

## INTERNATIONAL LIMITED WARRANTY

ARX Systems (ARX) warrants to the first purchaser of any ARX equipment that it is free from defects in materials and workmanship under normal use and service. ARX's sole obligation under this warranty shall be to provide, without charge, parts and labour necessary to remedy defects, if any, which appear within twelve (12) months from date of purchase, and for a further twelve (12) months supply parts only.

**This is our only warranty.** It does not cover finish or appearance items, or if the equipment has been, in ARX's sole judgement:

- Subjected to misuse, abuse, negligence or accident;
- Repaired, worked on, or altered by persons not authorized by ARX;
- Connected, installed, adjusted or used for a purpose other than that for which it was designed.

This warranty gives you and us specific legal rights and you may also have other rights which may apply.

# EC-1 & EC-2 Electronic Crossovers OWNER'S MANUAL

### **Warranty Service Procedure**

Should it become necessary to have your equipment serviced under the terms of the warranty, please follow these steps:

1. Call your ARX distributor for a Return Authorization (RA) number;
2. **Carefully** repack the unit, in its original packaging where possible, including a note with a description of the problem, and a copy of the receipt showing date of purchase. Attach these to the actual unit itself. Don't forget to write your name and address clearly, and include a phone number where you can be contacted during normal business hours. Make it easy for our service technicians to contact you if they have a question. Also, use **plenty** of packing material - better to be safe than sorry.
3. Send the unit freight prepaid to ARX Systems, at the address given you with your RA number. We will pay the return freight when the serviced unit is returned to you.
4. We strongly recommend you insure the package. We can't fix it if it gets lost! Send it by UPS, Fedex, or any similar service that can track the package. Parcel Post is *not* recommended

*If Warranty Registration Card is missing, please write to ARX in the country of purchase, stating model and where purchased, or to ARX, PO Box 15, Cheltenham, Victoria 3192, Australia.*

*Or you can Email us at: [info@arx.com.au](mailto:info@arx.com.au)*



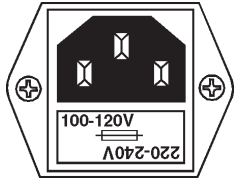
ARX Systems Pty Ltd, PO Box 15,  
Cheltenham, Victoria 3192, Australia  
Phone: 03 - 9555 7859 Fax: 03 - 9555 6747  
International Fax: +61-3 -9555 6747  
On the Web: <http://www.arx.com.au>  
Email: [info@arx.com.au](mailto:info@arx.com.au)



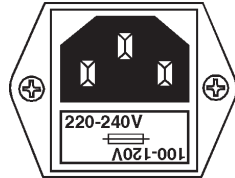
## IMPORTANT - PLEASE READ THIS FIRST



This is a dual voltage unit. It is essential that you check that the voltage on the fuseholder cover below the AC connector on the rear of the chassis is set correctly before connecting it to AC power.



THIS IS SET FOR  
100 V AC TO 120 V  
AC OPERATION



THIS IS SET FOR  
220 V AC TO 240 V  
AC OPERATION

To change, pull fuseholder out and rotate 180°, then push in again. Do not insert power cable into unit until voltage has been correctly set. Do not plug power cable into AC power until voltage has been correctly set

### WARNING SYMBOLS USED ON THIS EQUIPMENT



This symbol is intended to alert you to the presence of important operating instructions contained in this owner's manual



This symbol is intended to alert you to the presence of uninsulated dangerous voltage within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock.



This symbol indicates that a Slow Blow fuse is used in this equipment. Replace with same type and value only



**CAUTION**  
RISK OF ELECTRIC SHOCK  
DO NOT OPEN



TO PREVENT ELECTRIC SHOCK, DO NOT REMOVE  
COVER OR BACK OF UNIT  
NO USER-SERVICEABLE PARTS INSIDE  
REFER SERVICING TO QUALIFIED PERSONNEL

#### WARNING

TO PREVENT FIRE OR SHOCK HAZARD, DO NOT  
EXPOSE THIS UNIT TO RAIN OR MOISTURE.

#### ATTENTION

RISQUE DE CHOC ÉLECTRIQUE - NE PAS OUVRIR



Complies with 89/336/EEC Electromagnetic Compatibility Directive, amended by 92/31/EEC and 93/68/EEC and meets the following standards: EN 55013 : 1990, Sections 3.2 and 3.5 EN 55020 : 1988, Sections 4.3, 5.4, 6.2, 7.0, 8.0.

