

# MX100 Technical Specifications

## AUDIO PERFORMANCE

Dynamic Range	Nominal 115 dB, > 105 dB
THD+N (0 dBu 20 Hz - 20 kHz)	.003% (≤0.005%)

## INPUT

Connectors Type	Female XLR (Locking) Electronically Balanced Differential
Differential Impedance	15 kΩ Input
Unbalanced Impedance	7.5 kΩ Input
Input Overload (20 Hz - 20 kHz)	20 dBu

## OUTPUT

Connectors Type	Male XLR (Locking) Single-Ended
Impedance	47 Ω
Max Voltage	20 dBu
Minimum Resistive Load	1 kΩ
Maximum Capacitive Load	10 nF (Outputs are stable with any capacitive load.)
Output Noise (20 Hz - 20 kHz, R <sub>n</sub> = 600 Ω, All Bands Unity Gain)	
LF/HF	100 dB (typical)

## OPERATING MODES

(Note: Mode is set internally)

<b>Stereo Low Mode</b>	
HF Outputs	2 Male XLR's
LF Outputs	3 Male XLR's (1 Left Channel, 2 Right Channel)
<b>Mono Low Mode</b>	
HF Outputs	2 Male XLR's
Summed Mono LF	2 Male XLR's
Summed Mono Full Range	1 Male XLR

## ELECTRICAL/ ENVIRONMENTAL

Dimensions	19" W x 1.75" H x 6.25" D
Line Input Power	5 Watts
<b>Line Voltage Requirements</b>	
120 VAC Setting	103-127 VAC, 50-60 Hz
240 VAC Setting	206-255 VAC, 50-60 Hz
Line Input	IEC 320 Block
Fuse Holder	Tamper-proof Screw Release
Fuse Type	T1A
Operating Temperature	0° - 50° Celsius
Accessories Included	UL/CSA Line Cord

## CROSSOVER FILTER TYPE

HF High Pass	4 <sup>th</sup> Order Linkwitz- Riley, Variable F <sub>0</sub>
LF Low Pass	4 <sup>th</sup> Order Linkwitz- Riley, Variable F <sub>0</sub>

## CROSSOVER CUTOFF FREQUENCIES

HF High Pass	60 Hz - 2 kHz
LF Low Pass	60 Hz - 2 kHz

## SYSTEM HIGHPASS AND LOWPASS

LF High Pass	4 <sup>th</sup> Order, Variable Q, Variable F <sub>0</sub>
HF Low Pass	4 <sup>th</sup> Order Butterworth, -3 dB @ 35.2 kHz

## PASS BAND GAIN

HF/LF	-10 dB to +10 dB
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# MX200i, MX300i, MX800i Technical Specifications

## AUDIO PERFORMANCE

Dynamic Range	115 dB typical (≥108 dBu)
THD+N	(0 dBu 20-Hz 20 kHz) 0.03% typical (≤0.08%)

## INPUT

Connectors Type	Female XLR (Locking) Electronically Balanced Differential
Differential Input Impedance	>10 kΩ
Common-Mode Input	30 kΩ
Input Overload (20 Hz - 20 kHz)	+18 dBu

## OUTPUT

Connectors Type	Male XLR Single-Ended
Impedance	10 Ω
Max Voltage	+18 dBu
Minimum Resistive Load	300 Ω
Maximum Capacitive Load	22 nF (Outputs are stable with any capacitive load.)
Offset Voltage	±1.5 mV (±10 mV limit)

<b>Output Noise (20 Hz - 20 kHz, R<sub>s</sub>=600 Ω)</b>	
MX200i HF	
MX300i HF	
MX800i HF	-97 dBu Typical (≤ 94 dBu)
MX200i LF	
MX300i LF/SB	
MX800i MF/LF/SB	-100 dBu Typical (≤ 97 dBu)

## ELECTRICAL/ ENVIRONMENTAL

Dimensions	19" W x 3.5" H x 10" D
Line Input Power	≤30 W
<b>Line Voltage Requirements</b>	
115 VAC Setting	90-135 VAC, 50-60 Hz
230 VAC Setting	195-270 VAC, 50-60 Hz
Line Input/ Fuse Holder	IEC 320 socket with 5 x 20 mm fuseholder
Operating Temperature	0° - 50° Celsius
Accessories Included	UL/CSA Line Cord, Spare Line Fuse (in Fuse Holder)

