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ASC 24

# Analog System Controller

Owners Manual



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# 1. Introduction

Thank you for purchasing the JBL ASC 24 Array Series Controller, a specialised device designed for use of the Array Series Loudspeakers. It provides electronic crossover, phase alignment, level matching, and limiting for your system. Its advanced design and high quality components, coupled with in-depth acoustical measurements and extensive listening tests provide superior sonic performance.

This Owner's Manual contains the information necessary to properly set-up and operate your Array Series System.

The ASC 24 contains the following:

- Active crossover filters to divide the audio spectrum into separate passbands for each transducer.
- Pre-set equalization for smooth system frequency response over the entire bandwidth, and to provide uniform high frequency power response.
- Infrasonic filters to help prevent harmful very low frequency signals out of the power amplifiers and loudspeakers.
- Phase alignment for smooth response at crossover region.
- RMS type output limiters to protect system transducers from overload damage without affecting transient response for full musical dynamics.
- Convenient front panel controls for channel muting and level trim.

The maximum output capability of your system and its safe operation depend on your controller's setting with your chosen amplifiers. Carefully follow this manual's instructions for a long and pleasant relationship with your system.

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# 2. Installation

## 2.1 Unpacking

Carefully unpack the controller and inspect it for possible concealed shipping damage. Save the packing in case any damage is discovered and contact the dealer from whom you purchased the controller. In the event the ASC 24 is ever shipped outside of a rack, keep the packing for reuse.

## 2.2 Mechanical Mounting

The ASC24 occupies one standard rack space (1U). When mounted in an equipment rack that is transported it should be supported by a shelf or other equipment to prevent flexing of the mounting "ears" which may fatigue and break.

The chassis is used as a heat sink for the power supply regulators. It is normal for it to become warm during operation.

## 2.3 AC Power Connections

A 3-wire grounded outlet must always be used. It can be 120 or 240 Volts, 50-60 Hz. Before connecting the ASC 24 to AC power verify that the voltage selector switch is correctly set. The performance of the unit will not be affected in the voltage ranges of 96-132 V for the 120 V position, or 192-264 V for the 240 V position.

The ASC 24 does not have a power switch and must be shut down by removing the IEC power connector.

### **WARNING: THIS DEVICE MUST BE GROUNDED!**

The ground terminal of the IEC plug is required by wiring codes and regulations. It must always be connected to the electrical installation safety ground. The ASC 24 has carefully designed internal grounding and all balanced inputs and outputs to reduce the event of ground loops (hum). If hum occurs see Appendix A for suggested correct audio signal wiring and system grounding.

Replace fuse only with new fuse of correct size (20 mm) and rating (T250mA for 120 v, T200mA for 240 v).

