]	x10 LED	Indicates that the LOW/HIGH crossover frequency range is 450 Hz to 9.6 kHz.
[3]&[7]	LOW OUTPUT	Controls the low Frequency output level with a range of -∞ to +6dB.
[11]&[17]	PHASE INVERT	Switch for reversing the polarity on the low output. An led indicate the selection.
[4]&[8]	HIGH OUTPUT	Controls the high frequency output with a range of -∞ to +6dB.
[12]&[18]	PHASE INVERT	Switch for reversing the polarity on the high output. An led indicates the selection.
[14]	STEREO	Led indicating stereo mode operation.

MONO 3 -WAY MODE

In 3 -way mono operation the controls are marked ABOVE the horizontal blue line. Front panel controls not described in this section are not active in mono 3-way mode. LEDs are disabled for controls which are nonfunctional in this mode.

[1]	INPUT GAIN	Controls the input level with +/- 12dB of gain.
[9]	Low CUT	Switch for selecting the 40 Hz high pass filter. An led indicates the selection.
[2]	LOW/MID	Selects crossover point between low and mid frequencies.
[10]	x10 LED	Indicates that the Low/MID crossover range is 450 Hz to 9.6 kHz.
[6]	Mid/High	Selects the crossover point between MID and HIGH frequencies.
[16]	x10 LED	Indicates that the MID/HIGH crossover frequency range is 450 Hz to 9.6 kHz
[3]	Low OUTPUT	Controls the low frequency output level with a range of -∞ to +6 dB.
[11]	PHASE INVERT	Switch for reversing the polarity on the Low Output. An LED indicates that the phase is reversed.
[7]	MID OUTPUT	Controls the mid frequency output level with a range of -∞ to +6 dB
[17]	PHASE INVERT	Switch for reversing the polarity on the mid output. An led Indicates that the phase is reversed.
[8]	HIGH OUTPUT	Controls the high frequency output level with a range of -∞ to +6dB
[18]	PHASE INVERT	Switch for reversing the polarity on the high output. An led indicates that the phase is reversed
[13]	MONO	Led indicating mono mode operation.

On the back panel of the EC102/XO210 there are markings to help you connect the source devices and amplifiers to your crossover. To operate the EC102/XO210 in stereo 3-way operation, follow the top row of markings horizontally along the length of the EC102/XO210 for stereo 2-way operation of the EC102/XO210 use the second row of markings directly above the connectors. For mono 4-way operation of the EC102/XO210 use the markings directly below the connectors. The connectors not used in the selected mode are marked "not used". This designation applies only to that mode of operation.



The EC102/XO210 is marked in a similar way: for stereo 2-way operation use the markings above the connectors. To operate the EC102/XO210 in mono 3-way mode use the markings below the connectors. The connectors which are not used in the selected mode are marked "not used". This designation applies only to that mode of operation.

AUDIO CONNECTIONS

- Before connection anything to the crossover,, make sure it is not connected to any power source.
- Be sure that the source device(equalizer, compressor, mixing console, etc.) for theEC102/XO210 is turned off. connect the output(s) of the source device to the inputs of the crossover, following the rear panel markings carefully.
- Make sure that the amplifiers which will be used to drive your speaker system are turned off.. using the back panel markings as a guide, use high

quality cables to connect the amplifiers to the appropriate outputs of the EC102/XO210 **ELECTRICAL CONNECTIONS**

Ensure that your EC102/XO210 crossover conforms to the AC power specifications in your area, by checking the marked voltage spec on the rear of the unit. Never plug the incorrect voltage into your

Input:

Connectors:	1/4"TRS
Type:	Electronically balanced/unbalanced, rf filtered
Impedance:	Balanced > 50k Ω ,unbalanced>25k Ω
Max Input Level:	+22dB typical, balanced or unbalanced
CMRR:	>40dB, typicality >55dB at 1 kHz

OUTPUT

Connectors:	1/4"TRS
Type:	Impedance-balanced/unbalanced, RF filtered
Impedance:	balanced 220 Ω ,unbalanced100 Ω
Max Input Level:	>+21dBu Balanced / unbalanced into 2k Ω or greater