## MX200i, MX300i, MX800i HF SECTION DATA

HF Equalization	Shelving EQ Circuit, Boost Set Via Internal Multiposition Jumper, MX300i/MX800i Switch Defeats Circuit
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Highpass Filter Type	Two Cascaded Second-Order Sections, Variable F <sub>0</sub> Set Via Internal Resistor SIP
Lowpass Filter Type	Third-Order Butterworth
Limiter Type	RMS Above Threshold Infinite Compressor
Limiter Time Constant	39 msec
Limiter Threshold	Set via Internal Master Threshold Control & HF Threshold Resistor
Pass Band Gain	Range of ± 10 dB Set via Internal HF Gain Resistors

## MX800i MF SECTION DATA

Highpass Filter Type	Two Cascaded Second-Order Sections, Variable F <sub>0</sub> Set via Internal Resistor SIP
Lowpass Filter Type	Two Cascaded Second- Order Sections, Variable F <sub>0</sub> Set via Internal Resistor SIP
Phase	Network Type, MF/HF 1st Order Allpass
Phase Adjustment	0° - 180° (F <sub>0</sub> Set via Internal MF Phase Resistor)
Limiter Type	RMS Above Threshold Infinite Compressor
Limiter Time Constant	85 msec
Limiter Threshold	Set via Internal Master Threshold Control & MF Threshold Resistor
Pass Band Gain	Range of ± 10 dB Set via Internal MF Gain Resistors

## MX200i LF SECTION DATA

Lowpass Filter Type	Two Cascaded Second- Order Sections, Variable F <sub>0</sub> Set via Internal Resistor SIP
Phase Network Type	1st Order Allpass
Phase Adjustment, LF/HF	0° - 180° (F <sub>0</sub> Set via Internal LF Phase Resistor)
Limiter Type	RMS Above Threshold Infinite Compressor
Limiter Time Constant	182 msec
Limiter Threshold	Set via Internal Master Threshold Control & LF Threshold Resistor
Pass Band Gain	Range of ± 10 dB Set via Internal LF Gain Resistors
LF Equalization	Underdamped 2nd Order Sallen-Key Highpass Filter, Variable F <sub>0</sub> & Q Set via Internal PCB's

Dynamic LF Excursion Control	Sliding 2nd Order Highpass Filter Controlled by RMS Level in LF Passband, Engages when RMS Level is within 10 dB of LF RMS Threshold
Fixed LF Excursion Control	2nd Order Butterworth Highpass Filter, Variable F <sub>0</sub> , Set via Internal PCB's

## MX300i, MX800i LF SECTION DATA

<b>All Sub Modes</b>	
Lowpass Filter Type	Two Cascaded Second- Order Sections, Variable F <sub>0</sub> Set via Internal Resistor SIP
Phase Network Type	1st Order Allpass
Phase Adjustment, LF/MF	0° - 180° (F <sub>0</sub> Set via Internal LF Phase Resistor)
Limiter Type	RMS Above Threshold Infinite Compressor
Limiter Time Constant	85 msec
Limiter Threshold	Set via Internal Master Threshold Control & LF Threshold Resistor
Pass Band Gain	Range of ± 10 dB Set via Internal LF Gain Resistors

## SUB ADJ Mode

Highpass Filter Type	Two Cascaded Second-Order Sections, Variable F <sub>0</sub> , Set via Internal Resistor SIP
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## SUB DIST Mode

Fixed LF Excursion Control	2nd Order Butterworth Highpass Filter, Variable F <sub>0</sub> , Set Via Internal PCB's
Dynamic LF Excursion Control	Sliding 2nd Order Highpass Filter Controlled by RMS Level in SUB Passband, Engages when RMS Level is within 10 dB of SUB RMS Threshold

## SUB OFF Mode

Fixed LF Excursion Control	Two Cascaded 2nd Order Highpass Filters, Variable F <sub>0</sub> , Set via Internal PCB's
Dynamic LF Equalization	Underdamped Sliding 2nd Order Highpass Filter Controlled by RMS Level in SUB Passband, Engages when RMS Level is within 10 dB of SUB RMS Threshold

