

The ART Model 311™

Precision Stereo 2-Way Active Crossover with Subwoofer Output



USER'S GUIDE



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INTRODUCTION

Thank you for purchasing an ART 311™ - and congratulations: You now own one of the most versatile crossovers available. Offering a superb level of sound quality, the 311™ circuit design, combined with a straightforward user interface, quickly and easily gives you access to all of its features.

The Model 311™ has been carefully designed, engineered and manufactured to provide you with years of great sound and reliable service. You'll find it useful for pa systems for live sound reinforcement, public address, karaoke and other various signal processing applications.

General Overview

The Model 311™ is a fourth order Linkwitz-Riley Stereo 2-Way electronic crossover with additional subwoofer output. Each channel of the 311™ crossover splits the frequency of an input signal into two separate signals, which may then be sent to amplifiers, or other signal processing equipment in a sound system.

FEATURES:

- Balanced XLR and 1/4" inputs
- 1/4" Outputs
- 4-pole Linkwitz-Riley filter design (24dB/octave)
- Phase Reverse Switch on each channels High Output
- Switchable Low Cut (30Hz) filters on each channel and subwoofer
- Wide crossover frequency range (250Hz to 6kHz)
- Independent output level controls for each output
- Low noise circuitry
- Fully shielded all-steel chassis
- Internal AC power supply with standard IEC connector
- Designed and developed in the USA

INSTALLATION

The 311™ may be used in a wide variety of applications and environments. Enclosed in a rack-mountable, all-steel enclosure, the unit is designed for continuous professional use. 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 311™ has an internal power supply designed to operate at 115 VAC @ 50 to 60 Hz. Units manufactured for use outside the United States of America have been modified to comply with the required electrical specifications.

Before plugging the 311™ into the main AC line, make sure that all of the equipment following the crossover outputs, are turned off or all of the outputs are turned down.

ANALOG AUDIO CONNECTIONS

Audio input connections to the 311™ are balanced XLR (Pin 2 = Hot (+), Pin 3 = Cold (-), Pin 1 = Ground) and ¼" phone plug (Tip = Hot (+), Ring = Cold (-), Sleeve = Ground). All output connections are unbalanced ¼" (Tip = Hot (+), Sleeve = Ground).

SAFETY PRECAUTIONS

Warning: To avoid the risk of shock or fire, do not expose this unit to moisture. Refer all servicing to qualified personnel. Do not remove the metal cover; there are no user-serviceable parts inside. When applicable, only use the power adapter that came with this unit or one obtained from ART's Customer Service Department.

CONTROLS

POWER SWITCH

The power switch applies and removes power to the Crossover. Make sure all equipment after the 311™ is either off or the outputs are turned all the way down before turning on or off the 311™.

LOW OUTPUT LEVEL CONTROL

Each channel of the 311™ has a Low Output Level control. These controls are used to trim the output levels to the Low Output jacks on the rear of the unit.

They cover the range of -30dB to $+10\text{dB}$ of output gain trim, as indicated on the front panel. In most cases you would set them to 0dB , for flattest response from the Crossover. You can use these controls to compensate for amplifier gain variations or efficiency of your speakers.

LOW CUT FILTER SWITCH

The Low Cut switch activates a 30Hz high pass filter. There is one for each of the Low Outputs and 1 for the Subwoofer Output. This filter is a 2-pole Butterworth design (12dB/octave). Its response reduces spurious subsonic frequencies, which tightens up the low end and helps to protect your amplifiers and speakers.

CROSSOVER FREQUENCY CONTROL

Each channel of the 311™ has a crossover Frequency control to set the crossover point for the high and low frequencies. All frequencies below the set frequency will be sent to the Low output and all frequencies above the set frequency will be sent to the High output.

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

HIGH OUTPUT LEVEL CONTROL

Each channel of the 311™ has a High Output Level control. These controls are used to trim the output levels to the High Output Jacks on the rear of the unit.

They cover the range of -30dB to +10dB of output gain trim, as indicated on the front panel. In most cases you would set them to 0dB, for flattest response from the Crossover. You can use these controls to compensate for amplifier gain variations or efficiency of your speakers.

PHASE SWITCH

The Phase switch is used to switch the polarity (invert the phase) of the signal going to the High Outputs. Normally you would leave this switch in the Norm position. Putting the switch in the Invert position may be done to help correct audible phase related problems.

SUB OUTPUT LEVEL CONTROL

This control is used to trim the audio output level to the Subwoofer Output Jack on the rear of the unit. This signal is used to provide extra bass via a mono subwoofer in your system.

SUBWOOFER FREQUENCY CONTROL

The Subwoofer Frequency control sets the crossover point for signals going to the Subwoofer Output. For this function, both of the input channel signals are combined and frequencies below the set frequency will be sent to the Subwoofer Output. This is in addition to the normal signals that are sent to each of the channels other outputs.

