



ART CX310 Stereo 2-Way Mono 3-Way Active Crossover User Guide

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IMPORTANT SAFETY INSTRUCTIONS – READ FIRST



This symbol, wherever it appears, alerts you to the presence of uninsulated dangerous voltages inside the enclosure that may be sufficient to constitute a risk of shock.



This symbol, wherever it appears, alerts you to important operating and maintenance instructions in the accompanying literature.
Please read the manual.

Read instructions

Retain these safety and operating instructions for future reference. Heed all warnings printed here and on the equipment. Follow the operating instructions printed in this user guide.

Do not open

There are no user serviceable parts inside. Refer any service work to qualified technical personnel only.

Power sources

Only connect the unit to mains power of the type described in this user guide or marked on the rear panel. The power source must provide a good ground connection.

Power cord

Use the power cord with sealed mains plug appropriate for your local main supply as provided with the equipment. If the provided plug does not fit into your outlet consult your service agent. Route the power cord so that it is not likely to be walked on, stretched or pinched by items placed upon or against.

Grounding

Do not defeat the grounding and polarization means of the power cord plug. Do not remove or tamper with the ground connection on the power cord.

Moisture

To reduce the risk of fire or electrical shock, do not expose the unit to rain, moisture or use in damp or wet conditions. Do not place container of liquid on it, which may spill into any openings.

Heat

Do not locate the unit in a place close to excessive heat or direct sunlight, as this could be a fire hazard. Locate the unit away from any equipment, which produces heat such as: power supplies, power amplifiers and heaters.

Environment

Protect from excessive dirt, dust, heat, and vibration when operating and storing. Avoid tobacco ash, drink spillage and smoke especially that associated with smoke machines.

Handling

Protect the controls from damage during transit. Use adequate padding if you need to ship the unit. To avoid injury to yourself or damage to the equipment take care when lifting, moving or carrying the unit.

Servicing

Switch off the equipment and unplug the power cord immediately if it is exposed to moisture, spilled liquid or the power cord or plug becomes damaged during a lightning storm or if smoke odor or noise is noted. Refer servicing to qualified technical personnel only.

Installation

Install the unit in accordance with the instruction printed in the user guide.

OVERVIEW

The ART CX310 Stereo 2-Way/ Mono 3-Way Active Crossover is a perfect addition to any sound reinforcement system. Designed for PA and fixed-installation applications, the CX310 employs 24dB/ octave state-variable, fourth-order, Linkwitz-Riley filters. These filters guarantee in-phase outputs at all frequencies. This ensures the proper acoustic summing of common signals from adjacent drivers in the crossover region.

The CX310 may be used as either a stereo 2-way crossover network, splitting the signal in each channel into two

separate frequency ranges (Lo and Hi), or as a mono 3-way crossover network, splitting one signal into three separate frequency ranges (Lo, Mid and Hi).

Each channel features input level, high and low output level and crossover frequency rotary controls. A frequency x10 switch is provided for varying the crossover frequency from the standard 80Hz – 920Hz to 800Hz – 9200Hz. Front-panel output mute switches are provided for each individual output to ease system setup. The rear panel features balanced XLR and 1/4" TRS input and output connectors as well as a 2-way/ 3-way mode selector switch. Power for the CX310 is internal.

The ART CX310 Stereo 2-Way/ Mono 3-Way Active Crossover has the features and performance you need for any audio application requiring a crossover. Housed in a rugged all steel chassis, the model CX310 will provide years of reliable and continuous service.

Features

- Stereo 2-way or mono 3-way configurations
- Fourth-order Linkwitz-Riley filters
- Balanced XLR and 1/4" TRS input and output connectors
- Adjustable crossover frequency range (80Hz to 920Hz or 800Hz to 9.2kHz)
- Independent output level control for each output
- Individual output muting switches
- Clipping indicators on all outputs
- Rugged, fully shielded all-steel chassis
- Internal AC power supply
- Three year warranty

INSTALLATION

The ART CX310 may be used in a wide variety of applications and environments. Enclosed in a 1U (1.75 inches high) rack-mountable, all-steel enclosure, the unit is designed for continuous professional use. The depth is 6.5 inches, exclusive of the power cord. Mounting location is not critical. However, for greater reliability, we recommend that you not place the unit on top of power amps or other sources of heat.

