

Instruction Manual
For
Hsu Research High End Electronic Crossover

Introduction

Congratulations! You have purchased a high quality electronic crossover for your subwoofer. Please read this simple manual before connecting the unit.

Front Panel Controls

There are three controls on the front panel. The knob is for adjusting the subwoofer level. The button labeled “by-pass” is for selecting between running the main speakers full-range without the subwoofer, and running the system in the bi-amplified mode. i.e., with the button pushed in, low frequencies are fed to the “sub out” while the higher frequencies are fed to the “main out”, and with the button out, full-range is fed to the “main out” and no signal is fed to the “sub out”. In this way, you can compare running your main speakers as a full range speaker and running the system in bi-amplified mode. The second button is the phase switch. This changes the phase of the low pass section. High and low pass are in phase at the crossover point in the in position, and out of phase in the out position. For those who care about absolute phase, note that the high pass section does not invert phase.

Rear Panel Connections

On the left side is the “input”. Connect the preamp output to this. Next to the “input” is an “all pass” – basically a buffered output of the input (permanently full-range output). Next to it is the “main out” which is connected to the main speaker’s power amplifier. The last set of jacks is the “sub out” which should be connected to the subwoofer power amplifier.

Power

We recommend leaving the crossover permanently powered. Hence, connect the external transformer to an un-switched power outlet. The green LED indicates that the unit is on.

Subwoofer Setup with Electronic Crossover

We recommend that you set up the subwoofer(s) as close to you as possible, directly in front of you, or flanking your favorite listening chair, if the spouse acceptance factor (SAF) is not badly violated, or is of lower priority. The reason for this suggestion is the signal through the low pass section is one wavelength behind the signal through the high pass section. By placing the subwoofer(s) a lot closer to you, it helps to align the arrival of the signal from the subwoofers and the main speakers. With the main speakers about 10-15 ft from you, crossover point should be 91 Hz or 109 Hz for optimal time alignment. An added advantage is higher SPL (or lower distortion at the same SPL) at the listening seat since the subwoofers are close to you. Also, room effects will be reduced since you are in the near field of the subwoofer – room effects are lower in level relative to the direct sound.

Changing Crossover Modules

For this, you need a regular screwdriver, and preferably an i.c. extraction and insertion tool. Unscrew the four screws at the bottom of the crossover, and slide the cover off. You will see three bluish-green or yellow chips on the printed circuit board. Remove these modules using an i.c. extraction tool, or by carefully prying them out with a small screw driver. (If you are not familiar with removing and inserting i.c., we recommend you find a friend or technician who is able to perform this task). Insert the new modules into the sockets carefully, making sure that all the legs are securely in the socket. Note that the original 91 Hz chips have two sizes, one 16 pin, two 14 pin. The replacement chips have 16 pins on all. Just let the extra pins overhang either side of the i.c. sockets. Orientation of the chips is unimportant. Put back the cover and screw it tight.

Specifications

Crossover slope: 24 dB/Oct

Filter Type: Linkwitz-Riley high pass and low pass

Capacitors: All National 2% accuracy polypropylene film capacitors, even for power supply bypass

Discrete Resistors: 1% metal film resistors

Semiconductors: Discrete FETs operated single-ended for high pass, low noise, high slew rate bi-FET op-amps for low pass

Jacks: Gold plated RCA jacks

Available crossover frequencies: 28, 34, 43, 51, 62, 75, 91, 109, 131, 155 Hz.

User-replaceable modules are available from the manufacturer

Supplied standard with 91 Hz modules

Absolute phase: High pass section inverts phase