CONNECTIONS



It is easy to interface the unit with a wide variety of equipment. The rear panel has balanced XLR and 1/4" inputs as well as unbalanced 1/4" outputs.

XLR INPUT JACKS (REAR)

The XLR input connections are balanced and follow the AES standard for wiring: Pin 1 = Ground, Pin 2 = Hot (+), Pin 3 = Cold (-). This input parallels the 1/4" inputs.

1/4" INPUT JACKS (REAR)

The 1/4" input connections are balanced with Tip = Hot (+), Ring = Cold (-), and Sleeve = Ground. This input directly parallels the XLR input.

1/4" OUTPUT JACKS (REAR)

The 1/4" Output jacks are unbalanced. Tip = Hot (+) and Sleeve = Ground. They are used for sending signals to amplifiers, or other unbalanced configurations.

OPERATION

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

A stereo 2-way sound system is typically set up as follows: Separate high frequency (horn or tweeter) and low frequency (bass) cabinets are used for each side (left and right) of the sound system. The crossover is used to split each side of the stereo signal into two frequency bands, which will feed separate power amplifiers. This arrangement accomplishes two things: it allows the proper frequencies to be routed to the proper speaker cabinets and it allows the amplifier to produce power more efficiently to the speakers it is driving.

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: From the output of the mixer to an equalizer (Sometimes, for system protection, a limiter is placed between the mixer outputs and the equalizer, or after the equalizer.) From the equalizer to the crossover. From the crossover to the power amplifiers. From the power amplifiers to the speaker cabinets.

Here are some tips to help you with your initial setup.

1. Set all level controls to their full counter-clockwise position (-30dB.)
2. Connect the outputs of your mixer (or equalizer) to the inputs of the 311™. If stereo, Channel One is Left.

3. Connect the Low output of Channel One to the power amplifier powering the low frequency cabinets (left).
4. Connect the High output of Channel One to the power amplifier powering the high frequency cabinets (left).
5. Repeat for the right side of the system (Channel Two).
6. Connect the Subwoofer output to the subwoofer amplifier.
7. Set the crossover frequency for both channels (they should be the same if your PA cabinets are the same).
8. Set the crossover frequency for the Subwoofer output to that recommended for the Subwoofer.
9. With the power amplifier volume controls turned all the way down, turn on all equipment in the system.
10. With a program source running through the system, turn up the power amplifier volume controls and slowly turn up the crossover output 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, (A R T) 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 **one** year 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.

Exclusions:

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 the unit has the proper power supplied, all cables are connected correctly, and the cables themselves are in working condition.

2) If you find the unit to be at fault, write down a complete description of the problem, including how and when the problem occurs. Please write down a description of your complete setup before calling Customer Service.

3) Contact our Customer Service Department at (585) 436-2720 for your Return Authorization number or questions regarding technical assistance or repairs. Customer Service hours are 9:00 AM to 5:00 PM Eastern Time, Monday through Friday.

4) Pack the unit in its original carton or a reasonable substitute. The packing box is not recommended as a shipping carton. Put 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.

5) Include with your unit: a return shipping address (we cannot ship to a P.O. Box), a copy of your purchase receipt, a daytime phone number, and a description of the problem.

6) Ship your unit (keep your manual!) to:

APPLIED RESEARCH AND TECHNOLOGY

215 TREMONT STREET

ROCHESTER, NEW YORK 14608

ATTN: REPAIR DEPARTMENT

RA# _____

311™ SPECIFICATIONS

Dimensions	1.75"H x 19"W x 5.5"D
Weight	4.85 lbs. (2.2 kg)
Input Connections	XLR, ¼" TRS, balanced
Output Connections	¼"TS, unbalanced
Input Impedance	100K ohms
Output Impedance	220 ohms
Maximum Input Level	+21dBu
Maximum Output Level	+21dBu
CMRR	>75dB (typical @ 1kHz)
Frequency Response	10Hz to 40kHz, +/- .5dB
Signal to Noise Ratio	>95dB, Ref: 0dBu 20Hz to 20kHz, unweighted
Dynamic Range	>114dB
Total Harmonic Distortion	<0.01% (20Hz-20kHz,0dBu)
Crossover Filter Type	Fourth-order Linkwitz-Riley, 24dB/octave, state-variable
Crossover Frequency Range	250Hz to 6kHz
Subwoofer Filter Type	Two-pole Butterworth, 12dB/ octave
Subwoofer Frequency Range	50Hz to 250Hz
Power Requirements	USA – 110-125V AC / 50-60hz/ 15W Export units configured for country of destination.

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

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