AC POWER HOOKUP

The CX310 has an internal power supply designed to operate from 105 to 120VAC at 50/60Hz. Export units are configured with a different power cord and the voltage switch is set for the country of destination. Before plugging the CX310 into the AC mains, make sure that all of the equipment following the crossover outputs are turned off or that all of the outputs are turned down.

INPUT/OUTPUT CONNECTIONS

The CX310 has XLR and 1/4" TRS phone jack connectors for each input and output. All connections are active balanced although the 1/4" phone jack connections can easily be converted to unbalanced operation by using two-conductor phone plugs. Inserting a plug into a 1/4" jack disconnects the associated XLR connector.

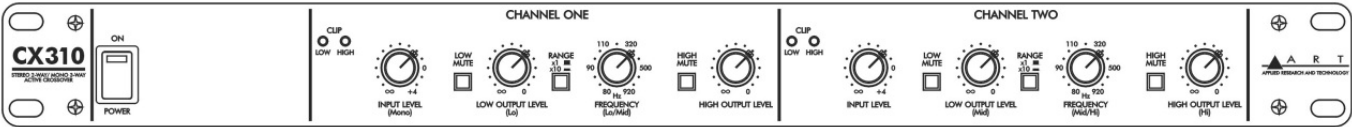
MONO 3-WAY CONFIGURATION

This information is intended to clarify how the CX310 is used in the mono 3 way configuration.

Connections:	
Input	Channel One INPUT (Channel Two INPUT not used)
Low Output	Channel One LOW OUTPUT
Mid Output	Channel Two LOW OUTPUT
High Output	Channel Two HIGH OUTPUT (Channel One HIGH OUTPUT not used)
Controls:	
Input Level	Channel One INPUT LEVEL control
Low Output Mute	Channel One LOW MUTE switch
Low Output Level	Channel One LOW OUTPUT LEVEL control
Low/Mid Crossover	Channel One RANGE switch and FREQUENCY control (Channel One HIGH MUTE switch and HIGH OUTPUT LEVEL control not used) (Channel Two INPUT LEVEL control not used)
Mid Output Mute	Channel Two LOW MUTE switch
Mid Output Level	Channel Two LOW OUTPUT LEVEL control
Mid/High Crossover	Channel Two RANGE switch and FREQUENCY control
High Output Mute	Channel Two HIGH MUTE switch
High Output Level	Channel Two HIGH OUTPUT LEVEL control

OPERATION

FRONT PANEL CONTROLS



POWER SWITCH

The POWER switch applies and removes power to the unit. Make sure that all equipment after the CX310 is either off or the outputs are turned all the way down before turning the CX310 on or off.

CLIP INDICATORS

Separate HIGH and LOW CLIP indicators are provided for each channel of the CX310. These indicators will light at approximately 3dB before clipping occurs in any stage of the channel. To prevent overloading the channel, either turn down the CX310 input control or turn down the output level of the piece of equipment feeding the CX310 (i.e. mixer, equalizer or other piece of processing equipment.).

INPUT LEVEL CONTROLS

An INPUT LEVEL control is provided on each channel of the CX310. If you are using the CX310 as a mono 3-way crossover, the Channel One INPUT CONTROL is the only one used. The INPUT LEVEL control should be set at its 0 marking in most cases. Increasing or decreasing gain should only be done to make up for deficiencies in other parts of the system.

MUTE SWITCHES

MUTE switches are provided for each output on the CX310. These are intended for use when setting up your system and testing either the crossover frequency point or the separate amplifiers and speakers they are feeding. These switches allow you to isolate a specific frequency output on a specific channel for fine-tuning or troubleshooting. It is not recommended that you mute or un-mute any frequency band during normal usage. Levels should be turned down when the MUTE switches are activated or de-activated.

LOW AND HIGH OUTPUT LEVEL CONTROLS

Each channel of the CX310 has LOW and HIGH OUTPUT LEVEL controls. These controls are used to trim the output levels to the LOW and HIGH OUTPUT jacks on the rear of the unit, respectively. If you are using the CX310 as a mono 3-way crossover, the Channel One LOW OUTPUT LEVEL control sets the level of the LOW OUTPUT, the Channel Two LOW OUTPUT LEVEL control sets the level of the MID OUTPUT, and the Channel Two HIGH OUTPUT LEVEL control sets the level of the HIGH OUTPUT.

These controls attenuate only (there is no gain). In most cases you would set them to 0 (fully clockwise). You can use these controls to prevent overdriving the inputs of your amplifiers or to compensate for variations in amplifier gain or speaker efficiency. Additionally, you can use these controls to balance the level between highs and lows in your system.

