

MSC1

MONITOR SYSTEM CONTROLLER

Owner's Manual

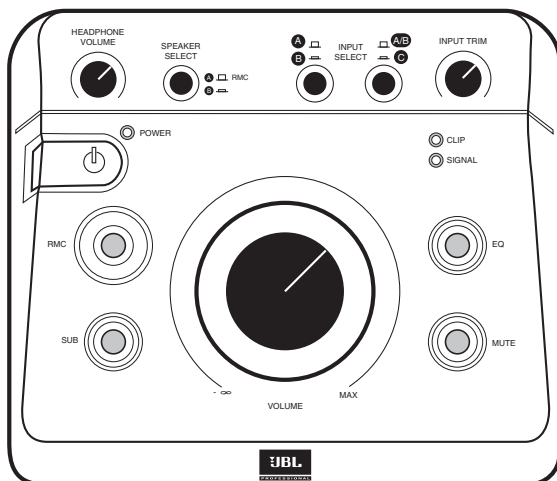


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Section 1: Important Safety Instructions

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with dry cloth.
7. Do not block any ventilation openings. Install in accordance with manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves or other apparatus that produce heat.
9. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacle and the point where the power cord connects to the apparatus.
10. Only use attachments/accessories specified by the manufacturer.
11. Unplug this apparatus during lightning storms or when unused for long periods of time.
12. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, including: power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
13. The appliance coupler of the power supply cord is used as the ultimate disconnect device from the mains. The appliance coupler shall remain readily operable.
14. The apparatus shall be connected to mains socket outlet with a protective earthing connection.
15. **POWER ON/OFF SWITCH:** The power switch DOES NOT interrupt connection to the mains. To disconnect the product from the mains, remove the power cord connector from the power input on the rear panel of the product.
16. **Caution:** This product is used to control loudspeaker volume. Very loud playback volume can damage hearing. Never adjust speaker volume to produce an output level that is audibly painful.

WARNING: To reduce the risk of fire or electrical shock, do not expose the apparatus to rain or moisture. The apparatus shall not be exposed to dripping or splashing and no objects filled with liquids, such as vases, shall be placed on the apparatus. As with any electronic product, use care not to spill liquids into any part of the system. Liquids can cause a failure and/or a fire hazard.

CAUTION! TO REDUCE THE RISK OF ELECTRONIC SHOCK - DO NOT REMOVE COVER. NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED PERSONNEL. DO NOT EXPOSE THIS APPARATUS TO RAIN OR MOISTURE.



Section 2: Introduction

Congratulations on your purchase of the JBL MSC1 Monitor System Controller, a unique product that combines the essential "Monitor Strip" functions found in large mixing consoles with JBL's highly acclaimed RMC™ Room Mode Correction technology, that allows any connected speaker system to be automatically tuned to your room. The end result is a calibrated reference environment in which your speakers work in harmony with your room to take the guesswork out of mixing. As the hub of your system, the MSC1 provides these powerful capabilities:

Mixing Console "Monitor Strip" Functions

- Monitor using two sets of stereo speakers.
- Monitor with and without a connected subwoofer* – The MSC1 automatically balances the subwoofer and gives you a choice of cross-over settings for proper integration of your subwoofer into your speaker system.
- Connect up to three 2-channel signal sources, and select the source to be monitored.
- Send a headphone feed to a performer, or use headphones in the control room to monitor program material.
- Tailor the frequency response of your speakers using flexible high and low frequency EQ.*

JBL RMC Room Mode Correction

With the supplied MSC1 Control Center Software and MSC1 calibration microphone, the MSC1 tunes the low frequency response of the speaker system* to compensate for inaccuracies measured at the listening position caused by room modes (standing waves) and the speakers proximity to walls, and the work surface.

