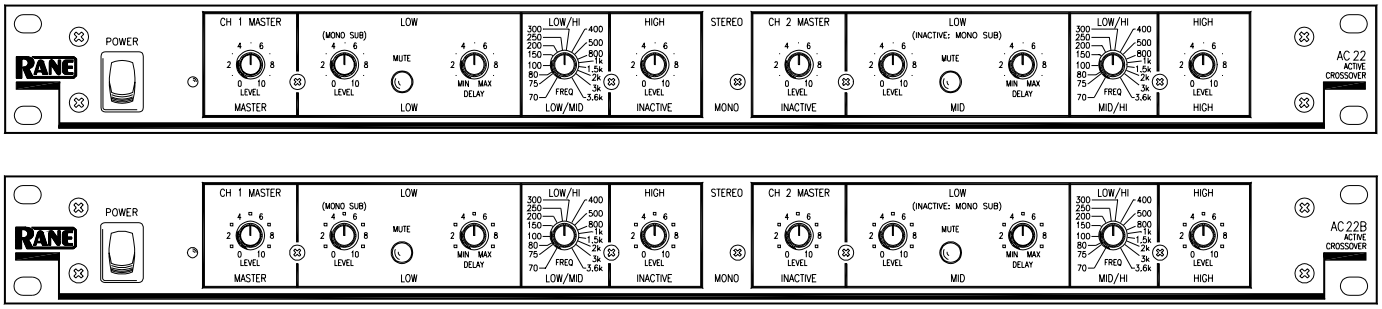


General Description

The Rane AC 22 and AC 22B Active Crossovers are Stereo 2-Way with mono subwoofer option, or can be used as a Mono 3-Way. They employ state-variable 4th-order Linkwitz-Riley filter alignments to minimize phase difficulties in the critical crossover region. The model AC 22 utilizes ¼" TRS connectors with balanced/unbalanced inputs and unbalanced outputs. The new AC 22B uses XLR connectors with active balanced inputs *and* outputs.

Simply put, a Linkwitz-Riley alignment is two cascaded 2nd-order Butterworth filters exhibiting identical phase characteristics on their Low pass and High pass Outputs. This characteristic guarantees in-phase outputs at all frequencies. In-phase outputs are mandatory for proper acoustic summing of common signals from adjacent drivers in the crossover region. An added benefit of this topology is steep 24 dB per octave rolloff slopes. A slope of this magnitude guarantees drivers designed to produce a specific range of frequencies, and no more, will not be driven past their limits, thereby minimizing distortion and driver fatigue.

To further guarantee the transparent operation of the AC 22 and AC 22B, adjustable Delay circuits appear on the Low (& Mid when used in 3-Way mode) Outputs of each Channel to compensate for any physical misalignment of the drivers. Time correction ensures the mechanical phase alignment of adjacent drivers will be acoustically correct, thus maintaining the integrity of the electrical phase alignment of the crossover's filters. The Low Delay circuit may be internally transplanted to the High Output when neccessary. CD horn equalization is also possible with an internal modification.

See RaneNote 107 for more information regarding Linkwitz-Riley designs.

Features

- Stereo 2-Way or Mono 3-Way
- Linkwitz-Riley Alignment with 24 dB per Octave Slopes
- Adjustable Delays
- Mono Subwoofer Switch and Output
- Infrasonic, Ultrasonic, and RFI Filters
- Low Output Muting (2-Way)
- Input & Output Level Controls
- UL/CSA/CE and 100/120/230 VAC Remote Power Supplies