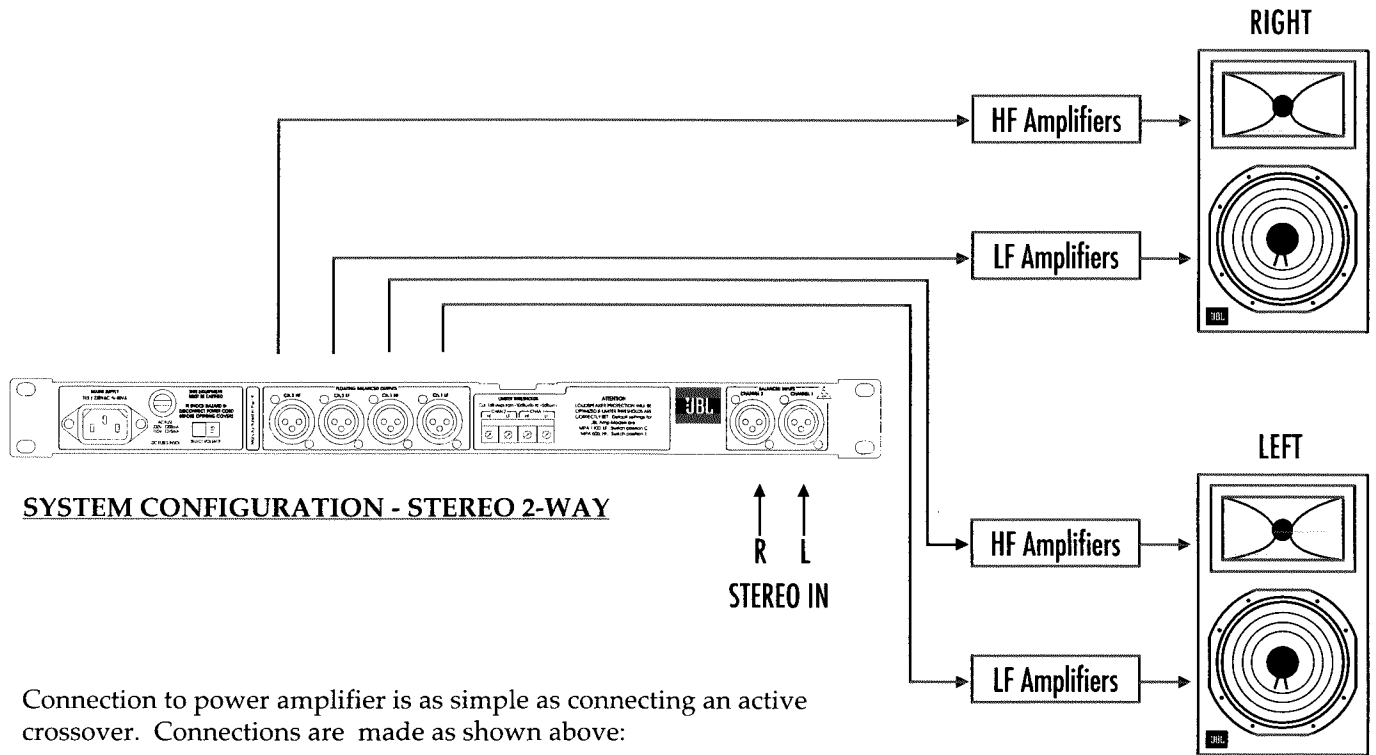
## 2.4 Audio Connections

Warning: The power amplifiers should be turned off before connecting the system together. Mis-wiring can connect the low frequency information to the high frequency drivers causing serious damage (not covered by warranty) to the drivers.

The two female XLR inputs are balanced, with pin 1 isolated to prevent ground loops (hum). The four male XLR outputs are balanced, with pin 1 connected to ground.

Pin 2 or pin 3 can be used as "hot" provided that the inputs and outputs are wired to the same standard. Two conductor shielded audio cable should always be used for all inputs and outputs.

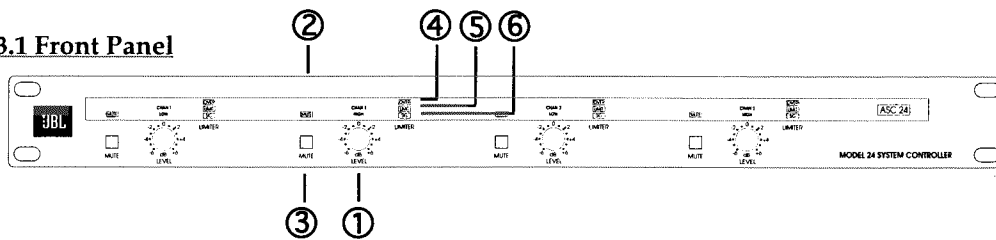
# 3. Installation and Operation



Connection to power amplifier is as simple as connecting an active crossover. Connections are made as shown above:

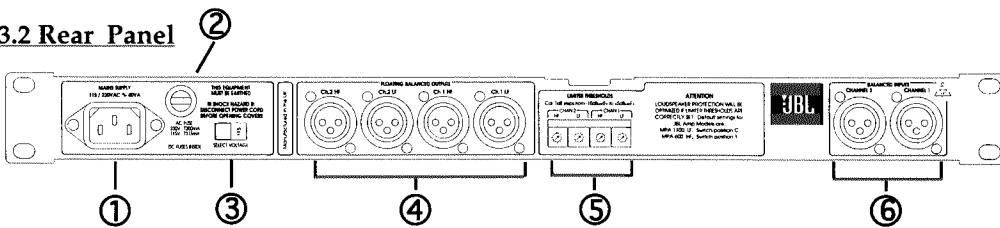
- Band 1- Channel A Low Frequency Output
- Band 2- Channel A High Frequency Output
- Band 3- Channel B Low Frequency Output
- Band 4- Channel B High Frequency Output