Supplied MSC1 Control Center Software

Install the supplied MSC1 Control Center software on your computer to perform RMC Calibration, adjust equalizer settings, speaker level and delay, and fine tune a connected subwoofer.*

*Note: the processing functions of the MSC1 Room Mode Correction, EQ, subwoofer settings, speaker level and delay are available on "A" SPEAKER OUTPUTS. Flat, unprocessed signal is routed to "B" SPEAKER OUTPUTS. The subwoofer output is muted when "B" SPEAKER OUTPUTS are selected.

We know that very few people read owner's manuals from cover to cover, so we've organized this one to make it easy to find the information you need.

Section 2: Introduction

The section Setting Up Your MSC1 will get you up and running in a matter of minutes. This is followed by a 1 page Quick Start section guide that provides a very basic set of instructions for use of all the MSC1 features. The Quick Start is followed by a section that describes every feature and function of the MSC1 in detail. Next are directions for installing the supplied MSC1 Control Center software, which allows advanced functions such as calibration of the RMC™ Room Mode Correction system, adjustment of equalization, subwoofer settings and fine speaker alignment including delay and level trim controls. Finally, we've included troubleshooting tips and specifications at the end of this manual, along with service contact and warranty information.

◀ Note: Throughout this manual, important tips and cautions will be presented like this.

Registration

Please take a moment to register your MSC1. Registration can be accomplished on-line by going to www.jblpro.com/MS1. Click on "Register your product" and complete the on-line form. Thank you.

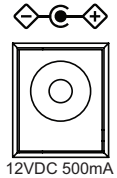
Section 3: Quick Start

1. Install the MSC1 Control Center Software following the procedure on pages 16.
2. Connect the MSC1 power supply to an available wall outlet and then connect the MSC1 to your computer using the supplied USB cable.
3. Launch The MSC1 Control Center Via the Desktop Icon.
4. To power the MSC1 on or off, press the MSC1's Power button or click on the Power Button image in the Software.
5. To change subwoofer level, crossover frequency or polarity settings, click the SUB button in the software or press the MSC1 front panel SUB control. Make adjustments using the on-screen Sub controls. To view Subwoofer settings at any time, click on the SUB GRAPH Tab.
6. To apply high frequency and low frequency monitor EQ, click the EQ button in the software or press the MSC1 front panel EQ control. Make adjustments using the on screen EQ controls. To view EQ settings at any time, click on the EQ Graph tab.
7. To enable MUTE click on the MUTE button in the software or press the front panel MSC1 MUTE control.
8. To activate Room Mode Correction (RMC) settings, click the RMC button in the software or press the front panel MSC1 RMC control.
9. To perform RMC Calibration, click RMC Menu, RMC Calibration, and follow the on-screen instructions.
10. To change the level of an individual speaker, click RMC Menu, RMC Alignment, and use your mouse to adjust the level slider, to the left of each speaker image. Note: Speakers levels are automatically adjusted during the RMC Calibration procedure.
11. To apply delay to an individual speaker click RMC Menu, RMC Alignment, and use your mouse to move the Delay level slider, to the right of each speaker image.

Section 4: Setting Up Your MSC1

Power Connections

Connect the MSC1 power adaptor to the POWER Connector on the rear of the MSC1. Plug the power adaptor into a suitable available power source. To minimize the potential for "ground-related" noise, we recommend connecting MSC1 to the same power source as the audio equipment and computers connected to the MSC1.



Audio Connections

The MSC1 Monitor System Controller is equipped with balanced 6.5mm (1/4 inch) TRS (Tip-Ring-Sleeve) output connectors for the connection of two stereo speaker systems (labeled "A" and "B"), plus a dedicated balanced 6.5mm (1/4 inch) TRS connector for the connection of a subwoofer to system A. In addition, three pairs of input connectors are provided: two pairs of balanced 6.5mm (1/4 inch) TRS connectors, labeled A and B, and one unbalanced pair of PHONO (RCA) connectors, labeled C, allowing the MSC1 to be used with a wide variety of professional computer audio interfaces, soundcards, mixing consoles and audio production equipment, as well as consumer audio products with unbalanced outputs such as personal music players, receivers and audio visual equipment. Finally, a stereo 6.5mm (1/4 inch) stereo headphone output with dedicated front-panel volume control allows you to send a headphone feed to a performer or monitor audio using headphones in the control room.

