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The Martin Experience

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Martin Audio – MX5 System Controller



Standards Applied

EMC Emission	EN55103-1:1996
Immunity	EN55103-2:1996
Electrical Safety	EN60065:1998

This equipment conforms to the requirements of the EMC Directive 89/336/EEC, amended by 92/31/EEC and 93/68/EEC and the requirements of the Low Voltage Directive 73/23/EEC, amended by 93/68/EEC.

1 INTRODUCTION

Thank you for purchasing a Martin Audio MX5 system controller.

The MX5 is the latest and most advanced analogue Martin Audio loudspeaker management system and can be configured to optimise the performance of any combination of Martin Audio high end loudspeakers.

The MX5 includes the following features:

1. Single plug-in board system-specific.
2. Accurate level controls with $\pm 6\text{dB}$ of gain.
3. All star grounding with separate buses for signal 0V, output 0V and digital 0V giving extreme low noise capabilities.
4. Individual voltage regulation of analogue display and output sections.
5. Enhanced output drive capabilities and balancing.
6. Absolute phase adjustment and band edge phase trim.
7. Ten sections of signal delay all pass filters for driver offset compensation.
8. Program dependant attack times on each limiter section.
9. Configurable as a '1 in - 4 out' line level distribution amplifier with all level and limiter functions operable.
10. LED peak programme meters on each band.

2 UNPACKING

Each Martin MX5 controller is built to the highest standard and thoroughly inspected before it leaves the factory. After unpacking the unit, examine it carefully for any signs of transit damage and inform your dealer if any such damage is found. It is suggested that you retain the original packaging so that the unit can be repacked at a future date if necessary.

Please note that Martin Audio and its distributors cannot accept responsibility for damage to any returned product through the use of non-approved packaging.

3.1 MECHANICAL

The MX5 is housed in an all steel 1U 19" rack case. In permanent installations, the MX5 should be rack mounted using the four holes in the front panel. Additional support may be required for heavy duty road use.

IMPORTANT: THE MAINS LEAD SUPPLIED MUST BE CONNECTED AS BELOW:

GREEN/YELLOW	-	EARTH
BLUE	-	NEUTRAL
BROWN	-	LIVE

Mains voltage tolerance $\pm 10\%$ on each setting.

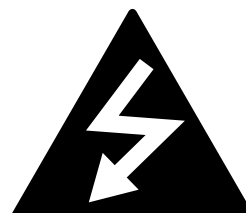
Fuses type T semi-delay
 100-120V 500mA(L)
 220-240V 250mA(L)

WARNING: The MX5 controller must always be operated with the mains safety connected.

This equipment must be earthed.



**CAUTION
 RISK OF ELECTRIC SHOCK
 DO NOT OPEN
 DO NOT EXPOSE TO RAIN
 OR MOISTURE**



It should not be necessary to remove any protective earth or signal cable shield connections.

3.2 INITIAL SETTINGS

MX5 Controllers are supplied with the adjustments set as follows:

Mains voltage	240V
Ground switch	On
Limiter threshold	2V setting
Plug-in board	System-specific

4 CONNECTIONS

Power is supplied to the unit via an IEC connector with integral fuse holder/voltage selector. To change to a different mains voltage remove the rectangular fuse cap, rotate and replace so that the correct voltage is indicated by the arrow on the body of the receptacle.

The earth terminal on the IEC connector is permanently connected to the chassis.

The electronic reference 0V is taken to chassis via the rear panel signal ground switch. This inserts a ground lift resistor when switched to off.

The inputs and outputs of the MX5 are electronically balanced, pin 2 being designated + (hot). Because both inputs and outputs are balanced either pin can be assigned as + (hot) provided the convention is maintained through the controller.

4.1 Input Connections

The MX5 inputs are on female XLR type connectors and are electronically balanced. Pin 1 is normally open circuit but may be linked to sig 0V or chassis earth by inserting a hard wire link on the PCB (see Fig 1). The signal is always applied between Pin 2 (hot +) and Pin 3 (cold -).

