MARTIN AUDIO LTD

WX3 SYSTEM CONTROLLER - USER'S GUIDE

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MARTIN AUDIO LTD

WX3 SYSTEM CONTROLLER

USER'S GUIDE

1.0 INTRODUCTION

Thank you for purchasing a Martin Audio WX3 System Controller. The WX3 is used to optimize the performance of Wavefront Series loudspeakers.

Crossover functions, relative output levels, and phase adjustments are all preset for a given Wavefront system by means of a dedicated system-specific plug-in board.

A user adjustable low-distortion limiter is fitted to each band.

Each band features output level adjustment, from -ve infinity to +6 dB relative to its nominal level. All inputs and outputs are electronically balanced. This feature in conjunction with extremely low system noise, makes the WX3 ideal for theatre and other critical applications.

2.0 UNPACKING

Each Martin WX3 controller is built to the highest standards 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.

3.0 MAINS CONNECTION

The WX3 is provided with an IEC type mains receptacle which should be fitted with a suitable three pin plug connected as follows:

GREEN/YELLOW - Earth

BROWN - Live

BLUE - Neutral

WARNING: The GREEN/YELLOW wire must be connected to the mains safety earth.

To change the mains voltage, remove the rectangular fuse cap and replace it so that the correct voltage is indicated by the arrow on the body of the rectangle. The earth terminal on the IEC connector is permanently connected to the metal casing. The unit is supplied with the 0v electronic reference ground taken to the case via an internal "signal ground" lead and spade receptacle, which inserts a 47 ohm ground lift resistor when in the lift/park position. To connect the 0v electronic reference direct to the chassis ground, use a pair of pliers to pull off the spade receptacle from the lift/park position and push it onto the 0v spade terminal (marked 0v on the PCB).

4.0 INPUT CONNECTIONS

WX3 inputs are on female XLR-type connectors and are electronically balanced. Pin 1 is always screen (ground) connection, and the signal is applied between pin 2 (cold) and pin 3 (hot).

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, and connect the cable screen to pin 1. The screen should always be connected at inputs and lifted only at source outputs if necessary, provided that normal safety requirements (i.e. the mains earth is correctly connected) are met. See Figs 1 & 2.

FIG. 1

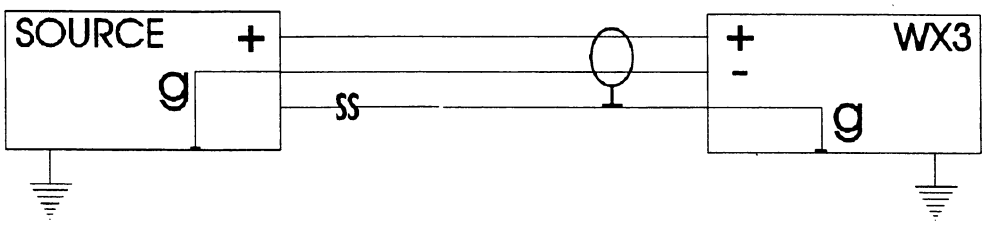
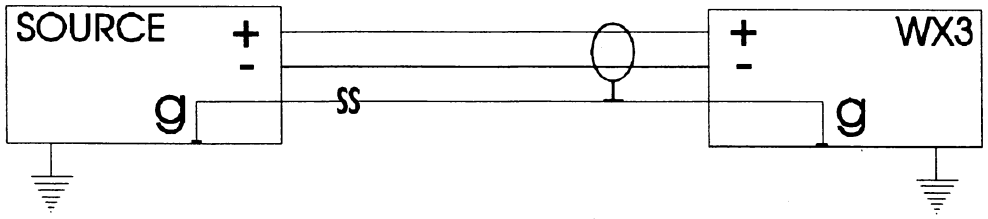


FIG. 2



5.0 OUTPUT CONNECTIONS

WX3 outputs are electronically balanced via male XLR-type connectors. Pin 1 is always the screen (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 the cable screen to the ground of the driven amplifier at the amp input. The screen should, in the case of hum occurring, be lifted at the WX3 output. This method takes advantage of the hum rejection properties of the output stage which permits the amplifier to be locally grounded (as required for safety reasons) without causing a hum loop. See Fig 3. If the signal is merely taken between either pin 2 or 3 and pin 1, a level loss and response degradation will occur.

For balanced operation, the screen should be connected to pin 1 (ground) at the receiving end. To eliminate ground current loops, it should be lifted at the WX3 output, provided normal safety requirements have been met (i.e. the mains earths are correctly connected). See Fig 4.