### EC-1 and EC-2 Specifications

#### Input Impedance

Balanced 20 Kohms  
Unbalanced 10 Kohms

#### Input Headroom

+ 21 dB

#### CMRR

>50 dB, 20 Hz - 20KHz

#### Output Impedance

Balanced 300 Ohms (EC-2 only)  
Unbalanced 150 Ohms

#### Output Level (Max)

21 dB

#### Filter Type

Linkwitz-Riley state variable 24dB per Octave

#### Frequency Response

30Hz(-0.5 dB) to 20KHz(-0.16dB)  
Note: 30Hz figure is the High Pass Filter

#### Signal to Noise ratio

-90 dB Unweighted  
-93 dB 'A' weighted (Unity gain)

#### Distortion

.004% THD @0 dB, 1KHz

#### Dynamic Range

111 dB

#### Power Requirements

100/120 V AC 220/240 V AC 50-60 Hz  
8 Watts (8 VA)

#### Weight

5 lbs/2.2 Kg

#### Dimensions

19"W x 1¾"H x 6"D 482 x 44 x 155mm

#### Input Connector type

Jack (TRS), ( +XLR on EC-2)

#### Output Connector type

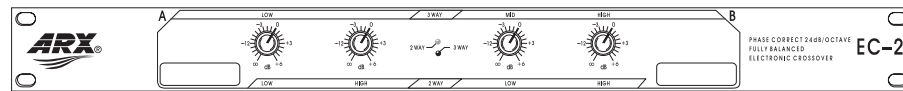
Jack, (XLR on EC-2)

• Most crossovers are dedicated i.e. bought and used for a particular purpose. Once the required frequency is set, there is no need to change it.

• Better value. A ten position switch for changing crossover points automatically has 90% of the filter circuitry unused...no matter which frequency you pick, the other 9 will be idle. We think you shouldn't have to pay for excess circuitry you won't be using.

• Wandering fingers can cause immense damage to speakers by either deliberately or accidentally changing crossover points. Once you have determined the optimum crossover point and set it, the last thing you want is other people changing it. In rental situation this can render PA systems unusable; in the studio, arbitrarily changing the crossover point can drastically upset the room EQ and the final mixes. The 'semi fixed' method adopted in the EC-1 and EC-2 avoids all these problems.

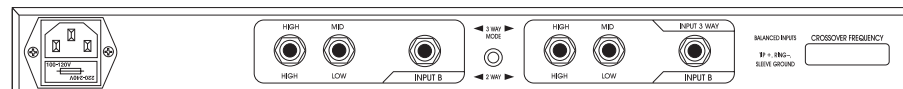
### Front Panel Controls



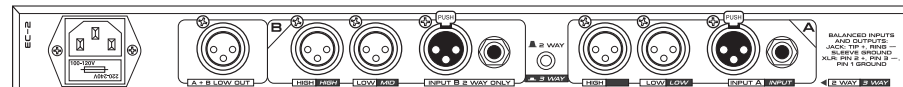
- Marker panel for Channels A and B
- Low output control for Channel A in 2 way and 3 way mode
- High output control for Channel A in 2way mode only
- Low output control for Channel B in 2 way mode, and Mid output control in 3 way mode
- High output control for Channel B in 2 way and 3 way mode
- 2 way/3 way mode LEDs. (EC-2 only)

### Rear Panel Connectors

#### EC-1



#### EC-2



- Input for Channel A in 2 way mode; Input for 3 way mode
- Low output for 2 way and 3 way modes
- High output for 2 way mode; not used in 3 way mode
- Mode switch: 2 way stereo(OUT), 3 way mono (IN)
- Input for Channel B in 2 way mode; not used in 3 way mode
- Low output for Channel B in 2 way mode; Mid output in 3 way
- High output for Channel B in 2 way and 3 way mode
- A+B Low Frequency sum output (EC-2 only)
- IEC 3 pin AC connector and integral fuseholder. Replace fuse with correct value only: 100 - 120 V AC 1 amp, 220-240 V AC 0.5 amp. Please also refer to voltage details on Page 2

### 2 Way and 3 Way Modes

In 2 way mode, the crossover is a dual channel (stereo) unit. Each of the channels has a 24 dB, Linkwitz Riley filter which divides the incoming signal into Low and High at the chosen frequency.

In 3 way mode the crossover is a single channel (mono) unit. The switch on the rear panel directs the output of the Channel A High frequency into the Input of Channel B, so that the filter from Channel B can be used as a Mid/High filter.

In order for this to work, **Channel B must be set up as a Mid/High filter**. If it is left as a Low/High filter (as in stereo 2 way mode) it won't work!

So, for single channel 3 way mode, it's not enough to just press the switch in on the rear panel! You must set up the filters correctly for 3 way use. The chart in this manual (Page 6) will give you a choice of typical filter points and their correct resistor values.

Each crossover point can be changed in the time it takes to change 4 resistors (all of them the same value). Replace the lid, and the unit is virtually tamper-proof.

### Summed Mono Out (EC-2 only)

Many Bass crossover applications (especially Sub Bass) sound a lot better (and often louder) with a mono feed. This removes small phase and amplitude differences that can cause unintentional shifting of the stereo image and blurring of the bass signal. Since frequencies 100 Hz and below are usually agreed to be non-directional, a mono feed makes a lot of sense.

The EC-2 sums the Low Outputs of Channel A and B and delivers them to a separate summed mono output on the rear panel. Note: It delivers the **same** frequencies that the Low Outputs of Channel A and B deliver, but in a summed mono form. It is **not a separate** Sub Bass output. However, if the crossover has been set up as a Sub Bass unit (100-120Hz and below), then Sub Bass will come out of the summed mono output.