AC 22 Features

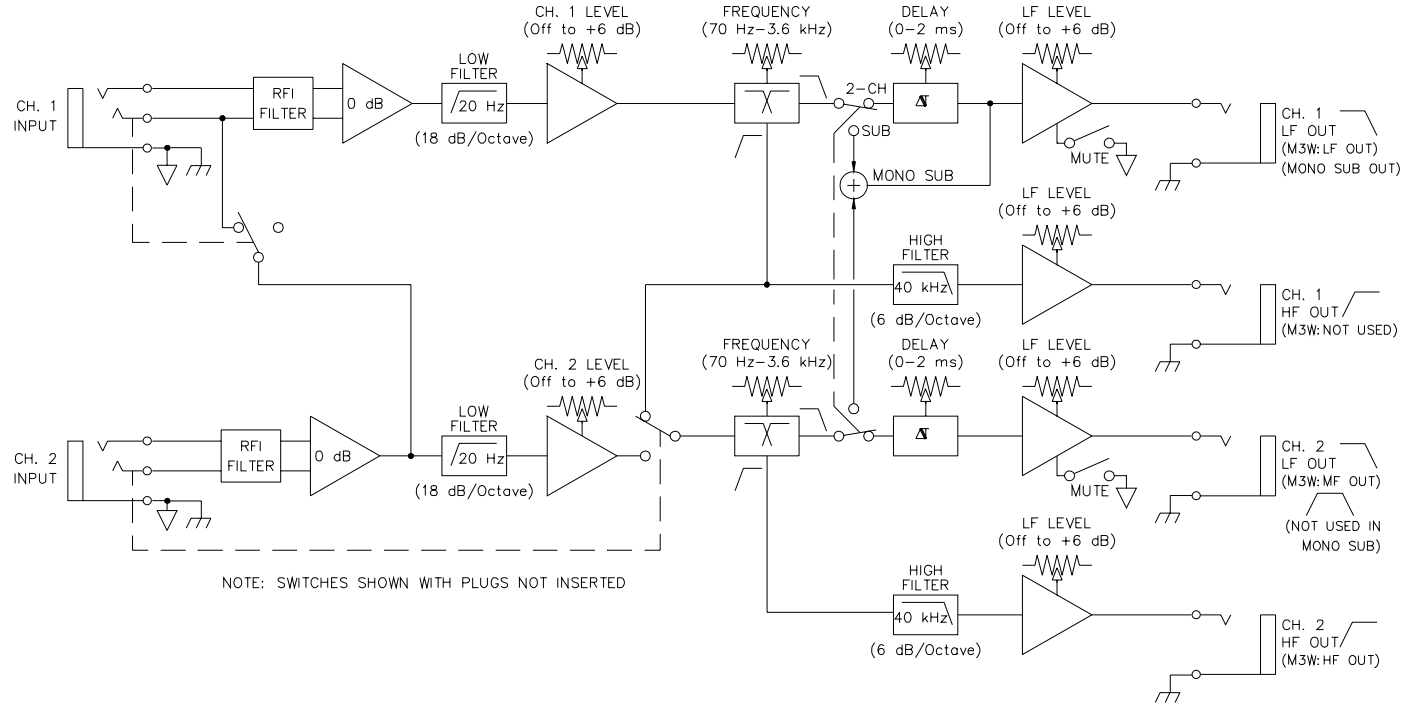
- ¼" TRS Inputs & ¼" TS Outputs
- Active Balanced/Unbalanced Inputs & Unbalanced Outputs

AC 22B Features

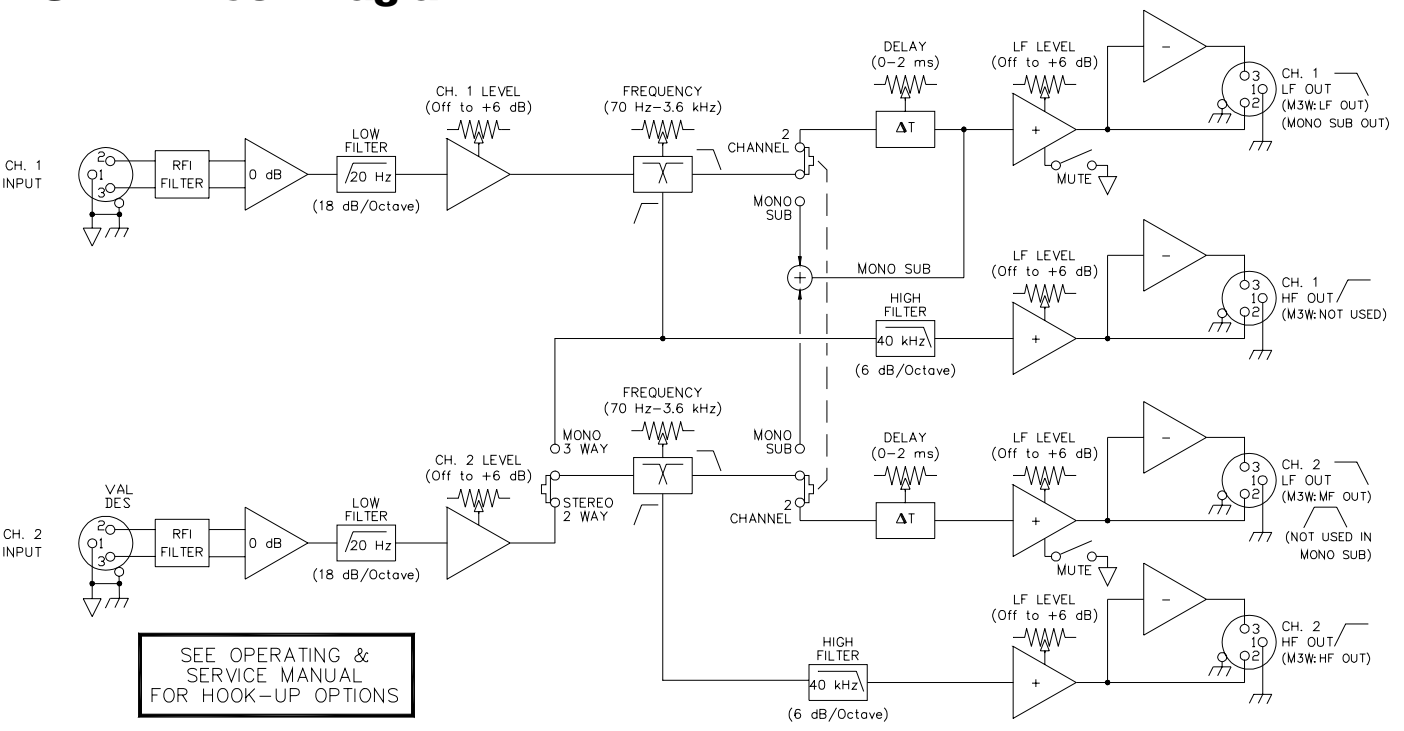
- XLR Inputs & Outputs
- Fully Active Balanced Inputs & Outputs