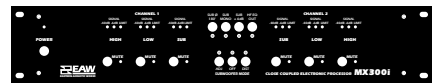
## MX300i, MX800i, SUB SECTION DATA

SUB Mono	Front Panel Button Sums Both SUB Bands, Each Attenuated 3 dB
SUB Boost	Front Panel Button Increased Passband Gain 6 dB
Polarity	Front Panel Switch Reverses Polarity When Depressed
Lowpass Filter Type	Two Cascaded Second-Order Sections, Variable F <sub>0</sub> , Set via Internal Resistor SIP
Phase Network Type	1st Order Allpass
Phase Adjustment, LF/SUB	0° - 180° (F <sub>0</sub> Set via Internal SUB Phase Resistor)
Limiter Type	RMS Above Threshold Infinite Compressor
Limiter Time Constant	182 msec
Limiter Threshold	Set via Internal Master Threshold Control & SUB Threshold Resistor
Pass Band Gain	Range of ± 10 dB Set via Internal LF Gain Resistors
Dynamic SUB Excursion Control	Sliding 2nd Order Highpass Filter Controlled by RMS Level in SUB Passband, Engages when RMS Level is within 10 dB of SUB RMS Threshold
SUB Equalization	Underdamped 2nd Order Sallen-Key Highpass Filter, Variable F <sub>0</sub> & Q Set via Internal PCB's

## MX200i, MX300i, MX800i

### MX200i, MX300i

The MX200i CCEP is a two-channel, two-way and the MX300i CCEP™ is a two-channel, three-way electronic crossover. Both are designed for use in fixed installations and touring sound systems and are supplied configured for use with specific EAW loudspeaker systems or combinations of subwoofers and full range systems. This removes the burden of "setting up" from the end user and assures optimum system performance under all conditions. CCEPs are compact, robust and very reliable, yet simple to service should the need arise.



### OVERLOAD PROTECTION

Each frequency band has its own overload protection circuitry. A true-RMS above threshold infinite compressor momentarily reduces gain whenever the preset output limit is approached. This is normally set to prevent the power amplifiers from being driven into clipping, but may also be intentionally set lower to protect particularly delicate drivers or to limit the maximum long term output of the system.

### LOW FREQUENCY CONTROL

The MX300i's low frequency output incorporates a low frequency control circuit to provide both stepdown alignment equalization and high pass filtering to prevent operation below system cutoff. This equalized filter is controlled to provide maximally extended distortion free low frequency response at all power levels. The threshold for this circuit is pre-set at the factory.

### SUB-BASS MODE

The MX300i's front panel switchable sub-bass modes - "OFF", "ADJacent" and "DIStant" - enable the user to maintain the correct sound balance and source localization with and without subwoofers and whether the subwoofers, if used, are adjacent to the main speaker stacks or located remotely. This is particularly valuable when sub-bass systems are mounted at ground level and the rest of the system is flown.

### PHASE COMPENSATION

Each MX200i or MX300i configuration incorporates phase correction circuitry, tailored to the specific systems for which it is designed. This technique compensates for the phase response of the drivers and their relative placement in the enclosure to present the listener with accurate, phase coherent sound. At the crossover points of any multi-way system, the sum of the upper and lower output bands should be flat: This state of affairs occurs only

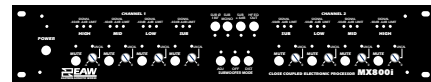
when the two signals being summed are in phase with each other. The amplitude responses of the filter and loudspeaker may each be correct. But when they are combined, phase errors can easily be introduced, so that the overall response is not flat. Definition and intelligibility are lost. Attempts to correct crossover-related phase errors through equalization may disguise the problem, but cannot cure it. The result may produce acceptable measurements with low resolution test equipment such as 1/3 octave analyzers. More detailed measurements as well as simple listening tests confirm that attempts to compensate for phase errors with equalization produce an inconsistent system with audible irregularities.

### ASYMMETRICAL FILTERS

The MX200i and MX300i CCEPs use multiple second order filters to create the fourth order filters on each frequency band. These second order filters are independently adjustable. These adjustments, performed with the aid of integrated test data acquisition and computer modelling software, are a key element in the close coupling of the crossover to a particular speaker system.

### MX800i

The MX800i CCEP two-channel, four-way electronic crossover is designed for fixed installations and touring sound systems. It is supplied configured for use with specific EAW systems. This ensures optimum system performance under all conditions, without the burden of "setting up." The unit is compact, robust and very reliable, yet simple to service should the need arise.



### OVERLOAD PROTECTION

Each frequency band has an independent true-RMS above threshold infinite compressor to reduce gain momentarily whenever the preset output limit is approached.

### LOW FREQUENCY CONTROL

The MX800i's lowest operating output band incorporates a low frequency control circuit that provides stepdown alignment equalization along with high pass filtering to prevent operation below system cutoff. This equalized filter is controlled to provide maximally extended distortion-free low frequency response at all power levels.