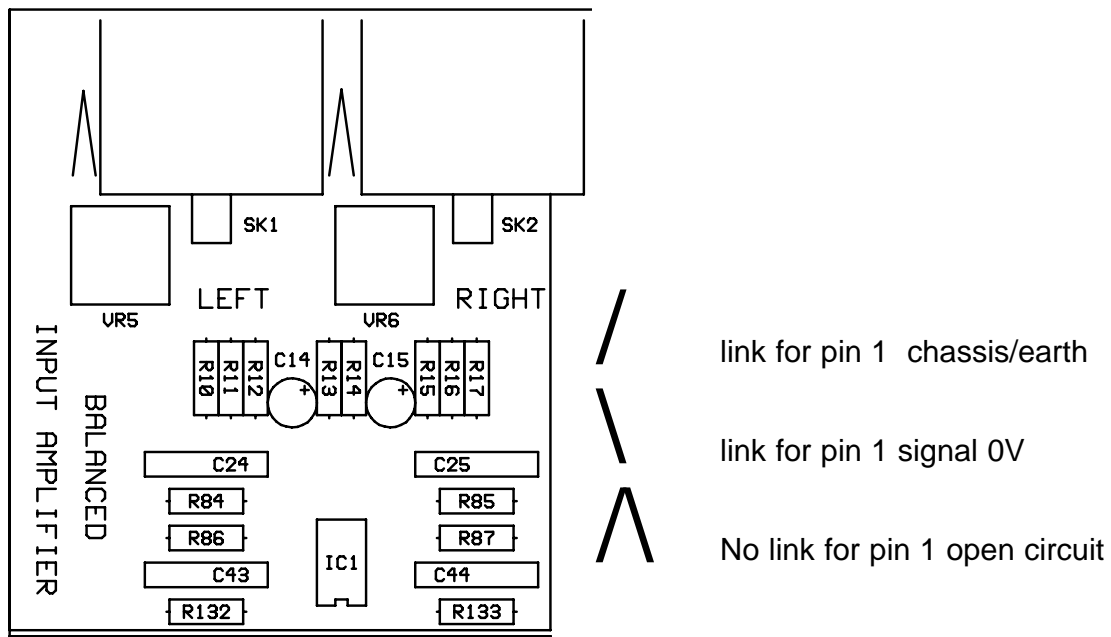


Fig 1.

Always use 2-core + screen 'balanced' type signal leads, even for unbalanced circuits. The screen should be regarded as separate from the signal return, even if they are connected together at one end of the line.

For either balanced or unbalanced operation, always connect the signal between Pins 2 and 3. The input cable shield should be derived from equipment which is sourcing the input provided that normal safety requirements are met (ie the mains earth is correctly connected) (See Fig 2).

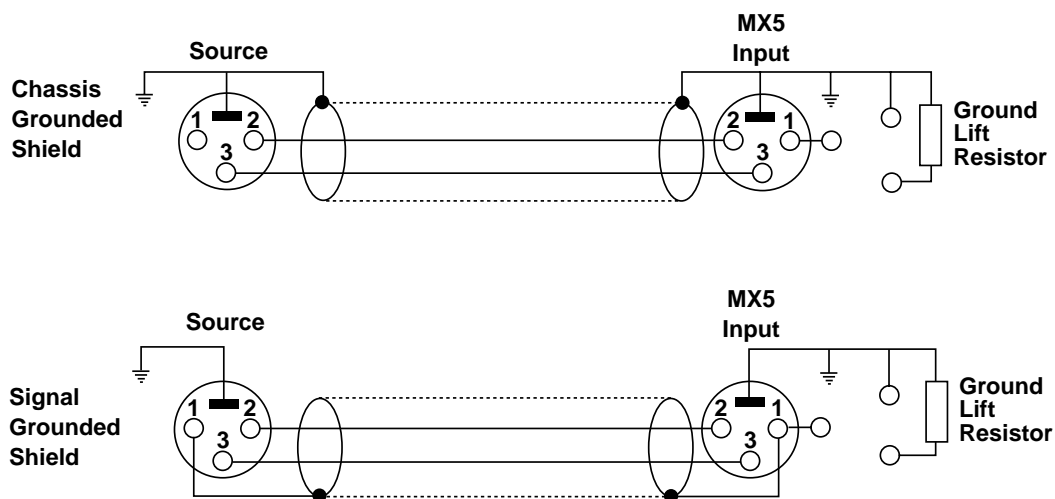


Fig 2.