## 3.1 Front Panel



- 1.) Band Output Control
- 2.) Mute Indicator
- 3.) Band Mute Switch
- 4.) Signal Present Indicator
- 5.) Limiter
- 6.) Signal Overload

## 3.2 Rear Panel



- 1.) IEC Power Select
- 2.) AC Power Fuse (120 V, T250 mA; 240 V, T200 mA) 20 mm
- 3.) AC Voltage Selector Switch
- 4.) Balanced, Floated, Outputs
- 5.) Limiter Threshold Switches
- 6.) Balanced Inputs

# 3. Installation and Operation

## 3.3 Controls

The front panel controls provide the functions needed for normal operation.

### **Mutes**

A LED indicates when each band is muted. Muting is achieved via a latching mute button for each channel. It is recommended that all outputs are muted when setting up a system, then the switches can be used to verify each band is correctly driving its respective amplifier. The outputs automatically mute for four seconds on power up, and immediately when power is removed to prevent "thumps".

### **Indicators**

With power applied a front legend strip illuminates. It contains indicators to show its configuration, and provide information concerning the operation of the controller. The three indicators; SIG (green), LIM (yellow), and OVER (red) show signal present at a level -15 dB below the limiter threshold, threshold of limiting, and 6 dB of gain reduction. The "LIM" may be allowed to flash occasionally in use, the red "OVER" indicates excessive input level that should be reduced.

### **Limiters**

Each input has a high quality limiter optimized for its band. They have a 20:1 ratio and are controlled by RMS detection of the signal level in the bandpass filter circuits.

To accommodate a range of amplifier sensitivities limiter adjustment can be made in 1 dB increments at the rear panel.

Both fixed and portable systems using Array Series loudspeakers can benefit from using the ASC 24. When a cost effective solution is a higher priority than the very high resolution performance of digital technology the ASC 24 is the choice. If subwoofers are required, a separate active crossover can be used to derive the subwoofer signal. This also allows a separate send (or mix) from the console to provide more precise control of the amount of very low frequency energy for improved sound clarity.

### **Applications**

To accommodate a range of amplifier sensitivities limiter adjustment can be made in 1 dB increments at the rear panel. Access to the 16-way is possible by removing the top panel and lifting out the window.

The ASC 24 limiters should normally be set to prevent the power amplifiers from being driven into hard clipping. If JBL MPA amplifiers are used the default setting listed on the rear panel should be used. If other amplifiers are used the limiter threshold should be set 1 dB below the "full power sensitivity rating" of the amplifier. This will allow full dynamic range of the system for high quality sound reproduction while providing protection for the transducers.

# 3. Installation and Operation

Where system levels are under the control of technically inexperienced operators, as in many disco installations, the limiters may be used to establish a maximum drive level for the purpose of system protection or noise control. In this case the settings will be lower than those recommended above. They can be calculated from desired maximum amplifier power, or determined by listening tests. Once set the limiters should be tamper-proofed by having the window in place.

## Level Controls

The level trim allows  $\pm 6$  dB of adjustment for each output band. It does not reduce the output level to zero. The controller has been designed for correct relative gain for each output band with minor changes from the level controls in their "0" positions. Use the table below as a guide for initial system setup (the values shown are for the same power amplifier gain HF and LF sections). Large systems or difficult operating environments may require adjustments.

System	Band 1	Band 2	Band 3	Band 4
4890	0	-2	0	-2
4891	0	-2	0	-2
4892	0	-2	0	-2
4892-90	0	-2	0	-2
4894	0	0	0	0
4894-90	0	0	0	0

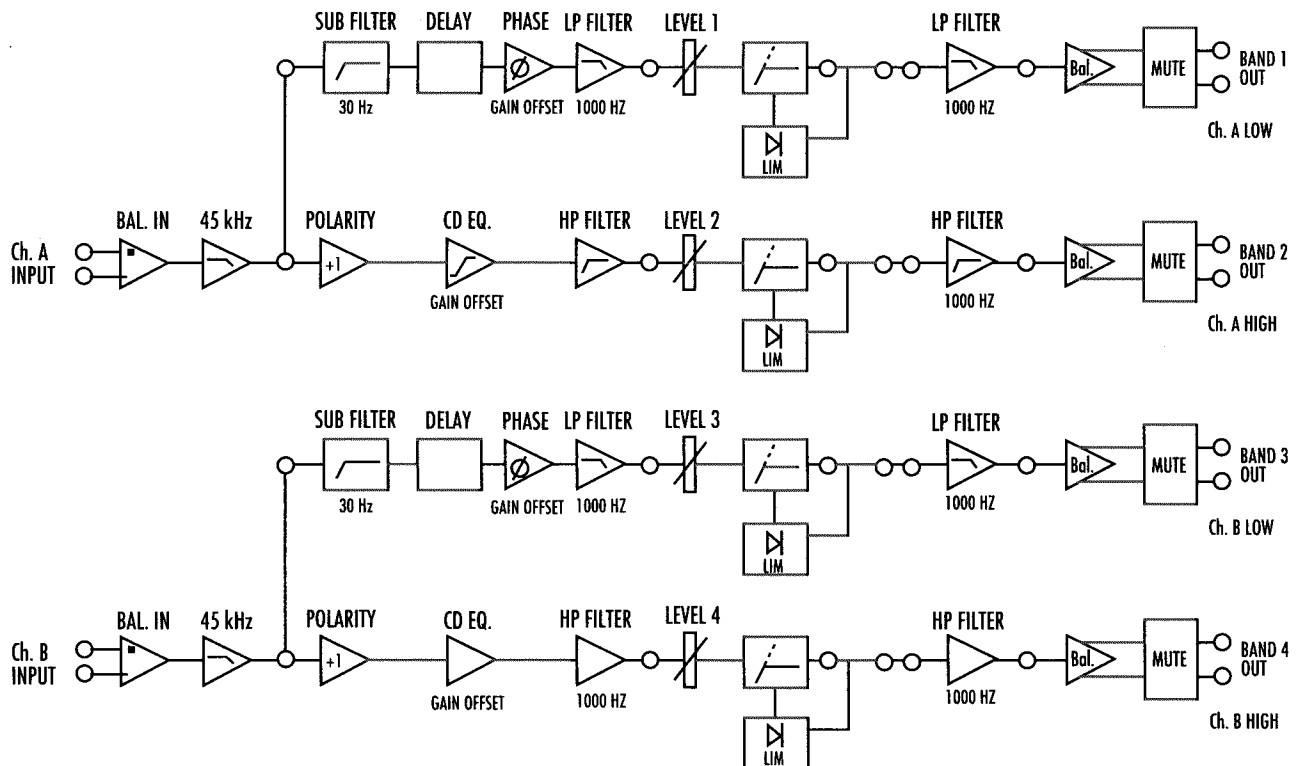
# 4. Specifications

## 4.1 Specifications

Inputs:	2 Channels, Max level +20 dBu, 10 kΩ imp., Pin 2 +
Outputs:	4 Bands, Max level +20 dBu, into 600 Ω imp., Pin 2 +
Output Impedance:	47 Ohms
Dynamic Range:	>105 dB
THD :	< 0.1%, typ. 0.005%
Configuration:	2 Channels x 2-way Outputs
Gain Control:	±6 dB Front Panel Trim Control
Nominal Gain :	0 dB (Unity gain)
Crossover:	24 dB/Oct Linkwitz-Riley, at 1 kHz
Limiters:	User Adjustable Threshold, Limit Ratio >20:1
System Capability:	Array Series 4890, 4891, 4892, 4892-90, 4894, 4894-90
Frequency Response:	30 Hz to 20 kHz
Power Requirement:	Selectable 120 V, or 240 V +10%, -20% 50/60 Hz
Display:	Band Type, Mute, Signal Present, Limiter Function, signal overload
Mute:	Each Output, Auto on (4 sec) Power Up, and Down
Dimensions:	44.5 mm x 483 mm x 292 mm (1.75" x 19" x 11.5")
Weight:	4 kg (8.8 LB)

JBL continually engages in research related to product improvement. New materials, production methods and design refinements are introduced into existing products without notice as a routine expression of that philosophy. For this reason, any current JBL product may differ in some respect from its published description but will always equal or exceed the original design specifications unless otherwise stated.

## 4.2 ASC 24 Block Diagram





# Appendix A

## Connector Wiring Information

### **Balance wiring**

Whether a system is wired to a 'pin 3 hot' convention is not so important so long as the wiring to both the input and output are the same. Input cable shield therefore needs to be derived from the signal source end as pin 1 is ground lifted for the inputs. It is recommended that the use a high quality audio cable with two conductors and a shield for low noise.

### **Unbalanced wiring**

If the equipment driving the ASC 24 has only unbalanced outputs then the input plug to the ASC 24 should be wired so that the shield connection on pin 1 is either shorted to EITHER pin 2 OR pin 3, depending on the wiring convention of the unbalanced equipment.

If the equipment connected to the ASC 24 outputs has only unbalanced inputs, then we again recommend the use of balanced (i.e. 2-conductor shielded) cable. The interconnecting cable should have the shield grounded to pin 1 at the ASC 24 output, the output "cold" should be connected to the unbalanced input 0 V ground, and the output "hot" should be connected to the unbalanced live input. There should be no connection between the cable screen and the 0 V/chassis ground connection of the unbalanced equipment. Strict adherence to this will help to eliminate potential ground loop hums by removing signal currents from the cable shield.

Following the wiring conventions noted above within a fully balanced signal system will yield the best possible results with none of the problems often associated with interconnected audio equipment. Wherever possible, the cable shield should not be connected to any signal pin, but rather left to perform a cable shielding function only.

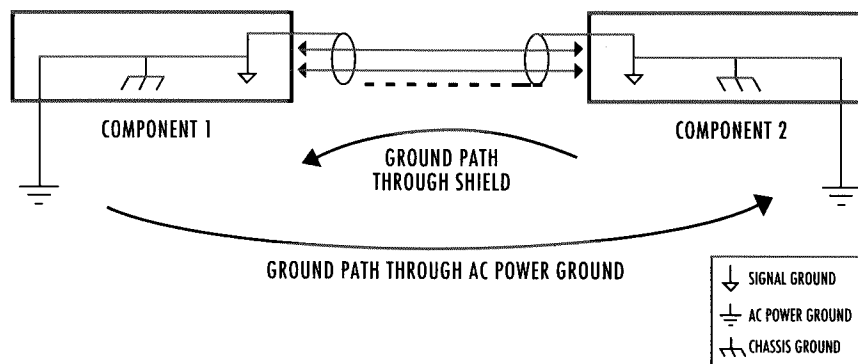
Where it is not possible to control all of the external cabling, it might become necessary to have internal electronic ground of the unit separated from the case safety ground. Provision is made internally within the ASC 24 to separate these two grounds at a convenient point, or to add a suitable impedance network as part of a house system requirement.

Under no circumstances should safety ground wire be removed from the AC power connector as an interim measure to achieve similar results.

# Appendix A

## Avoiding ground loops

A typical example of a ground loop situation is shown in the diagram below. Two interconnected components of a system are grounded through their individual AC power ground connections to separate AC power outlets. In this situation a path to ground exists both directly through the mains earth of each component and also via the shield in the signal wire to the AC power ground connection of the other component. In effect the two paths to ground form a loop antenna which picks up interference currents from surrounding equipment. Because of lead resistance these induced currents are transformed into voltage fluctuations in the ground system and hence the reference ground is no longer at a stable potential.



Various connection configurations are possible to prevent ground loops occurring. The aim is always to ensure that a loop path is never actually formed. It can be seen from the diagram above that this could, in theory, be achieved by disconnecting the AC power ground connection, however this practice is totally unsafe and should never be implemented as it could produce a potentially fatal accident.

The most flexible solution, and easiest to implement in touring system, is to use the practice of telescoping shields. This method is highly effective in removing ground loops and prevents unwanted signals entering the signal chain as the shield is always connected to ground. However this connection method relies on the use of unbalanced inputs and outputs between components as the ground connection is not carried through the signal path. The ASC 24 is designed with the input ground connections isolated so that a ground loop will not occur between the ASC 24 and the preceding source component as shown below.