CROSSOVER FREQUENCY CONTROLS and RANGE SWITCHES

Each channel of the CX310 has a crossover FREQUENCY control and RANGE switch to set the crossover point for the high and low frequencies. These controls cover the frequency range of 80Hz – 920Hz, with the RANGE switch in the out position (x1), or 800Hz to 9.2kHz, with the RANGE switch in the in position (x10). All frequencies below the set frequency will be sent to the LOW OUTPUT and all frequencies above will be sent to the HIGH OUTPUT.

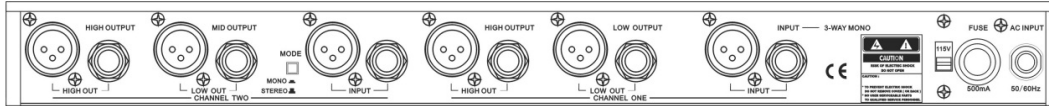
When the CX310 is used as a stereo 2-way crossover, both RANGE switches will most commonly be used in the out position (80Hz-920Hz). When used as a mono 3-way crossover, the Channel One FREQUENCY control is used to set the Low/Mid frequency point and the Channel Two FREQUENCY control is used to set the Mid/High frequency point. In this case, the Channel One RANGE switch will most commonly be used in the out position (80Hz 920Hz), while the Channel **Two** RANGE switch will most commonly be used in the in position (800Hz 9.2kHz).

The crossover filters are 4-pole Linkwitz-Riley designs (24dB/octave). This yields a sharp roll off to help protect speakers and the outputs sum to a flat response.

NOTE:

Never change the frequency range switches (from x1 to x10 position – or vice versa) with the crossover passing audio signals. This may produce transients that can damage speakers.

REAR PANEL CONNECTORS and CONTROLS



It is easy to interface the unit with a wide variety of equipment. The rear panel has balanced XLR and 1/4" phone jack connectors.

XLR JACKS

The XLR connections are balanced and follow the AES standard for wiring: Pin 1 = Ground, Pin 2 = Hot (+) and Pin 3 = Cold (-). These connectors directly parallel the associated 1/4" connectors.

1/4" PHONE JACKS

The 1/4" connections are balanced with Tip = Hot (+), Ring = Cold (-), and Sleeve = Ground. A twoconductor (tip and sleeve) shorts the Cold (-) and Ground connections together to convert to unbalanced operation. Inserting a plug into a 1/4" jack disconnects the associated XLR connector.

MONO/STEREO MODE SWITCH

This switch configures the CX310 for stereo 2-way operation with the switch in the out position or for mono 3-way operation with the switch in the in position.

APPLICATIONS

The following guidelines refer to a P.A. system, but the same basic ideas apply to a home recording setup or a Hi-Fi system.

Typical Setup

For a stereo 2-way system, separate high frequency (horn or tweeter) and low frequency (bass or subwoofer) speaker cabinets are used for each channel (left and right) of the stereo sound system and are driven by their own power amplifiers. For a mono 3-way system, separate high frequency (horn or tweeter), mid frequency (mid or full range) and low frequency (bass or subwoofer) cabinets are used for each channel of the sound system.

The crossover is used to split each channel's signal into two or three frequency bands, which feed separate amplifiers. This delivers the proper frequencies to each speaker cabinet as well as allowing its associated amplifier to produce acoustic power more efficiently.

Note: You will need **two** 310 crossovers if your three-way system is stereo.

It is very important that you use caution when selecting the crossover points for any system. Refer to the

documentation that came with your speaker cabinets for information on their proper frequency ranges. This is especially important for high frequency horns; damage may occur from sending lower frequencies than specified into the drivers!

Signal Flow

In most situations, the crossover is the last piece of equipment in the signal chain before the power amplifiers. Signal flow is as follows:

Mixer → Equalizer → Crossover → Power Amplifier → Speaker Cabinets

Sometimes a limiter is placed between the mixer outputs and the equalizer or after the equalizer for system protection.