FIG. 3

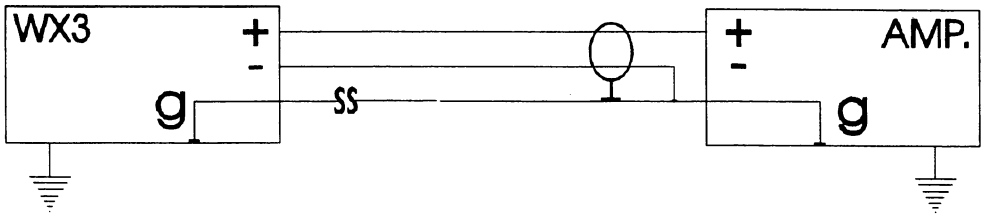
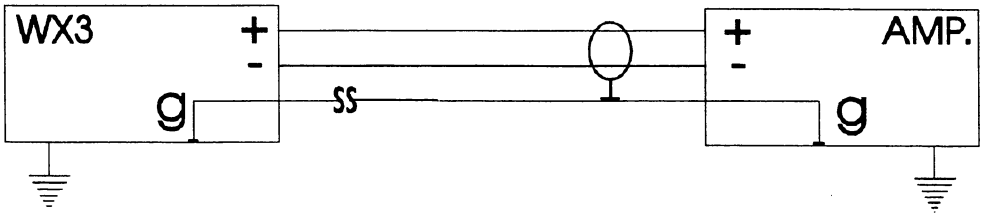


FIG. 4



The power ratings of amplifiers connected to the WX3 controller should lie within the range recommended for the Wavefront Series loudspeaker being driven. Please refer to the section on amplification in the Wavefront Series user's guide for further information.

6.0 INITIAL SETTINGS

WX3 units are supplied with the adjustments set as follows:

Mains Voltage :- 240V

Ground switch :- ON

Limiter Threshold :- 2V setting

Plug-in Board :- System Specific

7.0 WX3 SYSTEM CONFIGURATIONS WITH PLUG-IN BOARDS

It is important to note that the plug-in boards have PCB mounted jumper plugs which determine various LF EQ options. Please refer to the sections below on each specific board to check that the settings for the jumper plugs are appropriate to your application.

The WX3 used in conjunction with a plug-in board becomes a dedicated system controller. Depending on the plug-in system specific board, the WX3 is automatically configured either as a stereo 2-way or mono 3-way device for a specific Wavefront system.

Each plug-in board dictates a system specific crossover function, equalization and in some cases group delay.

Mounted on each plug-in board are jumper switches. The switches determine various low frequency equalization (LF EQ) options. They are set by the user according to the application of the system. The various options concerning LF EQ are outlined in the following. These should be examined carefully, especially when using sub bass in a system.

7.1 WX3/W2 - ACTIVE W2 CONFIGURATION (STEREO)

The W2 board is used to control the W2 when operated as an active 2-way system (see Fig. 6). Active crossover frequency (1500Hz), relative output levels, driver alignment and equalization are all pre-set for the W2 system. LF EQ circuitry gives 6dB of boost at 65Hz for full-range operation.

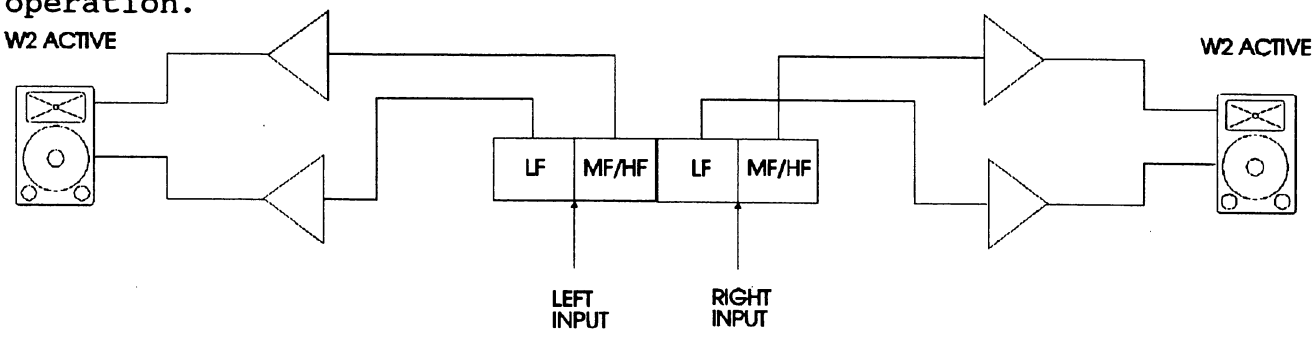


FIG. 6 W2 Active Configuration using WX3 with W2 Plug-In board

7.2 WX3/W3 - W3 CONFIGURATION (STEREO)

The W3 board is used to control the W3 loudspeaker system (see Fig. 7). Active crossover frequency (650Hz), relative output levels, driver alignment and equalization are all pre-set for the W3 system. LF EQ circuitry gives 6dB of boost at 65Hz for full-range operation.