### EC-1 and EC-2 Crossover Frequency Selection



**WARNING!**

**THE FOLLOWING SERVICE INFORMATION IS FOR QUALIFIED TECHNICIANS ONLY. SWITCH OFF AC POWER AT THE WALL AND REMOVE POWER CABLE FROM THE WALL SOCKET BEFORE PROCEEDING. FAILURE TO DO THIS CAN EXPOSE YOU TO LIFE THREATENING VOLTAGES! ARX ACCEPTS NO RESPONSIBILITY WHATSOEVER FOR PERSONAL DAMAGE CAUSED THROUGH DISREGARDING THIS ADVICE.**

1. Check that the unit is disconnected from the power at the wall socket.

2. Remove the four (4) self tapping screws (2 each side) holding the lid to the chassis, and lift off the lid.

3. Turn the unit around so the knobs are facing you .

4. You will see two areas with eight (8) rectangular pads, with an 'R' marked beside each 4 pads. Resistors are surface mounted horizontally between these pads.

The crossover frequency is changed by varying the value of these 4 resistors per channel. The value of the resistors is the same for all 4. For accuracy we recommend the use of 1/4 watt 1% metal film resistors.

For 3 way operation the Channel A frequency is the lower crossover point (eg. Low to Mid) and the Channel B frequency is your upper crossover point (eg. Mid to High). Remember, too, that for 3 way use the 2 way/3 way switch on the rear panel must be pushed IN.

To change your crossover point simply select the frequency required from the following table, obtain the correct value resistors and carefully solder them between the pads. The table lists 18 commonly used crossover frequencies, which have been carefully chosen to enable you to use easily obtainable resistor values.

#### **Crossover Point Frequency/Resistor Value Chart**

<b>Frequency</b>	<b>Resistor Value</b>
80 Hz	510 K ohms
100 Hz	390 K ohms
125 Hz	330 K ohms
150 Hz	270 K ohms
200 Hz	220 K ohms
250 Hz	160 K ohms
500 Hz	82 K ohms
800 Hz	51 K ohms
1 KHz	39 K ohms
1.25 KHz	33 K ohms
2 KHz	20 K ohms
2.4 KHz	18 K ohms
2.8 KHz	15 K ohms
3.5 KHz	12 K ohms
5 KHz	8.2 K ohms
6 KHz	6.8 K ohms
8 KHz	5.1 K ohms
10 KHz	3.9 K ohms

#### **Introduction**

Thank you for choosing this ARX Electronic Crossover. We hope you enjoy using it as much as we enjoyed creating it. As with all ARX equipment, it has undergone extensive factory calibration and 'burn in' before shipping. To ensure continued trouble free use, please familiarise yourself with the contents of this manual, especially if you are planning on modifying the crossover points.

#### **About the EC-1 and EC-2**

The twin keynotes of any active crossover, or frequency dividing system, would be accuracy and transparency. For accuracy, the crossover point must exactly complement the requirements of the drivers, and for transparency the crossover must not colour the sound in any way.

With this in mind, ARX design engineers have developed the EC-1 and EC-2, both flexible, 'user friendly' 24 dB per octave, Linkwitz Riley, Phase Correct electronic crossover in a single rack unit.

They have 2 modes of operation: as a Stereo 2 way crossover, or a Mono 3 way crossover, with user variable crossover points. A switch on the rear panel selects either mode.

Despite their compact size, the EC-1 and EC-2 are not short of features. All controls are clearly labelled on the front panel for either mode of operation; Low/High Channel A, Low/High Channel B for 2 way mode, and Low/Mid/High for 3 way. Other features include Balanced TRS inputs, and a preset 12 db per octave High Pass filter to remove Subsonics that can damage speakers and waste amplifier power. The EC-2 has Balanced XLR Inputs and Outputs, plus a Low Frequency sum output in 2 way mode, which provides a mono A+B output.

True Linkwitz Riley 24 dB per octave (Fourth Order) State Variable Filters are used throughout, ensuring a smooth transition through the crossover region, with up to 6 dB of gain available to compensate for amplifiers and speakers of differing sensitivities.

In addition to this, as on all ARX single rack unit equipment, there is a numbered marker panel you can write on for easy 'at-a-glance' confirmation of crossover assigns.

#### **About Electronic (Active) Crossovers**

Electronic crossovers are inserted into the signal chain directly before the amplifier. In 2 way mode they divides the frequencies into LOW and HIGH; in 3 way mode into LOW, MID and HIGH.

Each of these audio bands will require its own amplifier; in 2 way mode, one for LOW and one for HIGH; in 3 way mode, one for LOW, one for MID and one for HIGH.

The EC-1 and EC-2 crossover points are determined internally by the value of 4 resistors per filter. We call this 'semi fixed' and believe it is a far more reliable method of changing crossover points than switching or infinitely variable controls for the following reasons: