



LEM
by GENERALMUSIC

X0202²

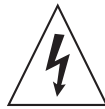
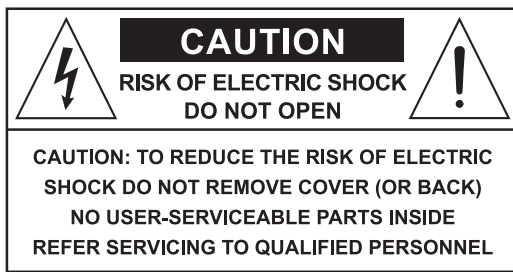
X0203²

ACTIVE CROSSOVERS

**MANUALE D'USO
OWNER'S MANUAL**

**Italiano
English**

CODE: 277.372



The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated "dangerous voltages" within the product's enclosure, that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

IMPORTANT SAFETY INSTRUCTIONS

INSTRUCTIONS PERTAINING A RISK OF FIRE, ELECTRIC SHOCK OR INJURY A PERSONS

WARNING - When using electric products, basic precautions should always be followed, including the following.

1. Read all the SAFETY INSTRUCTIONS before using the product.
2. A reduce the risk of injury, close supervision is necessary when the product is used near children.
3. Do not use this product near water - for example, near a bathtub, washbowl, kitchen sink, in a wet basement or near a swimming pool or the like.
4. This product in combination with an amplifier, may be capable of producing sound levels that could cause permanent hearing loss. Do not operate for a long period of time at high volume level or at level that is uncomfortable. If you experience any hearing loss or ringing in the ears, you should consult an audiologist.
5. This product should be located so that its location or position does not interfere with its proper ventilation.
6. This product should be located away from heat sources such as radiators, heat register or other product that produce heat.
7. The product may be connected a power supply only of the type described on the operating instructions or as marked on the product.
8. The product may be equipped with a polarized line plug (one blade wider then the other). This is a safety feature. If you are unable a insert the plug into the outlet, contact an electrician a replace your obsolete outlet. Do not defeat the safety purpose of the plug.
9. The power-supply cord of the product should be unplugged from the outlet when left unused for a long period of time. When unplugging the power-supply cord, do not pull on the cord, but grasp it by the plug.
10. Care should be taken so that object do not fall and liquid are not spilled into the enclosure through openings.
11. The product should be serviced by qualified service personnel when:
 - A. The power-supply cord or the plug has been damaged; or
 - B. Objects have fallen, or liquid has been spilled into the product; or
 - C. The product has been exposed to rain; or
 - D. The product does not appear to operate normally or exhibits a marked change in performance; or
 - E. The product has been dropped or the enclosure damaged.
12. Do not attempt to service the product beyond that described in the user-maintenance instructions. All other servicing should be referred to qualified service personnel.
13. **WARNING** - Do not place objects on the product's power cord or place it in a position where anyone could trip over, walk on or roll anything over it. Do not allow the product to rest on or to be installed over power cords of any type. Improper installations os this type create the possibility of fire hazard and/or personal injury.

SAVE THESE INSTRUCTIONS

Warnings and Installation

Connection to the mains supply

The apparatus has its own built-in power supply. Before switching on the unit, make certain that the mains voltage matches that shown on the rear (a tolerance of up to $\pm 10\%$ is acceptable).

Before connecting or disconnecting the power cord, make certain the ON/OFF switch is in the OFF position OFF.

Switching on and off

CAUTION: before switching on or off, make certain the sound system's amplifiers are off or turned down: this will avoid signal peaks, which are annoying and sometimes dangerous (particularly for speaker enclosures).

Connecting and preventing or identifying interference

First of all, check that the apparatus is installed in a place free from industrial or RF (radio frequency) interference. Avoid installing your equipment very near radio or TV sets, mobile phones, etc., as these can cause noisy interference.

When connecting the other parts of your sound system, watch out for the so-called "ground loops", which could cause hum and jeopardize the products's excellent Sound-to-Noise and low distortion characteristics.

The best way (even if not always feasible) to avoid ground loops is to connect the electric ground of all the equipment to a single central point ("star" system). In this case, the central point can be the mixer.

To avoid or solve hum and buzzing troubles, try different combinations of lifting grounds on units that are supplied with ground lift switches or make sure all chassis are connected to earth ground, either through the A.C. power cord ground or by the front panel rack mount screws.

CAUTION: before changing your grounds around, always turn your amplifiers down.

Protection and maintenance

Don't force knobs, switches or connectors: these are designed and manufactured to respond to light pressure and could be damaged if used with excessive force.

Take care of your connector cables, a very frequent cause of small/big problems. Always grip them by the connector, avoid pulling them forcefully and wind them without forming knots or sharp bends: they'll last longer this way, and be more reliable, which is a definite advantage.

Avoid exposing the product to strong direct sunlight, high temperatures or intense vibrations, in very dusty or particularly damp surroundings or, even worse, in the rain: this will help to avoid the risk of faulty operation, deterioration or even shock electric shocks and fires.

The product is built in shock-resistant material. Nevertheless, protect it during transport with a flight-case to avoid the risk of any casual accidents.

When you've finished using the apparatus, it's always advisable to protect it from dust, but any dust that does form should be removed using a cloth or a soft brush. Never use alcohol, acetone or any solvents.

The apparatus does not require any other maintenance.

In the event of breakdown

All user-adjustable parts are external and easily accessed (except for the shorting connector CN4 -see "Low-Summing" configuration). In the event of a breakdown, do not open the apparatus, but contact the nearest **Generalmusic/Lem Service Centre**.

Keeping the documentation

Keep this user's manual for future consultation. Also remember that the mixer will get a better price on the secondhand market if (as well as being in good condition) it has its original documentation and packaging.

Getting Started

READ BEFORE USING

Before starting to use the crossover in your sound system there is some information you should know and procedures you should follow.

The **XO 202** and **XO 203** are fourth order Linkwitz-Riley electronic crossovers.

These units can be used both in stereo and in mono modes, allowing the following configurations:

	XO 202	XO 203
STEREO MODE	2-WAY	3-WAY
MONO MODE	3-WAY	4-WAY

Stereo or mono modes can be easily set by pushing a switch and connecting Inputs and Outputs properly: no patch cords required.

Inputs & Outputs

All inputs and outputs are floating and balanced when connected (via a tip, ring, ...) to other floating and balanced equipment. Any combination of balanced and unbalanced operation is permitted (see also "Connection Cables").

CD Boost

The Constant Directivity horn equalization circuit is to be used with horns that require a high frequency boost. The provided boost is +3dB @ 3.5kHz rising 6dB per octave to 22.5kHz.

Consult your horn manufacturer to determine whether it is needed in your circumstance.

No changes need to be made to operate without the constant directivity boost.

If the constant directivity equalization circuit is desired on a particular channel then depress the corresponding switch labeled "CD BOOST". There is one switch for each channel located near to the input socket. If two or more channels are ganged together, then use only the switch near to the used input socket (the switch near to the unused input socket has no effect on the circuit when ganged).

Clip LED

This LED will light when output capability is being exceeded with clipping distortion. Occasional flickering of the Clip LED is acceptable, but if it remains on continuously you should turn down the level control or reduce the output level of the preceding component to avoid audible distortion.

Range x1 & x10 (XO 202 only)

This switch sets the cut off frequency adjusted by the LOW-HIGH Crossover frequency knob as follows:

OFF	:	Frequency x1 =	80Hz	-	920Hz	
ON	:	Frequency x10	=	800Hz	-	9200Hz

CAUTION: to prevent transients and possible equipment damage, never change the frequency range switch from the x1 position to x10 (or vice versa) with the crossover output levels passing signal.

LOW, MID & HIGH Phase Inversion

The Phase switches invert the phase between the speakers. Use them when you feel a bad sound continuity between the LOW, MID and HIGH ranges.

LOW Summing

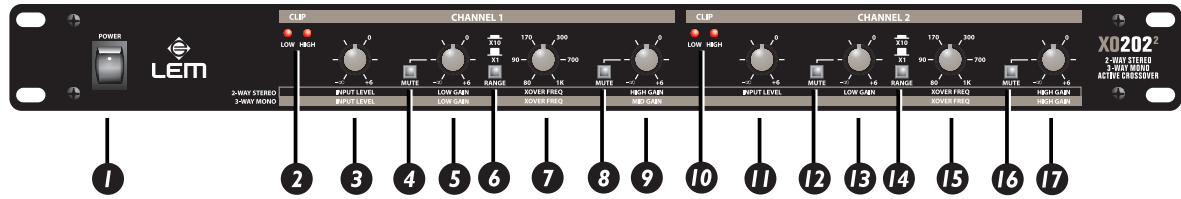
(for qualified personnel and/or advanced users only)

The XO 202 and XO 203 are designed to sum all or any of the LOW outputs if desired.

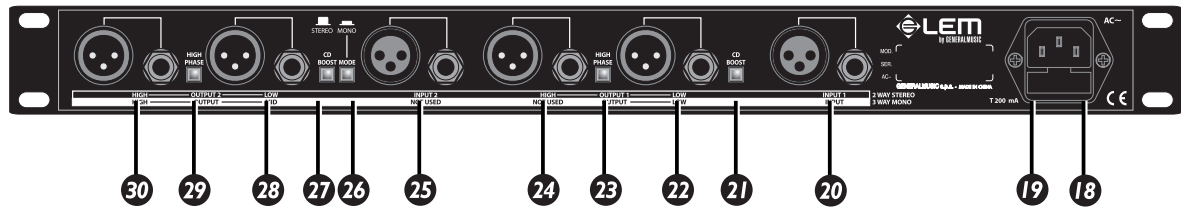
The shorting connector "CN4" must be removed from the channels being summed and should, for best results, be in place when no summing is desired. Shorting connector "CH4" is located nearly in the center at the two pieces board. You can easily find it while the top plate opened.

XO 202 2-way stereo / 3-way mono active crossover

XO 202 Front Panel



XO 202 Rear Panel



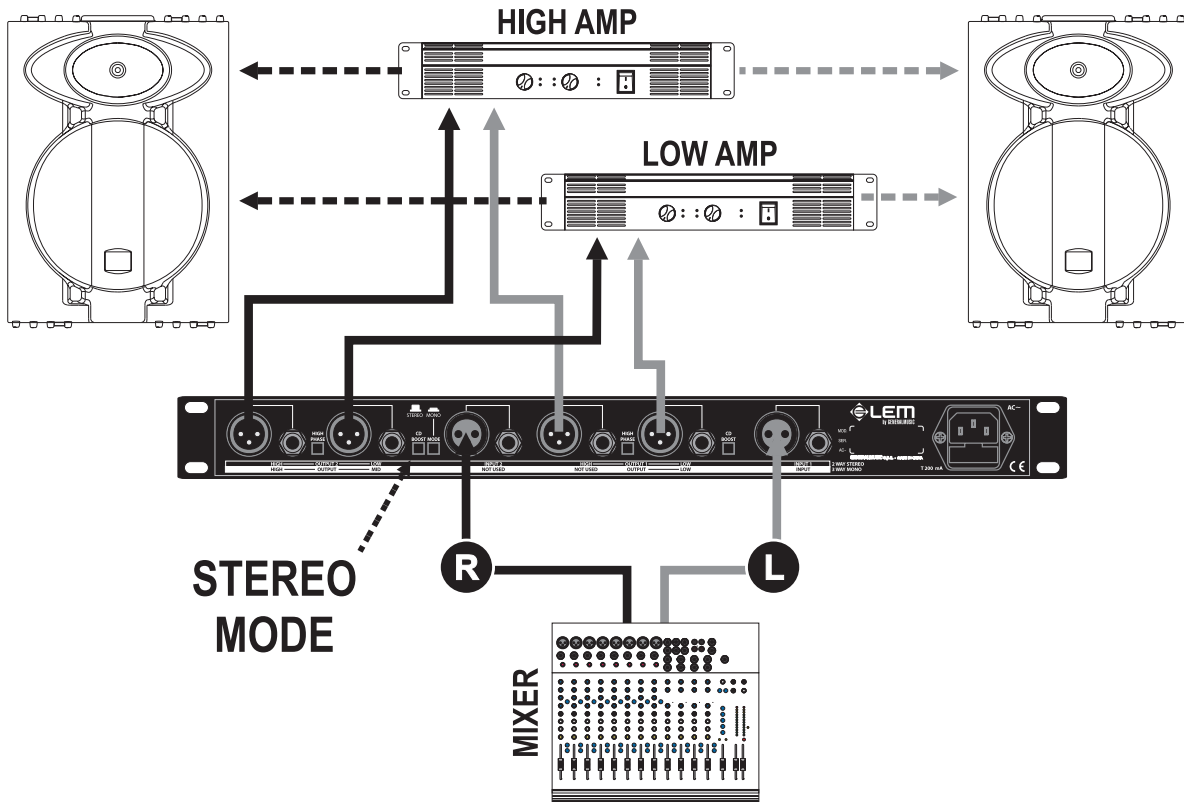
XO 202 • 2-way stereo / 3-way mono active crossover		
	2-WAY STEREO MODE	3-WAY MONO MODE
1	Power Switch	
2	Ch1 LOW & Ch1 HIGH Clip LEDs	LOW & MID Clip LEDs
3	Ch1 Input Level	Input Level
4	Ch1 LOW Mute	LOW Mute
5	Ch1 LOW Gain	LOW Gain
6	Ch1 LOW-HIGH Crossover Range	LOW-MID Crossover Range
7	Ch1 LOW-HIGH Crossover Frequency 800Hz - 10kHz (Range x10)	LOW-MID Crossover Frequency 80Hz - 1kHz (Range x1)
8	Ch1 HIGH Mute	(not used)
9	Ch1 HIGH Gain	(not used)
10	Ch2 LOW & Ch2 HIGH Clip LEDs	(ignored) & HIGH Clip LED
11	Ch2 Input Level	(not used)
12	Ch2 LOW Mute	MID Mute
13	Ch2 LOW Gain	MID Gain
14	Ch2 LOW-HIGH Crossover Range	MID-HIGH Crossover Range
15	Ch2 LOW-HIGH Crossover Frequency 800Hz - 10kHz (Range x10)	MID-HIGH Crossover Frequency 800Hz - 10kHz (Range x10)
16	Ch2 HIGH Mute	HIGH Mute
17	Ch2 HIGH Gain	HIGH Gain
18	Power Cord	
19	Fuse holder	
20	Ch1 Line Input (Linked XLR-F & Jack)	Line Input (Linked XLR-F & Jack)
21	Ch1 Constant Directivity Boost	Constant Directivity Boost
22	Ch1 LOW Output (Linked XLR-M & Jack)	LOW Output (Linked XLR-M & Jack)
23	Ch1 HIGH Phase Inversion	MID Phase Inversion
24	Ch1 HIGH Output (Linked XLR-M & Jack)	(not used)
25	Ch2 Line Input (Linked XLR-F & Jack)	(not used)
26	STEREO / MONO MODE	
27	Ch2 Constant Directivity Boost	(not used)
28	Ch2 LOW Output (Linked XLR-M & Jack)	MID Output (Linked XLR-M & Jack)
29	Ch2 HIGH Phase Inversion	HIGH Phase Inversion
30	Ch2 HIGH Output (Linked XLR-M & Jack)	HIGH Output (Linked XLR-M & Jack)

XO 202 - Connection Examples

XO 202 - 2-way stereo

- Set Mode switch to stereo Mode.
- Plug the Left line-in to INPUT 1 and the Right line-in to INPUT 2.
- Connect the LOW OUT 1 to the Left input of the Low frequency amplifier, and the LOW OUT 2 to the Right input of the Low frequency amplifier.
- Connect the HIGH OUT 1 to the Left input of the High frequency amplifier, and the HIGH OUT 2 to the Right input of the High frequency amplifier.
- Set the XOVER FREQ 1 and the XOVER FREQ 2 to x10 - LOW-HIGH Crossover control.