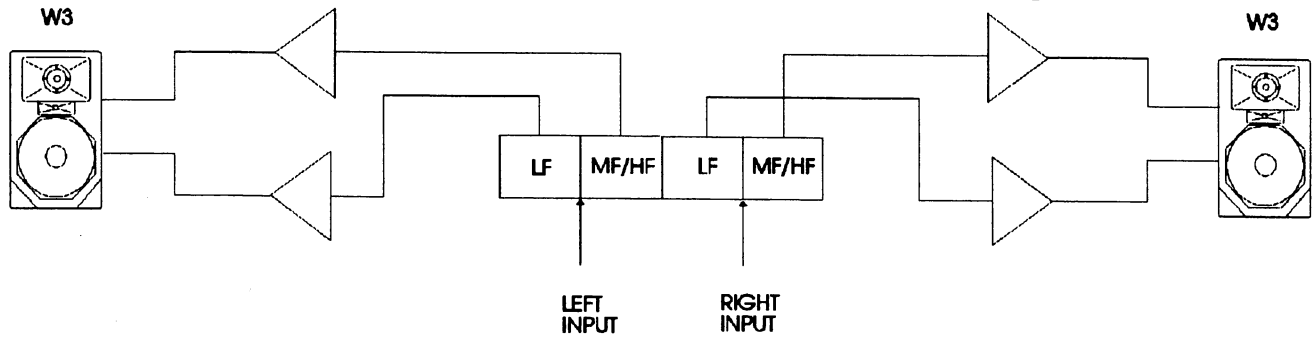


FIG. 7 W3 Configuration using WX3 with W3 Plug-In board

7.3 WX3S - SUB BASS + FULL-RANGE/HIGH-PASS CONFIGURATION (STEREO)

The WX3S, stereo sub-bass + full-range/high-pass board, is used to control the W1 and passive W2 when operating either as stand alone full-range systems or with additional WS2 sub-bass enclosures.

It is also used to provide the outputs for other WX3 controllers configured to drive active W2 and W3 systems used in stereo with WS2 sub-bass enclosures.

PCB mounted jumper plugs on the plug-in board select various alignment options for the full-range/high pass outputs (Bands 2 and 4). See FIG 8.

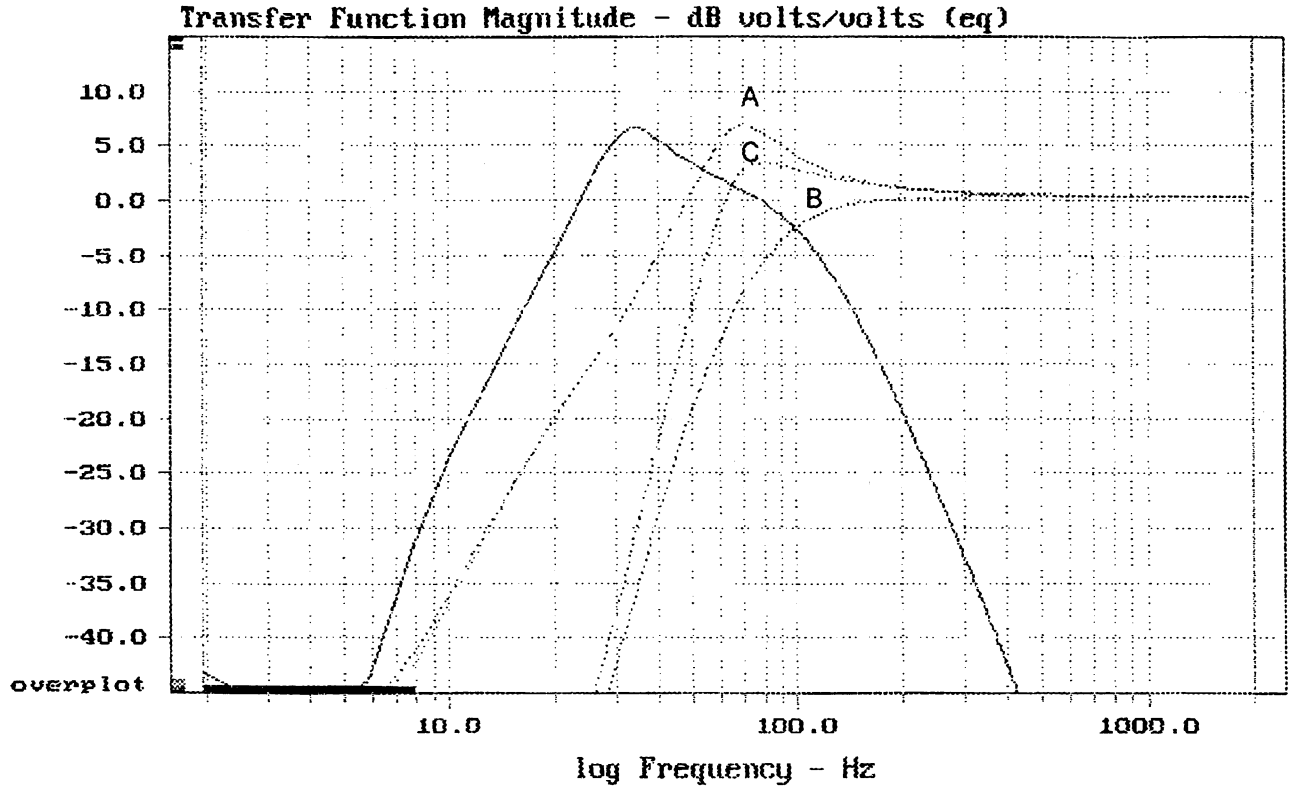


FIG. 8

If **Full-range Mode (A)** is selected, +6dB of low frequency boost at 65Hz is applied to the full-range outputs (Bands 2 & 4).

If **100Hz high-pass crossover Mode (B)** is selected, the full-range outputs are re-configured as 100Hz high-pass outputs.

In **Overlap Mode (C),** the sub-bass and full-range enclosures are allowed to overlap and 3dB of LF boost is applied to the full-range enclosure. This can be useful when the full-range systems are flown some distance from the sub-bass. This mode allows some low frequency energy to be reproduced by the flown loudspeakers without using up as much headroom as would be required if the full-range +6dB low frequency boost were applied.

Plug-in board jumper positions are as follows:

	JUMPER	POSITION
Mode (A), Full-range	J4/J8	EQL IN
	J5/J6/J2/J9	HP OUT
Mode (B), 100Hz high-pass	J4/J8	EQL OUT
	J5/J6/J2/J9	HP IN
Mode (C), Overlap	J4/J8	EQL IN
	J5/J6/J2/J9	HP IN

7.3.1 W1/PASSIVE W2 OPERATION USING WX3S (STEREO)

A WX3S controller is used to provide LF equalization and limiter functions for stand-alone W1 and passive W2 systems operated full-range (see Fig. 9). In this instance the W1 and W2 should be driven from Bands 2 and 4 set to operate in full-range **Mode (A)** (see Section 7.3)

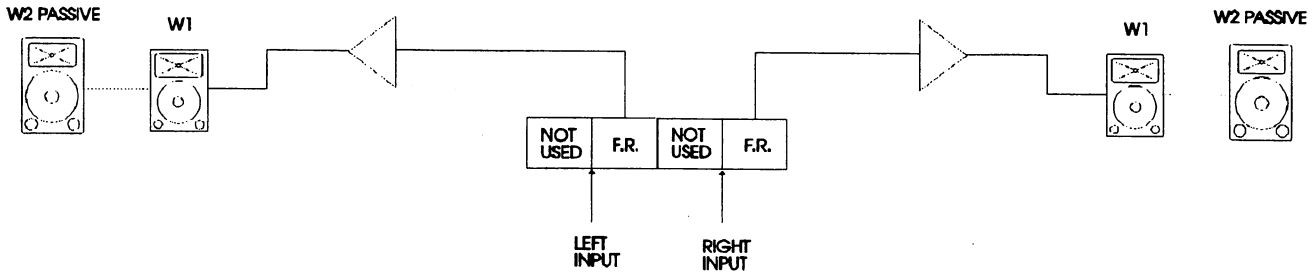


FIG. 9 W1 or W2 Passive Operation using WX3S

7.3.2 W1/PASSIVE W2 WITH SUB-BASS OPERATION USING WX3S (STEREO)

The WX3S may also be used to drive a sub-bass system to augment the W1 and passive W2 systems (see Fig. 10). The WX3S is normally operated in 100Hz High-pass/Crossover **Mode (B)** (see Section 7.3) for this configuration, although it may be operated in Overlap **Mode (C)** if overlap is required for flown systems. Full-range **Mode (A)** should only be used with care, in special cases where distant flown systems are required to run full-range. Some cancellation may occur if the W1/W2 is located in close proximity to the sub-bass enclosure. However, this cancellation may simply be resolved by reversing the phase of the sub-bass system.