◀ Note: Two additional rear-panel stereo 3.5mm (1/8 inch) audio connectors, labeled "RMC MIC IN" and "RMC MIC OUT," are used only during RMC calibration. See page 14 in this manual for more information.

◀ Note: To avoid audible noise, make audio connections with speakers and MSC1 powered off.

The following illustration shows various suggested MSC1 audio interconnections. The use of balanced cabling is recommended when connecting the MSC1 to equipment with balanced inputs and outputs as it ensures the best possible signal-to-noise performance. Additionally, use of unbalanced cable in systems with balanced inputs and outputs can reduce system gain by as much as 6 dB.

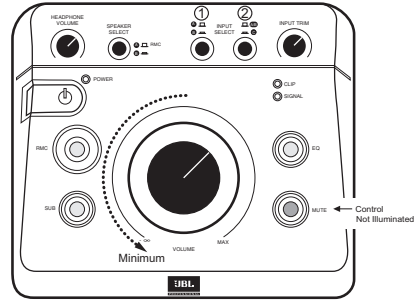
Confirm the settings of controls on connected speakers and subwoofer:

- Speaker and subwoofer volume controls should be set to maximum setting.
- If the Subwoofer includes a crossover control, it should be set to the highest available frequency.
- Speaker tone controls may be used, but we recommend these are bypassed prior to RMC calibration and restored according to taste, after RMC calibration (See MSC1 Control Center Software User's Guide).

Section 4: Setting Up Your MSC1

Getting Sound

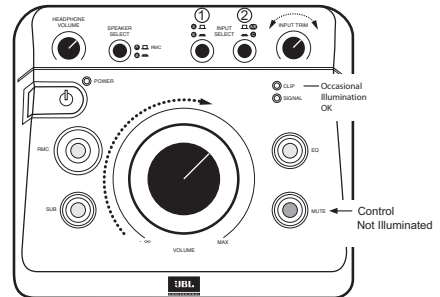
Make all audio connections with the power to all devices off. Once all connections are made, set the MSC1 front panel VOLUME control to minimum (fully counterclockwise), then power on all connected devices, and power on the MSC1 itself, by pressing the MSC1 front-panel POWER switch. Finally, power on the speaker system.



Next, make sure the front panel MUTE button is not illuminated and then use the front panel SPEAKER SELECT switch to choose the desired speaker system ("A" or "B") you wish to hear. Use the front panel INPUT SELECT switches ① and ② to choose the input signal ("A", "B", or "C") you wish to monitor.

◀ Note: If INPUT SELECT switch ② is depressed (set to the C position), the MSC1 will always be monitoring Input C, regardless of the position of INPUT SELECT ①, even if nothing is physically connected to Input C.

Finally, send audio signal from the device connected to the selected input and slowly advance the MSC1 VOLUME control until you achieve a suitable listening level. If necessary, adjust the MSC1 INPUT TRIM control for maximum signal strength. It is OK if the MSC1 CLIP LED illuminates occasionally.

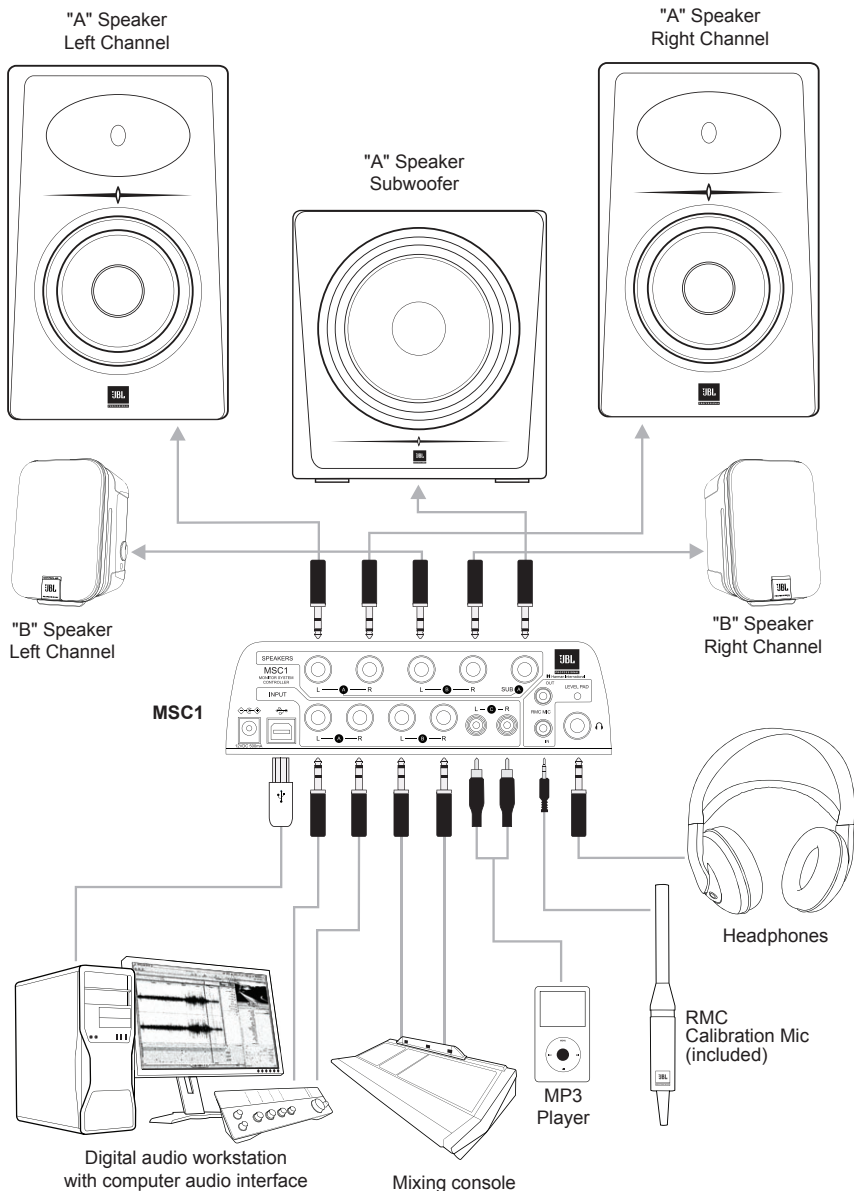


◀ Note: Although any audio source may be connected to any input "A", "B", or "C", we recommend connecting professional equipment with high level +4 dBu outputs (mixing consoles, professional audio interfaces and playback equipment) to input connectors A or B, and consumer equipment with low-level -10 dBV outputs (receivers, personal music players, electronic keyboards and rhythm machines) to the C input connectors.

For more information, and details about setting the INPUT TRIM control, refer to the "Front Panel" and "Rear Panel" sections on pages 9 - 14 of this manual, and to the "Troubleshooting" section on page 20.