Parameter	Specification	Limit	Units	Conditions/Comments
Crossover: Alignment	Linkwitz-Riley			Proprietary 4th-order state-variable
.....Slopes	24 dB/octave			
.....Range	70-3.6 kHz Low to High			41-detent continuously variable pot
Time Delay Adjust Range	Off to +2	5%	ms	Low & Mid Outputs
AC 22 Inputs: Type	Active Balanced/Unbalanced			
.....Connectors	¼" TRS			
.....Impedance	20k	1%	ohms	
.....Maximum Level	+21	1	dBu	
.....Gain Range	Off to +6	-0/+4	dB	
AC 22 Outputs: Type	Active Unbalanced			
.....Connectors	¼" TS			
.....Impedance	100	1%	ohms	
.....Maximum Level	+20	1	dBu	600 ohms or greater
.....Gain Range	Off to +6	-0/+4	dB	
AC 22B Inputs: Type	Active Balanced			
.....Connectors	XLR			pin 2 hot per AES standards
.....Impedance	20k	1%	ohms	
.....Maximum Level	21	1	dBu	
.....Gain Range	Off to +6	-0/+4	dB	
AC 22B Outputs: Type	Active Balanced			
.....Connectors	XLR			pin 2 hot per AES standards
.....Impedance	200	1%	ohms	
.....Maximum Level	+20	1	dBu	600 ohms or greater
.....Gain Range	Off to +12	-0/+4	dB	
Band Muting Switches	Yes			Low & Mid Outputs
RFI Filters	Yes			
Infrasonic Filter	20 Hz, 18 dB/oct., Butterworth	3%	Hz	
Ultrasonic Filter (AC 22)	40 kHz, 6 dB/oct., Bessel	3%	Hz	Linear phase
Frequency Response	20-40 kHz	+0/-3	dB	
THD+Noise	0.02	.01	%	+4 dBu, 20-20 kHz
IM Distortion (SMPTE)	0.02	.01	%	60 Hz/7 kHz, 4:1, +4 dBu
Signal-to-Noise Ratio	92	2	dB	re +4 dBu, 20 kHz noise bandwidth
Unit: Agency Listing				
.....120 VAC model	Class 2 Equipment			National Electrical Code
	UL & CSA			Exempt Class 2 equipment
.....230 VAC model	CE-EMC			EMC directive 89/336/EEC
	CE-Safety			Exempt per Art. 1, LVD 73/23/EEC
Power Supply: Agency Listing				Class 2 Equipment
.....120 VAC model	UL			File no. E88261
	CSA			File no. LR58948
.....230 VAC model	CE-EMC			EMC directive 89/336/EEC
	CE-Safety			LV directive 73/23/EEC
.....100 VAC model	Built to JIS			Japan only
Power Supply Requirement	18 VAC w/center tap	0.1	Vrms	RS 1 (see data sheet)
.....Maximum Current	160		mA	RMS Current from Remote Supply
Unit: Construction	All Steel			
.....Size	1.75"H x 19"W x 5.3"D (1U)			(4.4 cm x 48.3 cm x 13.3 cm)
.....Weight	4 lb			(3 kg)
Shipping: Size	4.25" x 20.3" x 13.75"			(11 cm x 52 cm x 35 cm)
.....Weight	8 lb			(5 kg)
Note: 0 dBu=0.775 Vrms				