4.2 Output Connections

The MX5 outputs are electronically balanced auto compensating via male XLR type connectors. Pin 1 is the (ground) connection and the signal appears between Pins 2 and 3.

Always use 2-core + screen 'balanced' type signal leads, even for unbalanced circuits. The screen should be regarded as separate from the signal return, even if they are connected together at one end of the line. This is to keep the screen a true screen so that no signal return currents flow through it which can induce signals in adjacent cables.

For unbalanced use, having decided which pin is 'hot' (see above), connect the 'cold' pin and (Pin 1) together. The signal ground switch should be placed in the Lift position at the MX5 outputs which permit the amplifier to be locally grounded (as required for safety reasons) without causing a hum loop. If the signal is merely taken between either Pin 2 or 3 and Pin 1, a level loss and signal degradation will occur.

For balanced operation, the screen should be connected to ground at the amplifier end. To eliminate ground current loops, it can be lifted at the MX5 output, provided normal safety requirements have been met (ie the mains earths are correctly connected-See Fig 3).

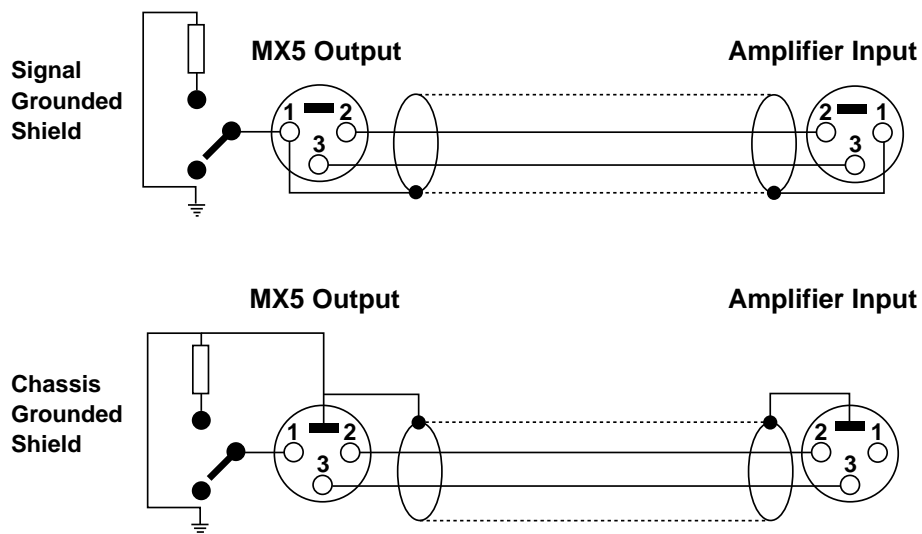


Fig 3.

5 CONTROLS

5.1 Mode Switch

This is mounted internally on the plug-in board and allows the unit when appropriate, to be switched from 3-way to 4-way operation.

In 3-way mode the ('mid') output will function up to the upper bandpass filter or as defined by system parameters, band 4 ('high') remains available and may be used for driving additional VHF units in 'overlap' mode.

5.2 Level Controls

Each frequency bands level can be adjusted over a 12dB range from -6dB to +6dB relative to its nominal level to allow the user to precisely balance each level with respect to each other.

5.3 Limiters

Each output is fitted with a limiter which provides momentary gain reduction when the signal level exceeds a preset threshold value. A red LED indicates the onset of limiting.

Threshold settings for the limiters may be adjusted by first removing the MX5 top cover (two screws on each side) to gain access to the 16 way switches which are located on the main motherboard. Setting the limiter threshold automatically sets the range of the LED display which will indicate dB's below threshold.

Threshold values corresponding to the switch positions are printed on the main motherboard reproduced here for your information.

0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0.2	0.4	0.5	0.7	0.9	1.1	1.3	1.4	1.6	1.8	2.0	2.2	2.3	2.5	2.7	2.9

Each channel limiter sets a maximum drive level from the MX5, which in turn sets the maximum continuous voltage that the amplifier can present to its load.

The plug-in top board has pre-set time constants that optimise the limiters for each frequency band.

The limiters in the MX5 may be used to control the average continuous power applied to the loudspeakers, if power amplifiers with a higher maximum power rating than that recommended are used. (See Amplifier section) Alternatively, if the loudspeakers selected will handle the full rated power, or if maximum system headroom is required, the limiters may be set to prevent the amplifiers being driven into hard clipping.

WARNING: Care should be taken to avoid amplifier clipping. It is important to understand that a low power amplifier driven into clipping is more likely to damage a loudspeaker than a higher power amplifier used within its ratings. This is because music signals have a high peak to average "crest" factor. When an amplifier is severely overdriven, its output waveform is clipped (its peaks are squared off) – reducing the crest factor. In extreme cases, the waveform can approach that of a square wave. An amplifier is normally capable of producing far more power under these conditions than its normal undistorted rated power output. Correct setting of the limiters will automatically avoid amplifier clipping and prevent damage occurring to the loudspeakers.

Each limiter may be completely defeated, if desired, by setting a jumper located on the main mother board (J1-J4). If another MX5 is to be driven from any of the output channels (eg where one MX5 splits the signal between sub-bass loudspeakers and the main system crossovers), then the limiters should be defeated on those channels to prevent them from operating before the limiters in the following units.

	<u>JUMPER</u>	<u>POSITION</u>	<u>LIMITER</u>
BAND 1	J1	RIGHT	ON
		LEFT	OFF
BAND 2	J2	RIGHT	ON
		LEFT	OFF
BAND 3	J3	RIGHT	ON
		LEFT	OFF
BAND 4	J4	RIGHT	ON
		LEFT	OFF

5.4 Phase Correction

Although the outputs from the MX5 are normally in phase at the crossover points, the acoustic outputs from the associated drive units may not be. Correct adjustment can compensate for the phase characteristics of the drive units and associated protective filter circuitry.

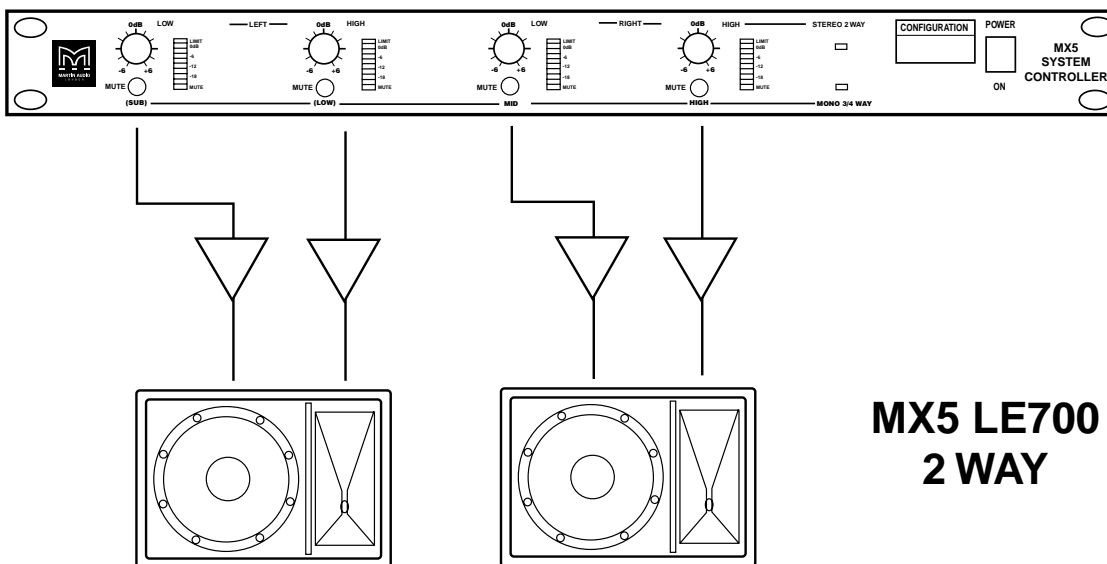
Phase alignment on an MX5 'system' board is accurately set for the speaker system for which it is supplied, and is not adjustable.