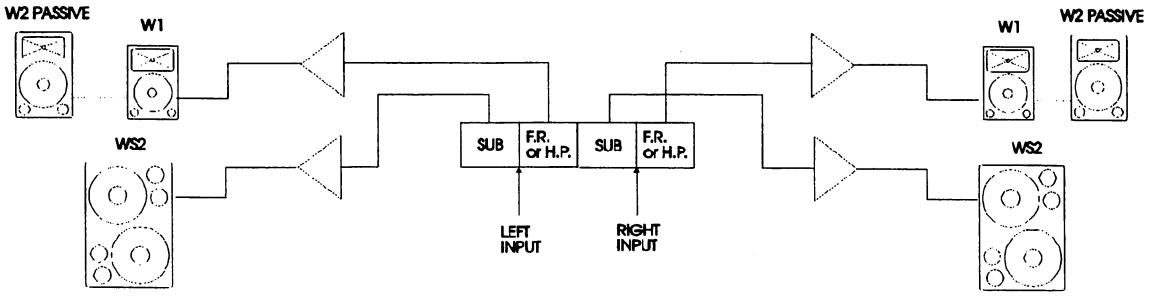


FIG. 10 W1 or W2 Passive with Sub Bass Operation using WX3S

7.3.3 ACTIVE W2/W3 WITH SUB BASS OPERATION USING WX3S AND WX3/W2 OR WX3/W3 (STEREO)

A WX3S controller may be used to drive a sub-bass system to augment stereo W2 and W3 systems and their controllers (see Fig. 11).

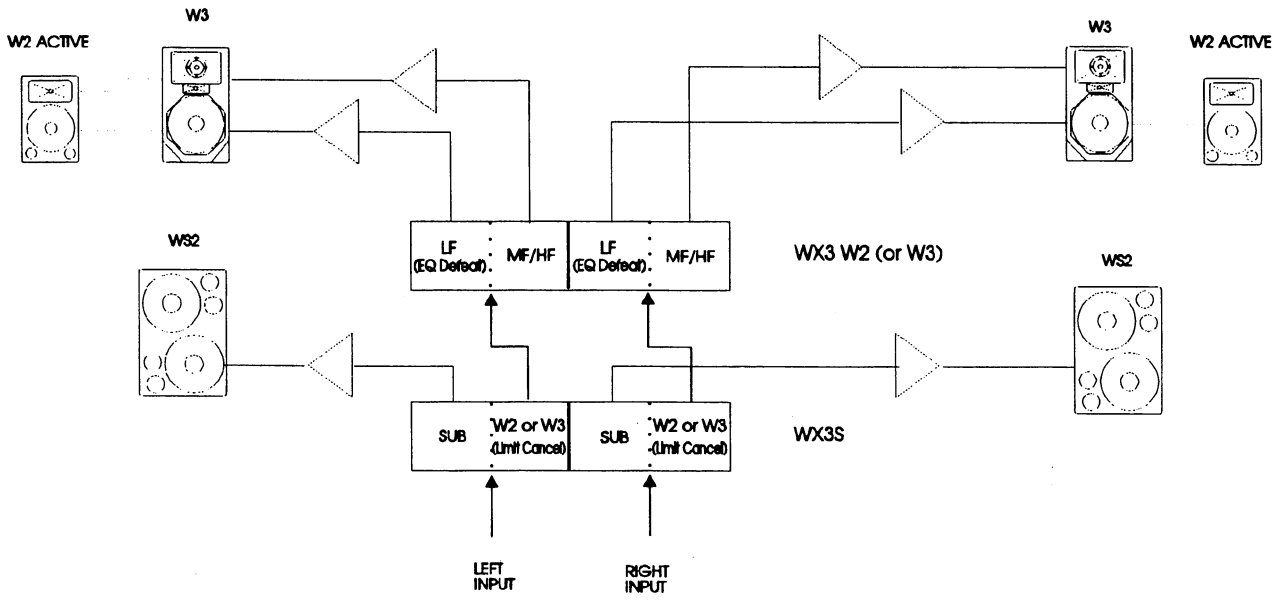


FIG. 11 Normal Operation for augmenting stereo W2 Active/W3 with Sub Bass

In this set-up, the LF EQ of the WX3/W2 (or W3) on Bands 1 & 3 should be switched out. This is achieved by moving jumpers **J2** and **J3** on the filter card from the **EQL IN** position to the **EQL OUT** position.

The limiters on the high-pass outputs of the WX3S should also be defeated to prevent them operating in advance of following units. To defeat the limiters on Bands 2 & 4 of the WX3S, move jumpers **J3** and **J5** on the main circuit board to the left position. Please refer to Section 9.0 on limiters for further information.
The WX3S is normally operated in 100Hz High-pass/Crossover **mode (B)** (see Section 6.1) for this configuration, although it may be operated in Overlap **mode (C)** if overlap is required for flown systems.

Full-range **mode (A)** should only be used with care, in special cases where distant flown systems are required to run full-range. Some cancellation may occur if the W3/W2 are used in close proximity to the sub-bass enclosure. However, this cancellation may be resolved by simply reversing the phase of the sub-bass system.

For special applications, instead of the normal method of feeding the high-pass outputs of the WX3S controller to a WX3 controller (as shown in Fig 11), the WX3S controller may be connected in parallel as an effects bandpass filter. The W2 and W3 are now left to run full-range (see Fig 12)

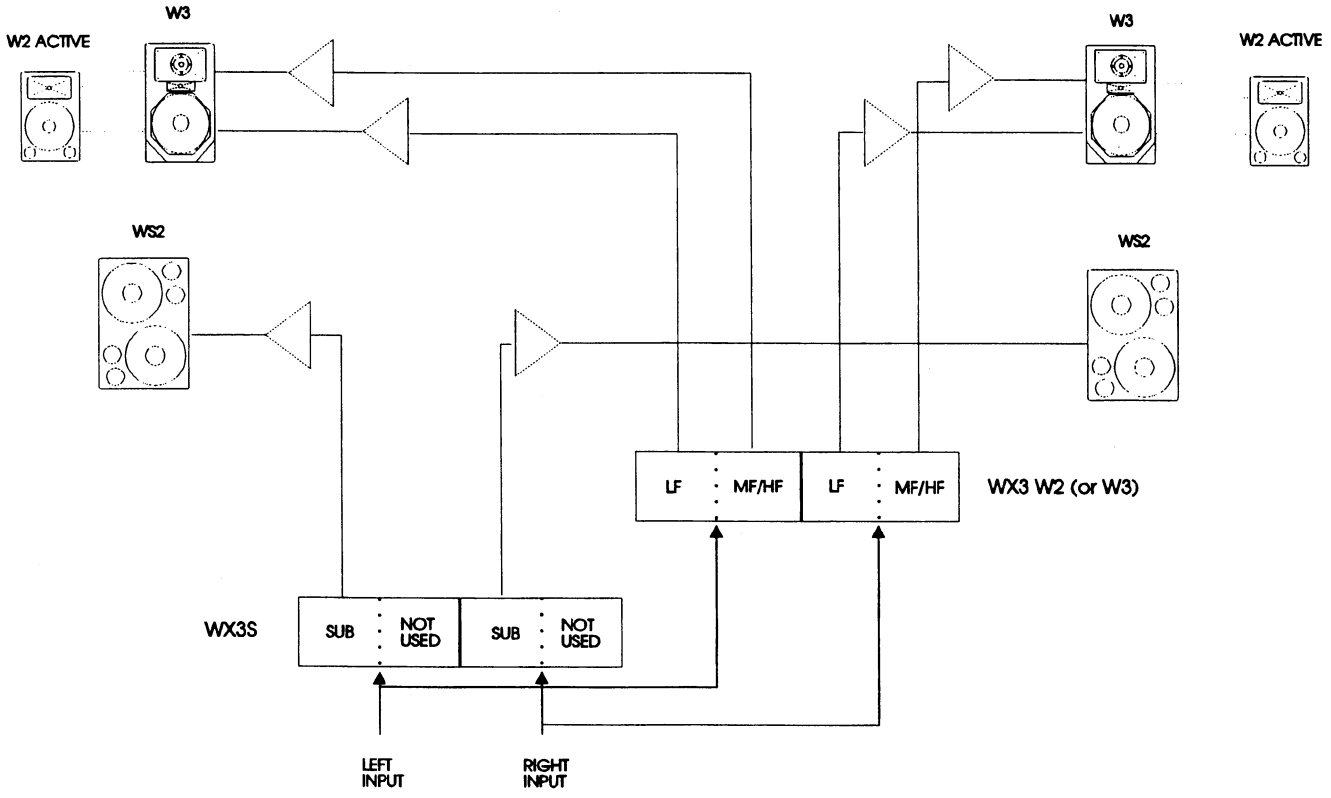


FIG. 12 Parallel Operation for augmenting stereo W2 Active/W3 with Sub Bass

In this parallel configuration it should be noted that, because the effect of LF EQ circuit in the WX3/W2 (or W3) is still present in the full-range output, some LF cancellation may occur. This may be especially noticeable if the full-range systems are used in close proximity to the sub-bass enclosures. LF cancellation due to this effect may simply be resolved by reversing the phase of the sub-bass system.