### SUB-BASS MODE

Front panel switches select "OFF", "ADJacent" and "DIStant" sub-bass modes. This maintains the correct sound balance and source localization regardless of whether or not you use subwoofers, or whether the subwoofer systems are mounted adjacent to the main speaker

stacks or located remotely. This function is particularly useful when subwoofers are mounted at ground level and the rest of the system is "flown."

### PHASE COMPENSATION

At the crossover points of any multi-way system, the sum of the upper and lower output bands should be flat so as not to cause any peaks or dips in the overall system response. However, this state of affairs occurs only when the two signals being summed are in phase with each other.

The amplitude responses of the filter and loudspeaker may each be correct. But when they are combined, phase errors are almost certain to occur so that the overall response is not flat. Many manufacturers use equalization in an attempt to combat this shortcoming but equalization is only an attempt to hide the problem; it doesn't cure it.

The MX800i CCEP™ incorporates phase correction circuitry, tailored to the specific system for which it is configured. This circuit compensates for the phase response of the drivers and their relative placement in the enclosure to present the listener with accurate, phase coherent sound. Without phase correction, the high frequency drivers in a multi-way system tend to lag behind low frequency drivers, causing a significant loss of definition and intelligibility.

### ASYMMETRICAL FILTERS

The MX800i CCEP™ incorporates independent internal settings for each of the six filters on each channel. Using each filter's individual settings, we are able to independently adjust both pairs of second order filters used to create the ultimate fourth order slope. This asymmetrical filter design is a key element in the close coupling of the crossover to a particular speaker system to compensate for the acoustical characteristics of individual elements.

- Front Panel Output Adjustments - up to 6 dB level reduction on each band, with automatic tracking of protection thresholds.
- Quick Configuration Programming - all closely coupled system-specific functions are located on an internal plug-in PC board for easy re-configuration.
- Improved Output Line Drive Capability - 10Ω output impedance: no need to adjust output balances.
- Meets UL, CSA & European Safety Standards.
- Full Transient Protection - for safe, quiet turn-ons and -offs.
- Enhanced Subwoofer Operating Modes - allows true three-way operation with or without subwoofers.
- Front Panel Indicators - watch band has LED indicators for signal presence, maximum safe output level and output level calibration.
- Rugged Mechanical Construction - built in the USA with heavy gauge materials for true reliability on the road.

## Group E Performance Specifications

# Close Coupled Processors

Specifications for Close Coupled Electronic Processors: MX100, MX200i, MX300i, MX800i



### CONFIGURATIONS

Each MX Series processor is configured (Close Coupled) to a particular EAW loudspeaker system or combination of systems. When ordering MX Series processors, it is recommended that you contact an authorized EAW sales agent, or the factory itself, to be sure that you order the correctly configured processor for your sound system or project.

MX200i, MX300i and MX800i processors can be reconfigured in the field, but this procedure is best performed by an authorized EAW service center or EAW factory service.

### SERVICE DEPARTMENT

For warranty repairs, replacement parts or other service needs, contact the EAW Service department at 800/992-5013 or 508/234-6158 during normal business hours. The Service fax number is 508/234-3776.

### DESCRIPTIONS

#### MX100

The MX100 CCEP™ is a two-channel, two-way electronic subwoofer crossover. The low frequency output is configurable either as a summed monaural or stereo output. Special configurations are also available to biamp two-way fullrange speaker systems.

#### MX200i

The MX200i CCEP™ is a two-channel, two-way electronic crossover, supplied configured for use with specific EAW loudspeaker systems or combinations of systems. Each frequency band output features overload protection circuitry.

#### MX300i

The MX300i CCEP™ is a two-channel, three-way electronic crossover, supplied configured for use with specific EAW loudspeaker systems or combinations of systems. Each frequency band output features overload protection circuitry.

#### MX800i

The MX800i CCEP™ two-channel, four-way electronic crossover supplied configured for use with specific EAW loudspeaker systems or combinations of systems. Each frequency band output features overload protection circuitry.

### CLOSE COUPLED PROCESSING

The concept of Close Coupled electronic processing (CCEP™) is central to the EAW design process. EAW engineers integrate electronic signal processing into the total loudspeaker system, but we recognize that electronics can only improve performance after all other electro-mechanical factors have been optimized. MX Series processors incorporate functions such as complex asymmetrical crossover filters, phase compensation, low frequency excursion control, amplifier clipping protection limiting and high frequency horn equalization. All of these parameters are configured for a particular loudspeaker system in an iterative design process using EAW's rapid data acquisition facility and in-house multi-platform computer network.



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