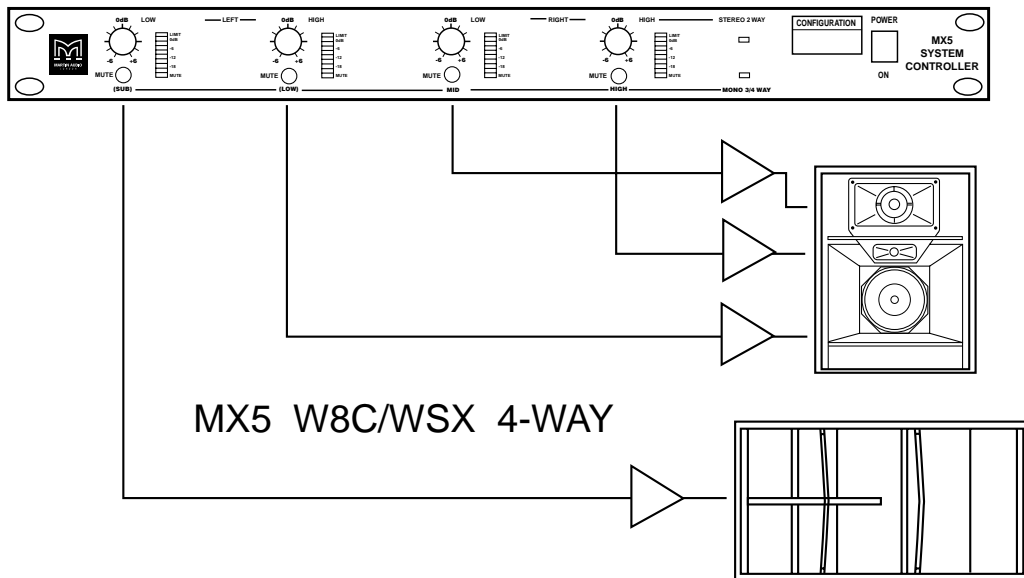
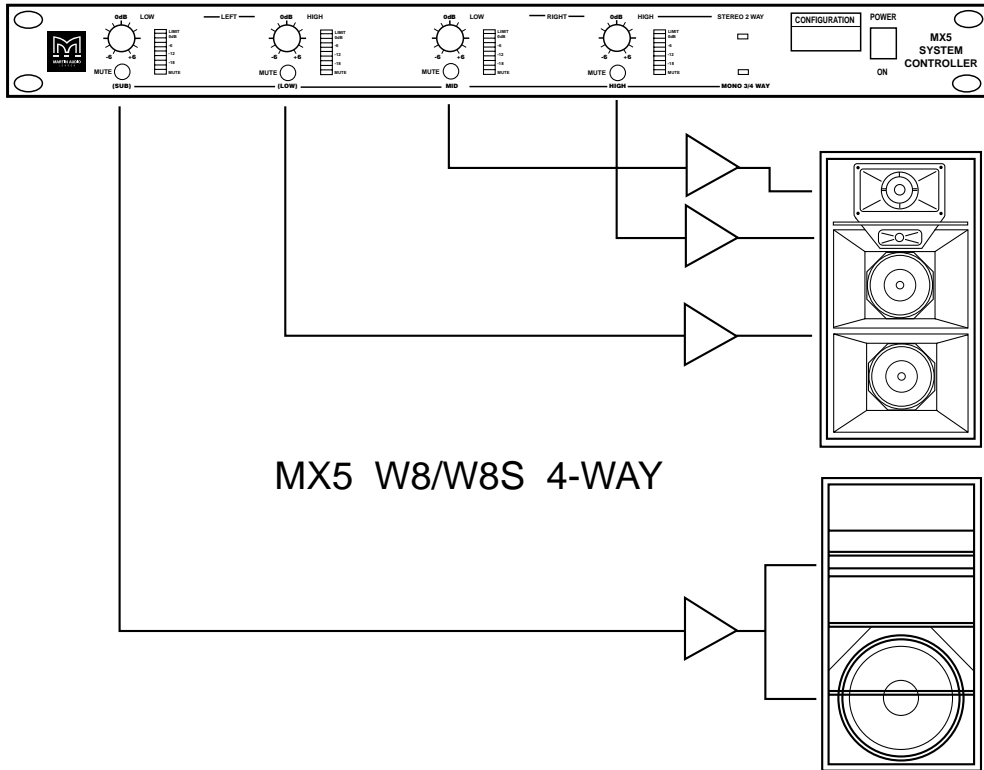
6 SYSTEM CONFIGURATION