No patch cord required.



XO 202 - 3-way mono

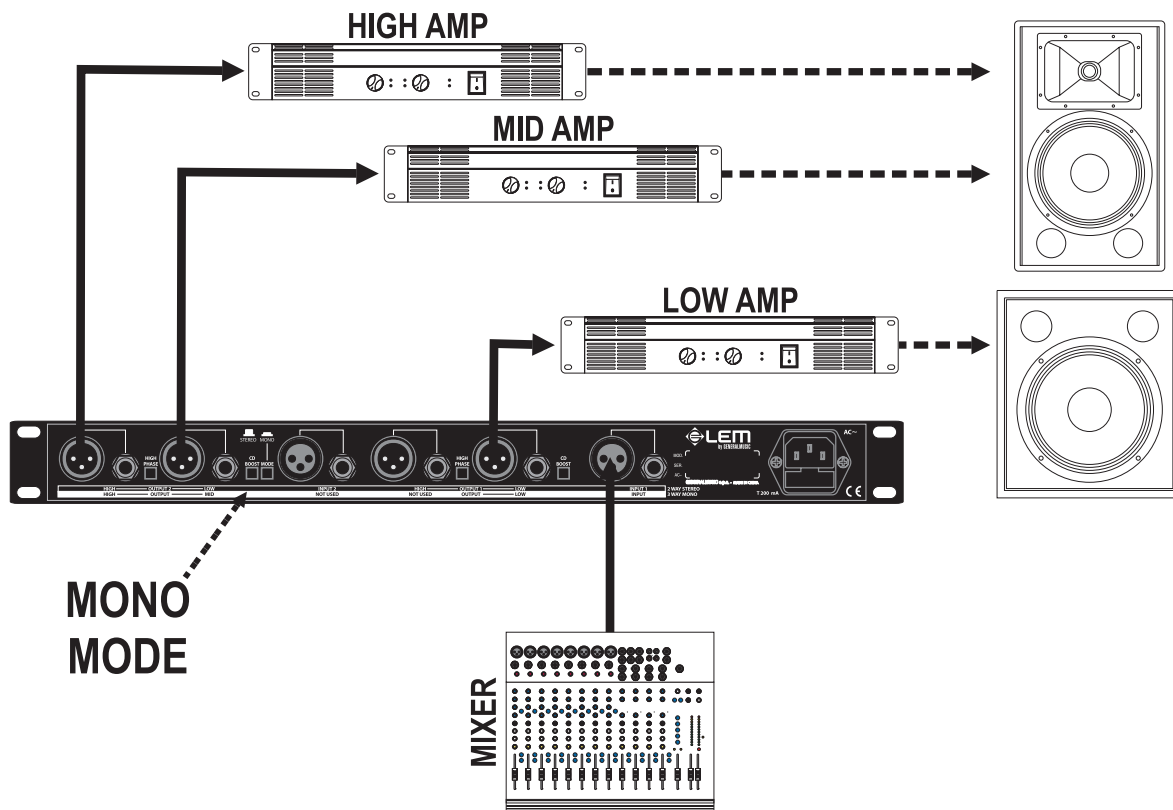
Rear Panel

- Set Mode switch to mono Mode.
 - Plug the line-in into INPUT 1.
 - Connect LOW OUT 1 to the Low frequency amplifier.
 - Connect LOW OUT 2 to the Midrange frequency amplifier.
 - Connect HIGH OUT 2 to the High frequency amplifier.
- NOTE: Do not connect anything into INPUT 2.
 Do not connect anything from HIGH OUT 1.
 (These inputs/outputs are automatically normalled when unplugged).

Front Panel

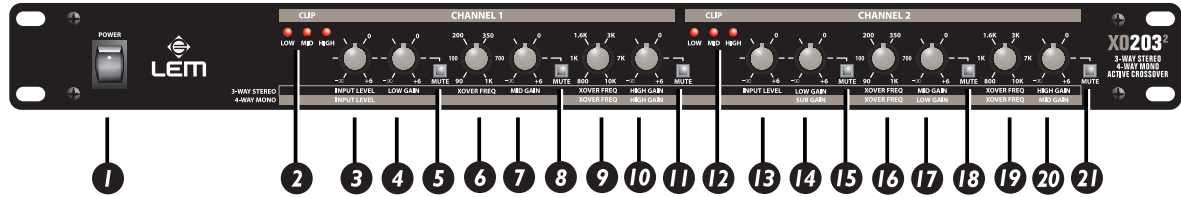
- INPUT 1 main input level control
- LOW Gain 1 Low frequency amplifier level control
- XOVER FREQ 1 set to x1 - LOW-MID Crossover control
- HIGH Gain 1 set to 0 and Mute
- INPUT 2 set to 0
- LOW Gain 2 Mid frequency amplifier level control
- XOVER FREQ 2 set to x10 - MID-HIGH Crossover control
- HIGH Gain High frequency amplifier level control

No patch cord required.