PERFORMANCE:

Bandwidth:	20 Hz to 20 kHz, +0/-0.5 dB	
Frequency Response:	< 3 Hz to >90kHz, +0/-3 dB	
Signal-to-Noise:	Ref: +4 dBu, 22 kHz measurement bandwidth	
	Stereo Mode:	Mono Mode:
Low Output:	> 94dB	> 94dB
Mid Output:		> 93 dB
High Output:	> 91dB	> 91dB
Dynamic Range:	>106dB, unweighted, any output	
THD+Noise:	<0.004% at +4 dBu,1 kHz	
	<0.004% at +20 dBu,1 kHz	
Interchannel Crosswalk:	< -80dB, 20Hz to 20 kHz	

INTRODUCTION

Congratulations on your purchase of the EC102/XO210.

Crossover. We are confident you will find this crossover to be the finest product of its kind in this price range .We have taken care to include all of the features you need to make your system sound its best. Some of the features common to EC102/XO210 crossovers are:

- Back panel switches for selecting the operating mode of the crossover.
- Back panel switches indicating the selected range of crossover frequencies. Both of these features have LED indicators on the front panel so you can see at a glance which mode the unit is in.
- Low frequency summed output designed specifically for mono subwoofer applications.
- Phase invert switches on all outputs.
- Individual level controls on every output.

We are sure you will agree that these crossovers are built to provide extremely high quality frequency division for all applications.

EC102/XO210 FUNCTIONS and PERFORMANCE FEATURES x10 OPERATION

If you are using your system in stereo 2-way or 3-way mode, the needed crossover frequency may be higher than 960 Hz, making it necessary to set the x10 switch to the active position. This changes the range of operation of the frequency selector from 45-960 Hz to 9.6 kHz. All other frequency selectors remain the same. When using the x10 switch, ALWAYS ensure that the amplifiers feeding all speaker systems are turned off or that the input gain controls on the power amplifiers are turned down before changing the setting of the x10 switch. Not doing so may send a spurious signal to the outputs of the crossover when the x10 switch is engaged, and may damage speaker systems which are powered any the time of the spurious signal.

POLARITY SWITCHCH

Every output is equipped with a polarity (Φ) reverse switch on the front panel. When speakers are not "in phase", the frequency response of the system is compromised, particularly in the low frequencies. Out of phase signals can also cause "comb-filtering" in the high frequencies. the polarity switch is extremely useful for fine tuning your sound system for peak performance. An LED is activated when the output polarity is reversed.

LOW FREQUENCY SUMMING

The other feature accessed on the back panel is " low frequency summing". This is useful with systems that utilize mono subwoofers. Activating the LF sum switch "sums" the low frequencies of both the left and right inputs. The sum is sent to channel one's low output marked "LF SUM" , while channel two's low output is not used, and channel two's pase invert led is disabled, indicating it is not operational in "LF SUM" mode. The summed low frequencies represent all the low frequencies of both the left and right inputs, and since lows are generally non-directional anyway, it will not detract from the true stereo picture of the source material..

RACK MOUNTING, GROUNDING AND SAFETY

We have provided 4 rack screws and washers for easy mounting in standard audio racks. You should avoid mounting the unit near large power transformers or motors. Route the AC cord away from audio lines and plug it into a power source close by , if the power cord must cross over audio lines, you should take care to them cross at 90degree angles.

The input and output connector are balanced/unbalanced 14"TRS-type connectors. The tip of the plug is wired as hot (+), the ring is wired as cold (-), and the sleeve is wired as the ground or shield.

The EC102/XO210 crossovers have differentially balanced input and output circuits. Balanced wiring is recommended, even with unbalanced source devices, especially when running long paths. Twin-conductor, shielded cable is more reliable since it does not depend on the shield wire itself to complete the signal connection. Using twin conductor cable, a broken shield may only result in a slight increase in noise or hum due to the lack of shielding. You may also use unbalanced cables to connect to and from the crossover.