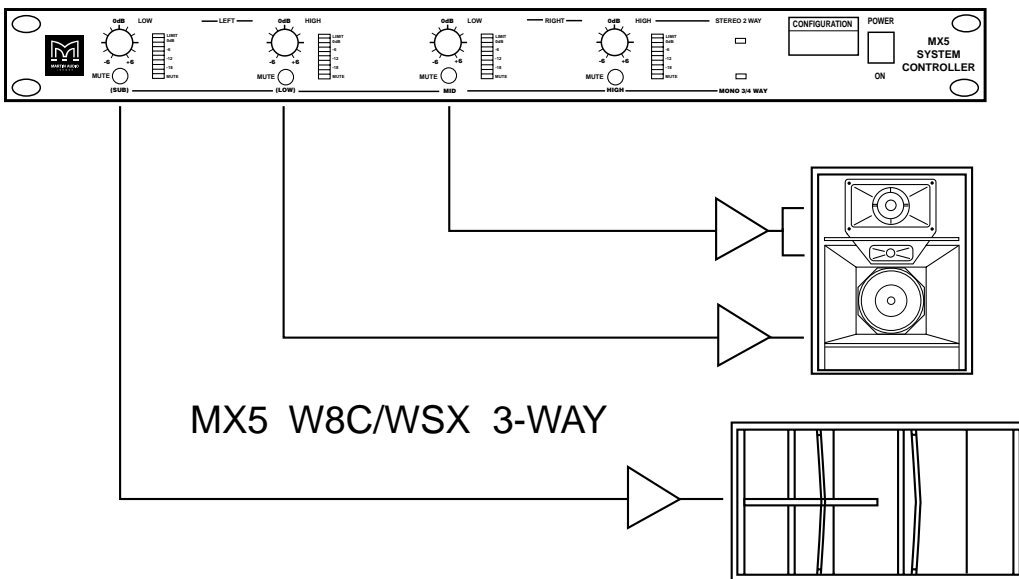
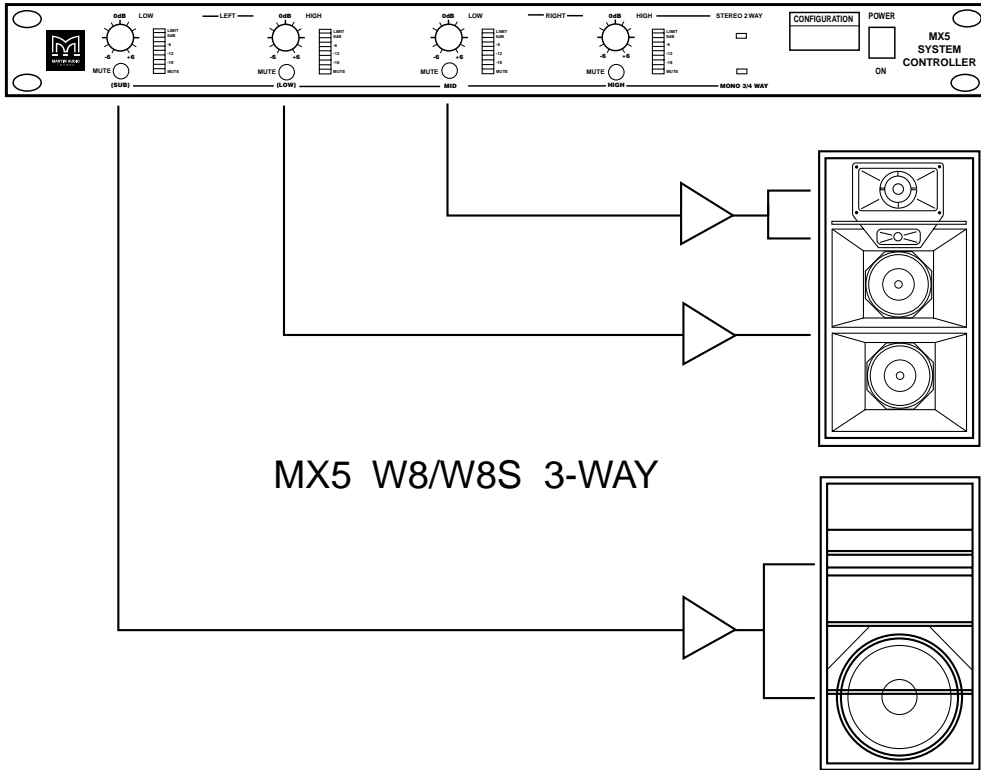
The MX5 when used in conjunction with a plug-in board becomes a dedicated system controller. Depending on the plug-in system-specific board, the MX5 is automatically configured either as a stereo 2-way or mono 3/4 way controller.