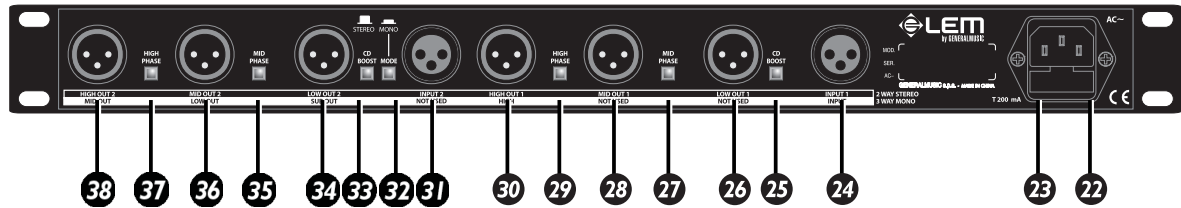


XO 203 3-way stereo / 4-way mono active crossover

XO 203 Front Panel



XO 203 Rear Panel



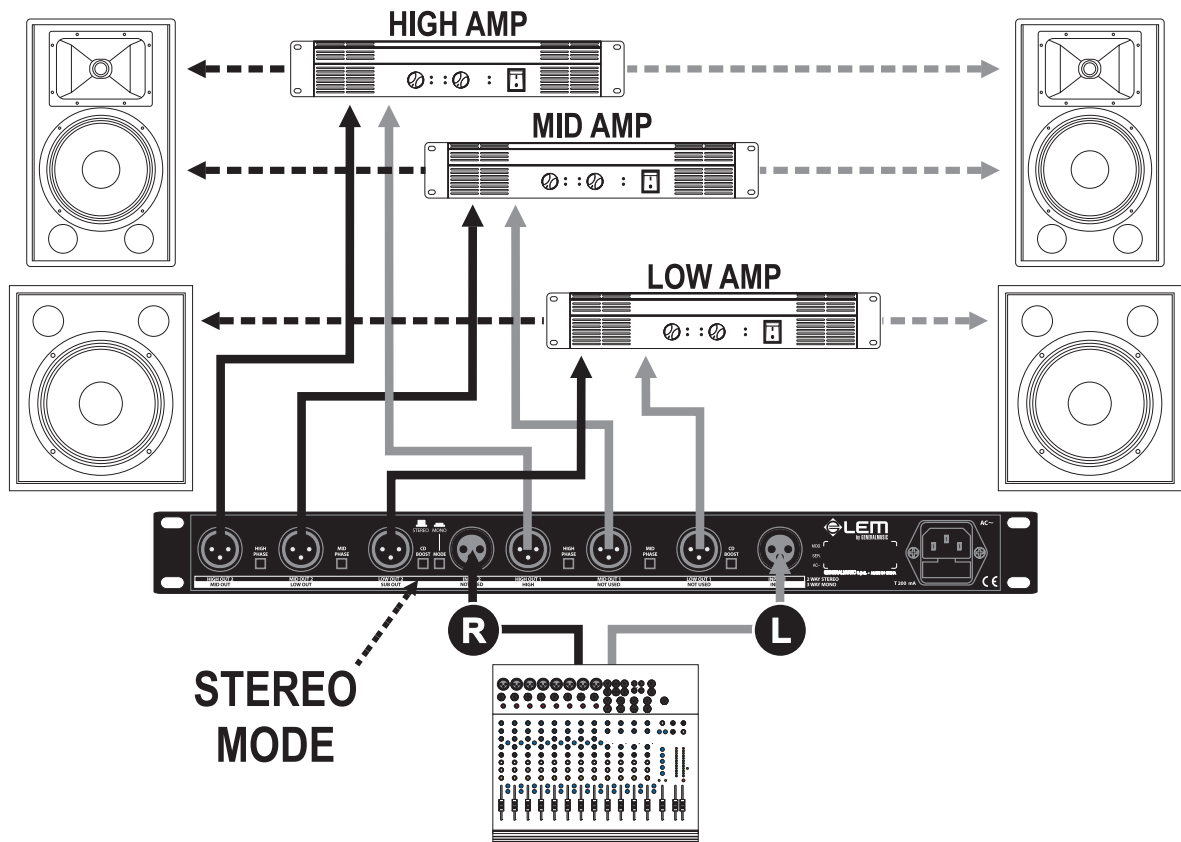
XO 203 • 3-way stereo / 4-way mono active crossover		
	3-WAY STEREO MODE	4-WAY MONO MODE
1	Power Switch	
2	Ch1 LOW, Ch1 MID & Ch1 HIGH Clip LEDs	HIGH Clip LED
3	Ch1 Input Level	Input Level
4	Ch1 LOW Gain	(not used)
5	Ch1 LOW Mute	(not used)
6	Ch1 LOW-MID Crossover Frequency	(not used)
7	Ch1 MID Gain	(not used)
8	Ch1 MID Mute	(not used)
9	Ch1 MID-HIGH Crossover Frequency	MID-HIGH Crossover Frequency
10	Ch1 HIGH Gain	HIGH Gain
11	Ch1 HIGH Mute	HIGH Mute
12	Ch2 LOW, Ch2 MID & Ch2 HIGH Clip LEDs	SUB, LOW & MID Clip LEDs
13	Ch2 Input Level	(not used)
14	Ch2 LOW Gain	SUB Gain
15	Ch2 LOW Mute	SUB Mute
16	Ch2 LOW-MID Crossover Frequency	SUB-LOW Crossover Frequency
17	Ch2 MID Gain	LOW Gain
18	Ch2 MID Mute	LOW Mute
19	Ch2 MID-HIGH Crossover Frequency	LOW-MID Crossover Frequency
20	Ch2 HIGH Gain	MID Gain
21	Ch2 HIGH Mute	MID Mute
22	Power Cord	
23	Fuse holder	
24	Ch1 Line Input	Line Input
25	Ch1 Constant Directivity Boost	Constant Directivity Boost
26	Ch1 LOW Output	(not used)
27	Ch1 MID Phase Inversion	(not used)
28	Ch1 MID Output	(not used)
29	Ch1 HIGH Phase Inversion	(not used)
30	Ch1 HIGH Output	HIGH Output
31	Ch2 Line Input	(not used)
32	STEREO / MONO MODE	
33	Ch2 Constant Directivity Boost	(not used)
34	Ch2 LOW Output	SUB Output
35	Ch2 MID Phase Inversion	LOW Phase Inversion
36	Ch2 MID Output	LOW Output
37	Ch2 HIGH Phase Inversion	MID Phase Inversion
38	Ch2 HIGH Output	MID Output