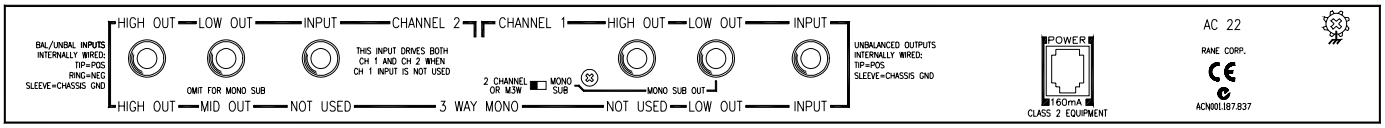
AC 22 Block Diagram

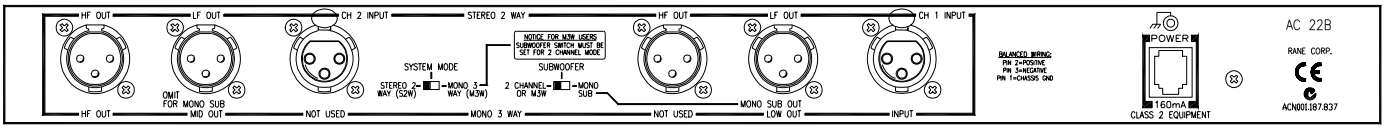


AC 22B Block Diagram



Rear Panels





Choosing the Right Configuration: Mono, Two-Channel Mono or Stereo?

Very few systems indeed will utilize a two channel crossover for the purpose of true stereo imaging. Discrete stereo channels which are run from the mixing board are usually used for panning effects and/or for separate equalization of left and right speaker stacks. Different sides of the room often require significantly different equalization due to varying room acoustics, dimensions, positioning of speaker stacks near walls, curtains and the like.

Even though you may not plan to use stereo equalization or panning effects, it is recommended that your system utilize discrete crossover channels for each stack of speakers to ensure flexibility and control for consistent, optimum sound quality. For example, if you plan to run a multi-stack system mono three-way, use the AC 23 rather than the AC 22 for separate control over each set of speakers—especially since phase alignment may differ with each stack requiring separate time delay adjustments. Even with only a single system equalizer, the AC 23 can deliver the extra independent control which can make a difference in sound throughout the listening area. If all drivers are built into a single cabinet, or you are running bi-amped monitors, then the AC 22 is the one for you.

Available Accessories

- SC 1.7 Security Cover

Architectural Specifications

The active crossover shall contain 4th-order Linkwitz-Riley filters. Provisions shall exist to correct for driver misalignment by means of adding time delay to the low frequency outputs.

The crossover frequency shall be controlled by a continuously variable control with 41 detents to allow mechanical reference of crossover setting.

Signal inputs shall be active balanced/unbalanced designs terminated with ¼" TRS (tip-ring-sleeve) connectors for the AC 22, and active balanced terminated with XLR connectors for the AC 22B. Signal outputs shall be unbalanced type terminated in ¼" TS connectors for the AC 22, and active balanced design terminated with XLR connectors for the AC 22B. RFI filters shall be provided. Infrasonic and ultrasonic filters shall be built-in.

The active crossover shall afford an input level range of off to +6 dB. The output level controls shall afford a level range of from off to +6 dB (+12 dB for the AC 22B) with muting capability on the low frequency outputs. The crossover shall supply two independent channels.

The unit shall be exempt from agency safety requirements and powered from a UL listed, CSA certified remote power supply (120 VAC) or CE approved (230 VAC) via a rear panel input modular plug. The unit shall be constructed entirely from cold-rolled steel, and mount into a standard 1U EIA rack.

The unit shall be a Rane Corporation AC 22 or AC 22B Active Crossover.

References

1. S.H. Linkwitz, “Active Crossover Networks for Noncoincident Drivers,” *J. Audio Eng. Soc.*, vol. 24, pp. 2-8 (Jan/Feb 1976).
2. D. Bohn, “A Fourth-Order State-Variable Filter for Linkwitz-Riley Active Crossover Designs,” presented at the 74th Convention of the Audio Engineering Society, New York, Oct. 9-12, 1983, preprint no. 2011.
3. D. Bohn, “Linkwitz-Riley Crossovers,” *Rane Note 107*, (1983).
4. D. Bohn, “Why Not Wye?” *Rane Note 109*, (1984).
5. D. Bohn, “Overload Characteristics of State-Variable Crossovers,” *Rane Note 112*, (1985).
6. D. Bohn, “Linkwitz-Riley Active Crossovers Up To 8th-Order: An Overview,” *Rane Note 119,* (1989).