7.4 WX3/ACTIVE W2 (MONO) WITH SUB BASS CONFIGURATION

The W2 ACTIVE + SUB mono configuration is used to control a single channel active W2 system when used with a sub-bass (see Fig. 13). Active crossover frequencies (100Hz, 1500Hz), relative output levels, driver alignment and equalization are all pre-set for the W2 system plus sub-bass.

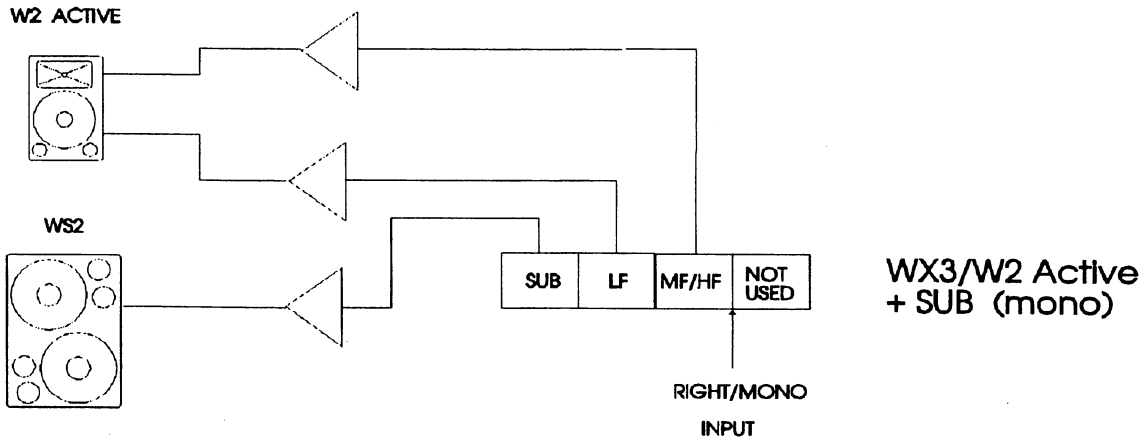


FIG. 13 W2 Active + Sub Configuration (mono)

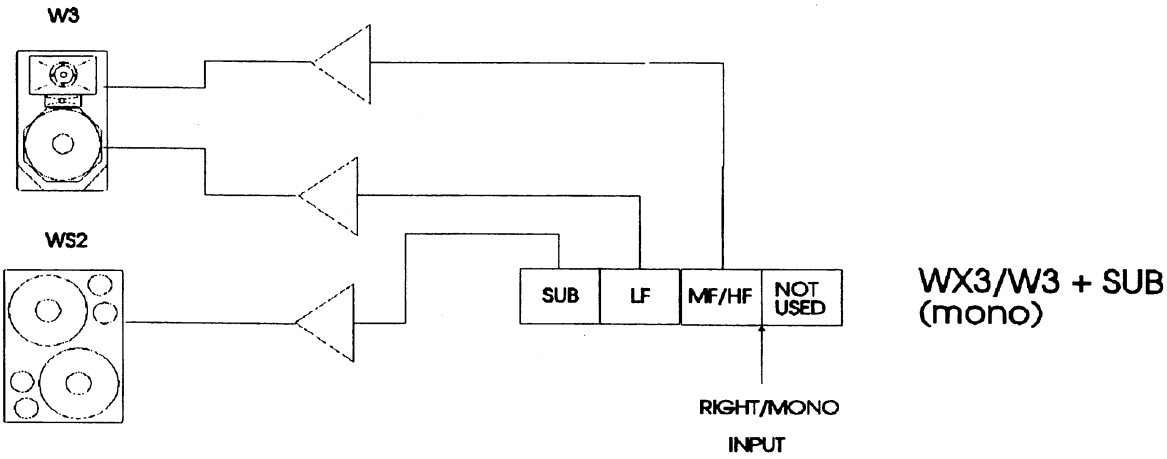


FIG. 14 W3 + Sub Configuration (mono)

7.5 WX3/W3 (MONO) WITH SUB BASS CONFIGURATION

The W3 + SUB mono configuration is used to control a single channel active W3 system when used with a sub-bass (see Fig. 14). Active crossover frequencies (100Hz, 650Hz), relative output levels, driver alignment and equalization are all pre-set for the W2 system plus sub-bass.