XO 203 - Connection Examples

XO 203 - 3-way stereo

- ☞ Set Mode switch to stereo Mode.
- ☞ Plug the Left line-in to INPUT 1 and the Right line-in to INPUT 2.
- ☞ Connect the LOW OUT 1 to the Left input of the Low frequency amplifier, and the LOW OUT 2 to the Right input of the Low frequency amplifier.
- ☞ Connect the MID OUT 1 to the Left input of the Mid frequency amplifier, and the MID OUT 2 to the Right input of the Mid frequency amplifier.
- ☞ Connect the HIGH OUT 1 to the Left input of the High frequency amplifier, and the HIGH OUT 2 to the Right input of the High frequency amplifier.

No patch cord required.



XO 203 - 4-way mono

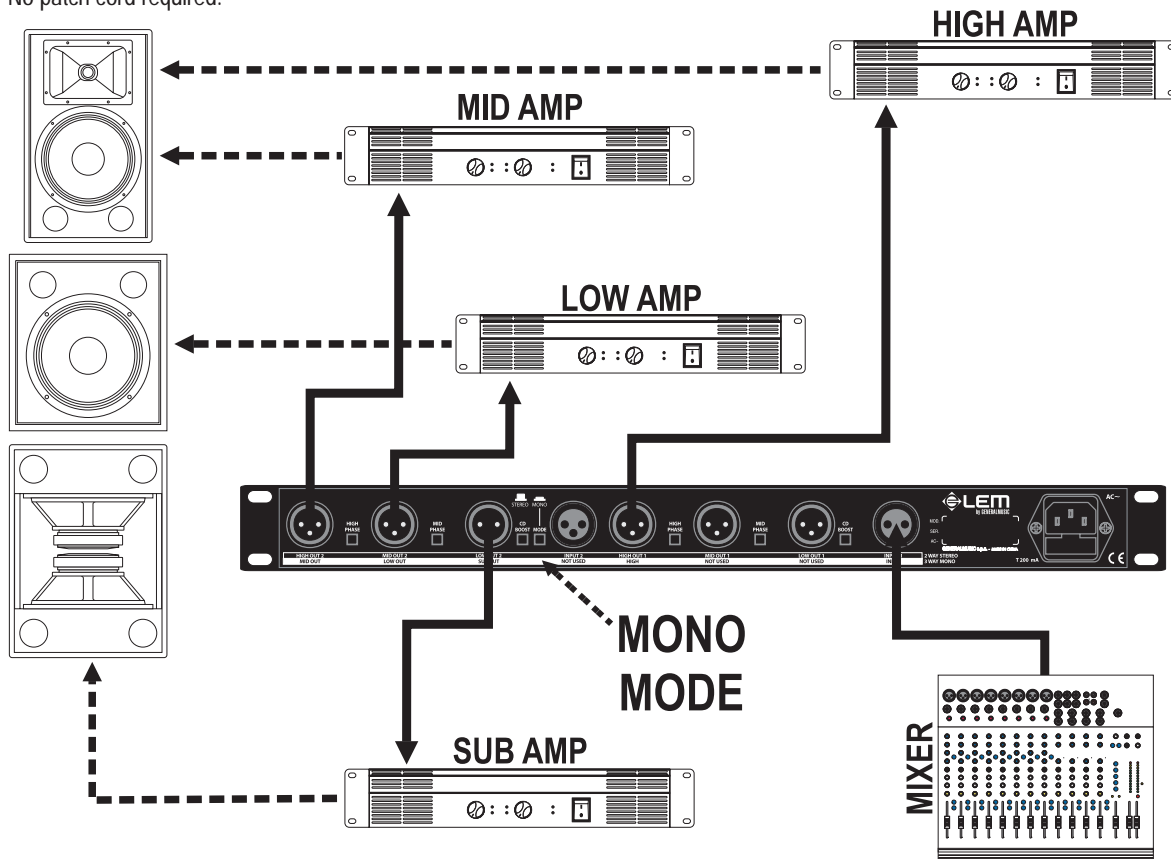
Rear Panel

- ☞ Set Mode switch to mono Mode.
 - ☞ Plug the line-in into INPUT 1.
 - ☞ Connect LOW OUT 2 to the Sub frequency amplifier.
 - ☞ Connect MID OUT 2 to the Low frequency amplifier.
 - ☞ Connect HIGH OUT 2 to the Midrange frequency amplifier.
 - ☞ Connect HIGH OUT 1 to the High frequency amplifier.
- NOTE: Do not connect anything into INPUT 2.
Do not connect anything from LOW OUT 1 and from MID OUT 1.
(These inputs/outputs are automatically normalled when unplugged).