Initial Setup Tips

1. Set all level controls to their full counter-clockwise position.
2. Connect the output(s) of your mixer (or equalizer) to the input(s) of the CX310. If stereo, Channel One is left.
3. Connect the LOW OUTPUT of each channel (LOW OUTPUT of Channel One for mono 3-way configuration) to the power amplifier powering the low frequency cabinet(s).
4. If set for mono 3-way, connect the MID output (LOW OUTPUT of Channel Two) to the power amplifier powering the mid frequency cabinet.
5. Connect the HIGH OUTPUT of each channel (HIGH OUTPUT of Channel Two for mono 3-way configuration) to the power amplifier powering the high frequency cabinet(s).
6. Set the crossover frequency for each channel (they should be the same if your PA cabinets are the same) or each frequency band for mono 3-way configuration.
7. With the power amplifier volume controls turned all the way down, turn on all equipment in the system.
8. With a program source running through the system, turn up the power amplifier volume controls and slowly turn up the crossover input level controls while checking for clipping.
9. Turn up each of the crossover's output level controls while checking each individual output for sound and performance.

WARRANTY INFORMATION

Limited Warranty

Applied Research and Technology will provide warranty and service for this unit in accordance with the following warrants:

Applied Research and Technology, (ART) warrants to the original purchaser that this product and the components thereof will be free from defects in workmanship and materials for a period of three years from the date of purchase. Applied Research and Technology will, without charge, repair or replace, at its option, defective product or component parts upon prepaid delivery to the factory service department or authorized service center, accompanied by proof of purchase date in the form of a valid sales receipt.

This warranty does not apply in the event of misuse or abuse of the product or as a result of unauthorized alterations or repairs. This warranty is void if the serial number is altered, defaced, or removed.

ART reserves the right to make changes in design or make additions to or improvements upon this product without any obligation to install the same on products previously manufactured.

ART shall not be liable for any consequential damages, including without limitation damages resulting from loss of use. Some states do not allow limitations of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific rights and you may have other rights, which vary, from state to state.

For units purchased outside the United States, an authorized distributor of Applied Research and Technology will provide service.

SERVICE

The following information is provided in the unlikely event that your unit requires service.

1. Be sure that the unit is the cause of the problem. Check to make sure that the unit has power supplied, that all cables are connected correctly, and that the cables themselves are in working condition. You may want to consult with your dealer for assistance in troubleshooting or testing your particular configuration.
2. If you believe that the ART unit is at fault, go to www.artproaudio.com. You may contact Customer Service for more assistance, or directly request a Return Authorization for service in the "resources" area of the website.
3. If you are returning the unit for service, pack the unit in its original carton or a reasonable substitute. The original packaging may not be suitable as a shipping carton, so consider putting the packaged unit in another box for shipping. Print the RA number clearly on the outside of the shipping box. Print your return shipping address on the outside of the box.
4. Include with your unit: a note with the RA number and your contact information, including a return shipping address (we cannot ship to a P.O. box) and a daytime phone number, and a description of the problem, preferably attached to the top of the unit. Also include a copy of your purchase receipt.

Fill in the following information for your reference:

Date of purchase _____

Purchased from _____

Serial Number _____

SPECIFICATIONS

Input Connections: XLR, 1/4" TRS, balanced

Output Connections: XLR, 1/4" TRS, balanced

Frequency Response: 10Hz to 20kHz, +0/-1.5dB

Crossover Frequency Range:

x1: 80Hz to 920Hz

x10: 800Hz to 9.2kHz

Crossover Filter Type: Fourth-order Linkwitz-Riley, 24dB/octave

Dynamic Range: 118dB

Signal to Noise Ratio: >85dB

Input Impedance: 20k Ohms

Output Impedance: 150 Ohms

Maximum Input Level: +13dBu

Maximum Output Level: +21dBu

Total Harmonic Distortion (THD): <0.05% (20Hz-20kHz)

Maximum Gain: +4dB

Power Requirements:

105-120V AC, 50-60hz, 3VA (USA)

Export units configured for country of destination

Dimensions (HWD):

1.75" x 19" x 6.5"

44mm x 483mm x 165mm

Weight: 7.1 lbs. (3.2 kg)

ART maintains a policy of constant product improvement. ART reserves the right to make changes in design or make additions or improvements to this product without any obligation to install these changes on products previously manufactured. Therefore, specifications are subject to change without notice.




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Documents / Resources

	<p>ART CX310 Stereo 2-Way Mono 3-Way Active Crossover [pdf] User Guide CX310 Stereo 2-Way Mono 3-Way Active Crossover, CX310, Stereo 2-Way Mono 3-Way Active Crossover, 2-Way Mono 3-Way Active Crossover, Active Crossover, Crossover</p>
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References

- [ART Pro Audio](#)

