



RENKUS-HEINZ

MODELS

X12

X14

X24

Loudspeaker Controllers



Advanced Circuitry for Optimum Performance

The X12, X14 and X24 use advanced electronic circuitry to optimize the overall performance of their associated loudspeakers while protecting them from overload damage. The X12 is a single channel 2-way controller designed for use with two-way loudspeakers such as the SR and TRC Complex Conic loudspeaker systems or with 3-way CoEntrant loudspeakers set up for bi-amping with built-in mid/high crossovers. The X-24 is a dual channel version of the X12 intended for use with the same loudspeakers in stereo systems. The X-14 is a single channel 4-way controller designed for use with 3-way loudspeaker systems, such as the CE-3T, or in 2-way and 3-way systems that also have subwoofers. All three controllers utilize individual crossover, response equalization/delay and protection modules to provide 3rd or 4th order electronic crossovers, preset parametric equalizers to smooth and extend the loudspeaker's frequency response and sophisticated loudspeaker protection circuitry. When needed, signal (time) alignment is also provided. These modules are plug-in to allow the controller to be easily reconfigured for use with other loudspeaker systems.

Efficient, Cost Effective System Design

The complete crossover, response equalization and protection circuitry provided by these controllers eliminates the need for separate electronic crossovers, compressors and limiters. This simplifies system design and setup, cuts rack space requirements and reduces overall system cost while optimizing performance.

Positive Loudspeaker Protection

The X12, X14 and X24 feature sophisticated protective circuitry that unobtrusively protects the transducers against damage from overheating (thermal overload), over excursion and the deterioration caused by high level transients. Thermal protection is provided by a slow acting gain reduction circuit that prevents overheating without upsetting the system balance. A power/frequency dependent gain reduction circuit is used to prevent low frequency over excursion damage. High level transient protection is provided by a unique limiter that ensures the highest possible dynamic range while preventing destructive signals from reaching the components. The limiter is entirely transparent and does not color the audio signal.

Exclusive Sense Fail Circuitry (US Patent # 4887298)

These controllers protective circuitry relies upon data received from sense lines connected to the power amplifier outputs. These lines are constantly monitored and if a sense line connection is broken, the controller senses that protection has been lost and "mutes" that channel. This prevents damage to the loudspeakers while the protective circuitry is not functioning because of the absence of a sense signal.

Diagnostic LED Matrix

Color LEDs provide system status information at a glance. Green status indicators are used to indicate normal operation with red indicators reserved for malfunctions needing immediate attention.

TECHNICAL SPECIFICATIONS

TYPE:	PROTECTION CIRCUITRY:
X12: Single-channel, 2-way	TRANSIENTS: Fast acting limiter
X14: Single-channel, 4-way	EXCURSION: Frequency dependent gain reduction
X24: Dual-channel, 2-way	THERMAL: Soft limiting; controlled by long term detectors.
SIGNAL INPUTS: 100 K ohms bal., +4 dBm nominal	SENSE FAIL: Loss of sense line activates muting of affected output.
SENSE LINES: 100 K ohms floating	INDICATORS:
FREQUENCY RESPONSE: ± 0.5 dB, 20 Hz to 20 kHz (no EQ)	POWER: Green LEDs
THD & IM DISTORTION: < 0.01% @ 1 kHz	SIGNAL PRESENT: Green LEDs
HUM & NOISE: -100 dBV, 20 Hz to 20 kHz	PROTECTION: Red LED's
COMMON MODE REJECTION: > 60 dB @ 400 Hz	SENSE FAIL: Red LEDs
OVERALL GAIN: Unity, 20 Hz to 20 kHz (no EQ)	REAR PANEL CONNECTORS: Female XLR-3 for inputs; male XLR-3 for outputs.
OUTPUTS: 200 ohms bal., +20 dBm max.	4-pin plug-in connectors for sense inputs.
CROSSOVERS: Third or fourth order, 18 dB or 24 dB per octave	DIMENSIONS (H X W X D): 1.75" x 19" x 9.25" (4.4 cm x 48.2 cm x 23.5 cm)
POWER REQUIREMENTS: Selectable; 115V/230 V, 50/60 Hz; 20 watts maximum	NET / SHIPPING WEIGHT: 8.0 lbs (3.6 kg) / 12 lbs (5.4 kg)
FUSE: 5 x 20 mm, 0.400 Amp. Slow Blow	

ARCHITECTS AND ENGINEERS SPECIFICATIONS

Use for X12 only

The loudspeaker controller shall be a Renkus-Heinz model X12 or approved equal single-channel, two-way loudspeaker controller designed for use with 2-way loudspeakers in single-channel systems.

Use for X14 only

The loudspeaker controller shall be a Renkus-Heinz model X14 or approved equal single-channel, four-way controller designed for use with 3-way and 4-way loudspeakers in single-channel systems.

Use for X24 only

The loudspeaker controller shall be a Renkus-Heinz model X24 or approved equal two-channel, two-way loudspeaker controller designed for use with 2-way loudspeakers in two-channel (stereo) systems.

Use for all models

It shall include plug-in personality modules calibrated to match the crossover, equalization, protection and delay requirements of the associated loudspeaker systems. The modules shall be removable to allow the controller to be reconfigured for use with other loudspeaker systems.

The loudspeaker controller and its personality modules shall provide preset response shaping circuitry (para-

metric EQ's) for the associated loudspeakers, (3rd or 4th order, 18 dB or 24 dB per octave) active crossovers, any necessary low frequency signal delay circuitry, and protective circuitry for the associated loudspeakers. The protective circuits shall be designed to prevent damage from overheating (thermal overload), from over-excitation and from high-level transients.

Fail safe sense line circuitry shall also be provided to prevent damage from occurring if any of the sense line connections should be broken.

The controller shall have instrumentation style balanced inputs with a common mode rejection ratio of at least 60 dB at 400 Hz. XLR type input and output connectors shall be provided; sense lines shall terminate in 4-pin plug-in connectors. Frequency response shall be ± 0.5 dB, 20 Hz to 20 kHz (neglecting EQ) with less than .01% THD and IM distortion. Hum and noise shall be less than 100 dBV, 20 Hz to 20 kHz.

The controller shall be finished in black, be no more than 1.75" high, 19" wide and 9.25" deep and weigh no more than 8 Lbs.