Each plug-in board dictates a system-specific crossover function, equalisation and, in some cases, group delay. User options include low frequency EQ in/out (J1 and J2), 3/4 way operation (S2) and mono bass in 2-way stereo configurations. Where a particular option is not available it will be hard wired out.

7 CONNECTION DIAGRAMS







8 WARRANTY

Martin Audio MX5 System Controllers are warranted against manufacturing defects in materials or craftsmanship over a period of 1 year from the date of original purchase. During the warranty period Martin Audio will, at its discretion, either repair or replace products which prove to be defective provided that the product is returned in its original packaging, shipping prepaid, to an authorised Martin Audio service agent or distributor.

Martin Audio Ltd. cannot be held responsible for defects caused by unauthorised modifications, improper use, negligence, exposure to inclement weather conditions, act of God or accident, or any use of this product that is not in accordance with the instructions provided by Martin Audio.

Martin Audio is not liable for consequential damages.

This warranty is exclusive and no other warranty is expressed or implied. This warranty does not affect your statutory rights.

9 TECHNICAL SPECIFICATIONS

MX5

INPUTS	2 Electronically Balanced
IMPEDANCE	36K ohms (18K ohms per leg single ended)
CMRR	67dB @ 10KHz
CONNECTORS	3 Pin female XLR
OUTPUTS	4 Electronically Balanced
SOURCE IMPEDANCE	47 ohms
MIN LOAD IMPEDANCE	500 ohms
MAX OUTPUT	+20dBu into 500 ohms limiter defeated
CONNECTORS	3 Pin Male XLR
FREQUENCY RESPONSE	-3dB @ 25 Hz 24dB/octave -3dB @ 35KHz 12 dB/octave (ultimately set by system parameters)
DISTORTION+NOISE	0.009% THD @ 2V output (limiters cancelled)
SIGNAL+NOISE/ NOISE RATIO	>97dB @ 2V output 20Hz – 20KHz quasi peak o/c input
LIMITERS	Individual for each channel. With program related attack times. Ratio 20:1. Threshold range -12dBu to +12dBu in 16 steps
INDICATORS	2-way stereo, 3/4 way-mono LED's. 10 section LED PPM indicating signal level, threshold and limit on each band
PROTECTION	Auto muting relays and soft start (4 seconds)
MAINS SUPPLY	IEC mains connector with integral fuse holder
MAINS VOLTAGE	Externally selectable on IEC inlet 100-120-220- 240V AC, 50/60Hz. Voltage tolerance on each setting $\pm 10\%$
MAINS FUSE	220-240V: -250mA Type 'T'(L) 100-120V: -500mA Type 'T'(L)
DIMENSIONS	(W) 482mm x (H) 44mm x (D) 211mm (W) 19ins x (H) 1.75ins x (D) 8.3ins
WEIGHT	3.5kg (7.7 lbs)
SHIPPING DIMENSIONS	(W) 530mm x (H) 120mm x (D) 310mm (W) 21ins x (H) 4.7ins x (D) 12.2ins
SHIPPING WEIGHT	4.1kg (9lbs)

Due to our policy of continuous product improvement all specifications are subject to change without notice.

MX5 System Controller



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MX5 System Controller

User's Guide



ENGLISH



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