Front Panel

- ☞ INPUT 1 main input level control
- ☞ LOW Gain 1 set to 0 and Mute
- ☞ LOW-MID XOVER FREQ 1 (not used)
- ☞ MID Gain 1 set to 0 and Mute
- ☞ MID-HIGH XOVER FREQ 1 MID-HIGH Crossover control
- ☞ HIGH Gain 1 High frequency amplifier level control
- ☞ INPUT 2 set to 0
- ☞ LOW Gain 2 Sub frequency amplifier level control
- ☞ LOW-MID XOVER FREQ 2 SUB-LOW Crossover control
- ☞ MID Gain 2 Low frequency amplifier level control
- ☞ MID-HIGH XOVER FREQ 2 LOW-MID Crossover control
- ☞ HIGH Gain 2 Mid frequency amplifier level control

No patch cord required.

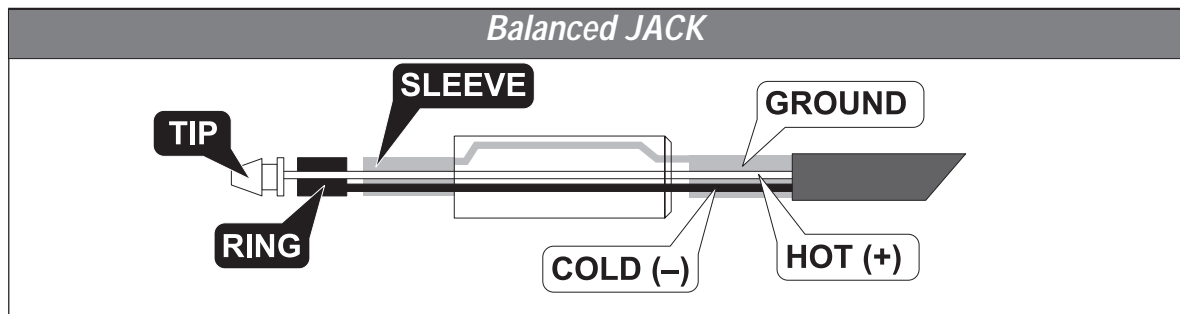
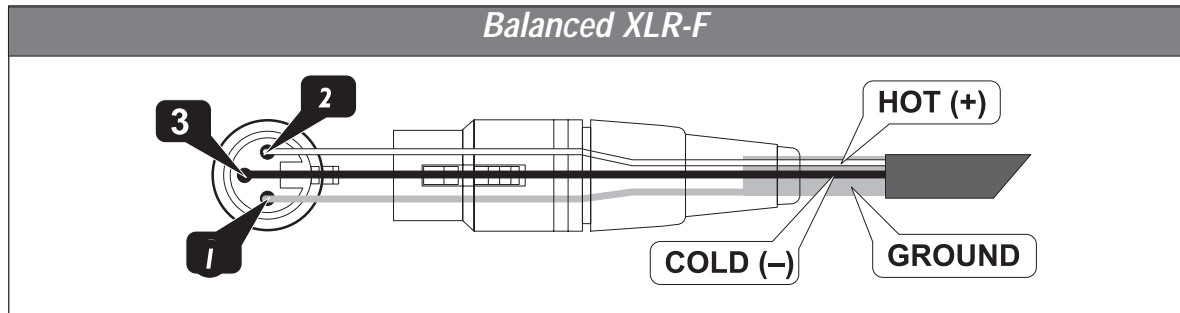
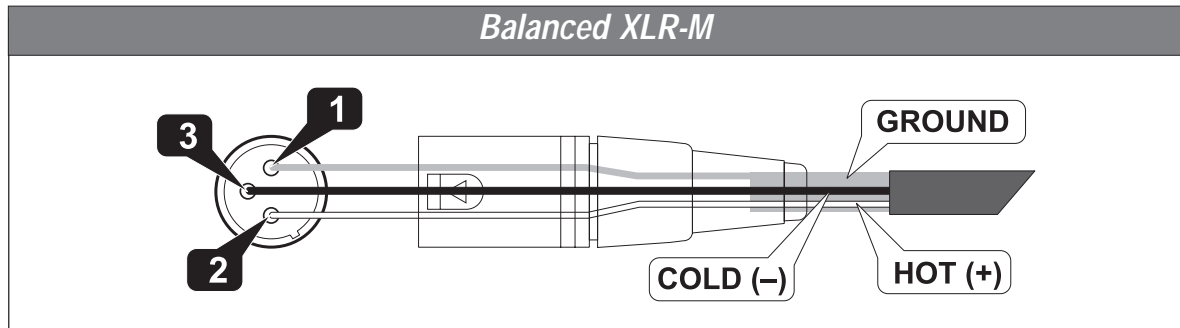