8.0 LEVELS

Each output level may be adjusted from -ve infinity to +6dB relative to its nominal level. The system-specific plug-in boards include mid and high frequency attenuation to provide level matching for approximate system balance when all controls are set to 0dB (assuming the use of amplifiers with identical gains). It should be noted, therefore, that front panel calibration will not necessarily indicate absolute band gains within the WX3. When setting up a system for the first time, the WX3 band levels should be adjusted for desired balance and the settings noted for future reference.

9.0 LIMITERS

The WX3 system controller features fast attack limiters to prevent power amplifiers from clipping, thus providing speaker protection whilst preserving full system headroom. The limiters are set by adjusting the limit threshold switches to the value that matches the input sensitivity of the amplifier. A system operated in this way, with amplifiers having a power rating as recommended for the particular Wavefront system and used by experienced professional sound engineers, should be sufficiently protected from overdriving. Amplifier gain controls should normally be set at maximum. Triggering of the limiter is indicated by a red LED on the front panel.

Recommended amplifier powers for Wavefront Series loudspeakers are as follows:

W1	300-400 watts per channel into 4 ohms
W2/W3	400-550 watts per channel into 4 ohms
WS2	470-700 watts per channel into 4 ohms

Limiter threshold settings may be altered by removing the top panel of the WX3 case (two screws each side) to gain access to the main circuit board.

The limiter threshold is set by a 16-way switch on each band. This is located on the main circuit board behind the front panel and to the right of the corresponding band level control. The switches are labelled as follows:

BAND 1	SW1
BAND 2	SW2
BAND 3	SW3
BAND 4	SW4

Threshold values corresponding to the switch settings are printed on the main circuit board for easy reference when making adjustments.

They are:

SWITCH POSITION	THRESHOLD VOLTAGE
0	0.18V
1	0.37V
2	0.55V
3	0.73V
4	0.9V
5	1.1V
6	1.25V
7	1.45V
8	1.6V
9	1.8V
A	2.0V
B	2.15V
C	2.3V
D	2.5V
E	2.7V
F	3.0V

If operated by inexperienced personnel or in situations where abuse is likely, limiter switches can be backed off 2 or 3 positions to lower "safe" thresholds. This will ensure that the output of the amplifiers cannot exceed the long-term continuous power ratings of the drive units.

Each limiter may be defeated if required by moving jumper plugs J2-J5 on the main circuit board to the left position.

	JUMPER	POSITION	LIMITER
BAND 1	J2	RIGHT	ON
		LEFT	OFF
BAND 2	J3	RIGHT	ON
		LEFT	OFF
BAND 3	J4	RIGHT	ON
		LEFT	OFF
BAND 4	J5	RIGHT	ON
		LEFT	OFF

IMPORTANT NOTE

If another WX3 is to be driven from any of the outputs - for instance when a WX3S provides the high-pass outputs for a WX3 configured for an active W2 or W3 - the limiters should be defeated on those outputs to prevent them from operating in advance of the limiters in the following units (see Fig. 11).

10.0 WARRANTY

MARTIN AUDIO Wavefront Series loudspeakers are warranted against original manufacturing defects in material or craftsmanship over a period of 1 year from the date of original purchase. This warranty is in addition to your statutory rights. MARTIN AUDIO LTD cannot, however be held responsible for failures caused by abuse, unauthorized modifications, improper operation or damage caused elsewhere within your system. The determination of the cause of failure will be made by MARTIN AUDIO LTD or its authorized service agent or distributor based upon physical inspection of the failed parts. Due to our policy of continuous improvement all specifications are subject to change without notice.

11.0 WX3 SPECIFICATIONS

Mains Supply	IEC mains connector with integral fuseholder and voltage select switch
Mains Voltage	Selectable 100/120/220/240 VAC, 50/60Hz
Hum & Noise	-90dBm 20Hz-20kHz unweighted
Inputs	XLR3-31 type >10k electronically balanced. Maximum level +20dBu
Outputs	XLR3-32 type <50 ohms electronically balanced. Maximum level +20dBu into 1k (limiter defeated)
Fixed Filters	-3dB @ 20Hz, -3dB @ 30kHz
System Parameters	System specific, defined by plug-in board
Limiters	Individual band limiters with switchable threshold and programme related dual attack time. Limit ratio 20:1
Indicators	2-way stereo/3/4-way mono LED's. Signal present, threshold and limit LED's on each band.
Front Panel	Mains switch, 4 x level controls (-ve infinity to +6dB)
Dimensions(WxHxD)	482 x 45 x 190mm (19 x 1.75 x 7.5 ins)
Shipping Dimensions	545 x 105 x 310mm (21.5 x 4 x 12 ins)
Weight	3.5kg (7.7lbs)
Shipping Weight	4kg (8.8lbs)