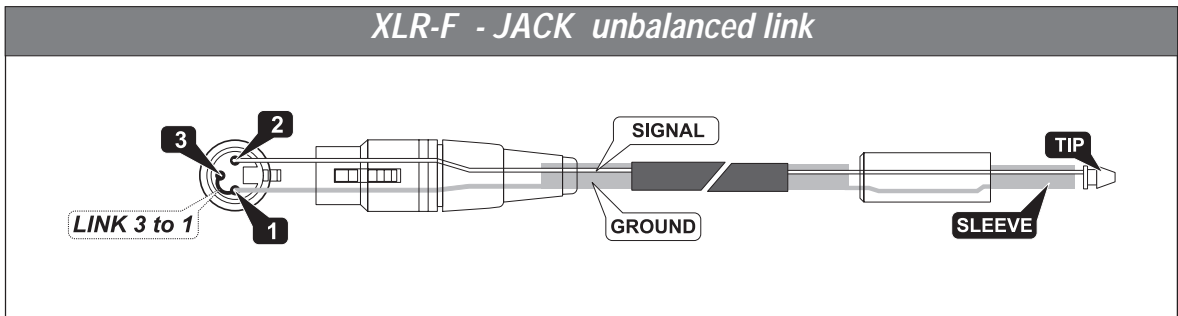
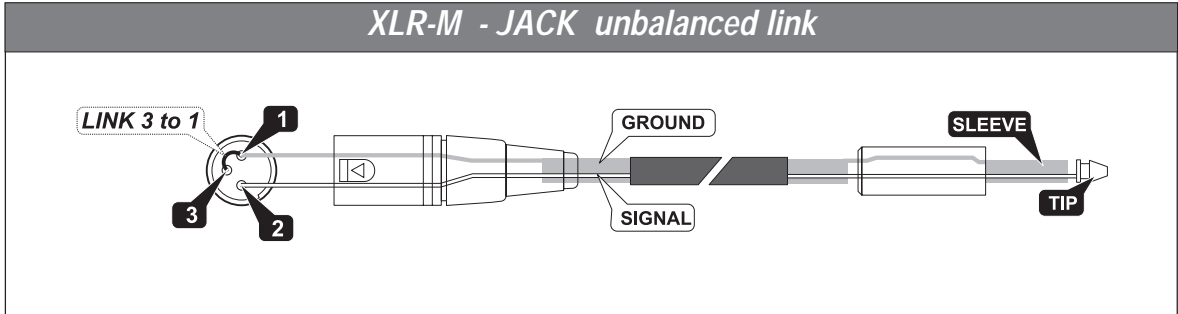
Connection Cables

In this chapter you'll find the wiring diagrams for the connectors to be used with your crossover.

Take care of the connector cables, always holding them by the connectors and avoiding knots and twists when coiling them: this gives the advantage of increasing their life and reliability, which is always to your advantage.

Periodically check that your cables are in good condition, that they are correctly wired and that all their contacts are perfectly efficient: a great number of problems (faulty contacts, ground hum, discharges, etc.) are caused entirely by using unsuitable or faulty cables





Technical Specifications

CROSSOVER FREQUENCY	XO 202	XO 203
LOW-MID	Range x1 80Hz - 1kHz	90Hz - 1kHz
MID-HIGH	Range x10 800Hz - 10kHz	800Hz - 10kHz
OUTPUT @ 0dB		
LOW SECTION	< -106dBu	< -98dBu
MID SECTION		< -95dBu
HIGH SECTION	< -97dBu	< -93dBu
HUM & NOISE (20Hz - 20kHz)		
	Av=0dB, fc=800Hz	Av=0dB, fc=230Hz, 2.3kHz
S/N RATIO		
	118dB	114dB
POWER SUPPLY		
	see label on the apparatus	
DIMENSIONS (W x H x D) mm		
	483 x 44.5 x 216	483 x 44.5 x 216
WEIGHT		
	2.5 kg	2.5 kg

FEDERAL COMMUNICATIONS COMMISSION

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference in which case the user will be required to correct the interference at his own expense.

CAUTION: Changes or modifications to this product not expressly approved by the manufacturer could void the user's authority to operate this product.

Le informazioni contenute in questo documento sono state attentamente redatte e controllate. Tuttavia non è assunta alcuna responsabilità per eventuali inesattezze.

Tutti i diritti sono riservati e in questo documento non può essere copiato, fotocopiato, riprodotto per intero o in parte senza previo consenso scritto della **GENERALMUSIC S.p.A.**

GENERALMUSIC si riserva il diritto di apportare senza preavviso cambiamenti e modifiche estetiche, funzionali o di design a ciascun proprio prodotto.

GENERALMUSIC non assume alcuna responsabilità sull'uso o sull'applicazione dei prodotti o dei circuiti qui descritti.

STAMPATO IN ITALIA

The information contained in this publication has been carefully prepared and checked. However no responsibility will be taken for any errors.

All rights are reserved and this document cannot be copied, photocopied or reproduced in part or completely without written consent being obtained in advance from **GENERALMUSIC S.p.A.**

GENERALMUSIC reserves the right to make any aesthetic, functional or design modification to any of its products without prior notice.

GENERALMUSIC assumes no responsibility for the use or application of the products or circuits described herein.

PRINTED IN ITALY



Sales Division: 47842 S.Giovanni in Marignano (RN) – Via delle Rose, 12 – tel. +39-0541-959511 – fax +39-0541-957404
Internet: <http://www.lemaudio.com>