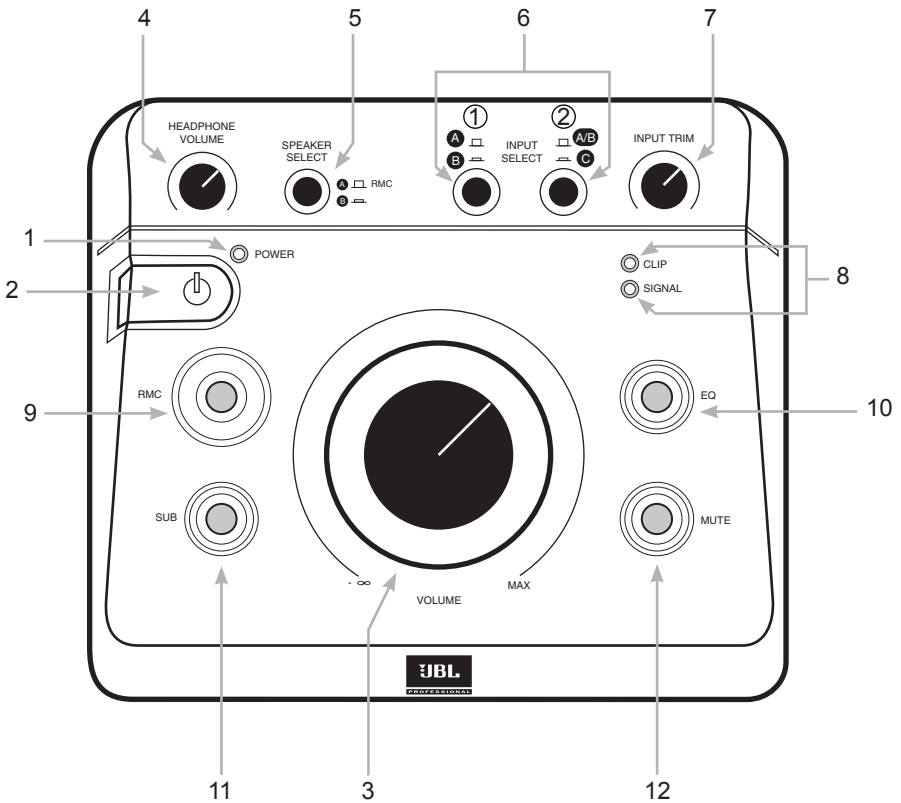
Section 4: Setting Up Your MSC1

MSC1 System Example



Section 5: Features and Operation

Front Panel Controls, Indicators, and Functions:



1. **POWER LED** – This LED (Light Emitting Diode) flashes twice when the MSC1 is first connected to a power source and remains illuminated when the MSC1 is powered ON.
2. **POWER SWITCH** - When the MSC1 is connected to an AC power source, press this button to power-on the MSC1 (The front panel buttons will illuminate in a pattern). To power off the MSC1, press the power button again. Once power down begins, the sound is muted while a different light pattern is displayed. Do not disconnect the power adaptor until all MSC1 front panel indicators are no longer illuminated.

⚠ **Note:** The power switch and all MSC1 features are disabled for 4 seconds immediately following connection of MSC1 to a power source.

3. **MSC1 VOLUME** – Sets the output level for the selected input signal (see #6), from $-\infty$ (full attenuation) to MAX (0 dB, or no attenuation). Note that this control does NOT affect headphone output level (see #4).
4. **HEADPHONE VOLUME Control** – A dedicated volume control for connected headphones. Other than this, the only MSC1 control that effects the headphone signal is MUTE control (see #12).

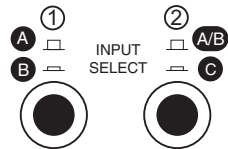
Section 5: Features and Operation

5. **SPEAKER SELECT** switch – Determines which set of Speaker Outputs ("A" or "B") are active. When the button is in the up position, speakers connected to Output A and a connected subwoofer are active. When it is depressed (in the down position), speakers connected to B OUTPUT SPEAKER are active.

◀ Note: The subwoofer output is disabled when B is selected

◀ Note: The processing functions of the MSC1 (Room Mode Correction, EQ, and subwoofer capabilities) are only applied to "A" Speaker Outputs. Flat, unprocessed signal is routed to the "B" Speaker Outputs.

6. **INPUT SELECT** switches ① & ② – Determine which of the three stereo input signals (A, B, or C) is being monitored. To monitor sources connected to inputs A or B, make sure INPUT SELECT switch ② is in the UP position and then use the INPUT SELECT switch ① to choose Input A (up) or Input B (down). To monitor Input C, depress INPUT SELECT switch ②. When INPUT SELECT Switch ② is pressed, the position of the INPUT SELECT Switch ① has no effect.



◀ Note: If the INPUT SELECT Switch ② is depressed (set to the C position), the MSC1 will always be monitoring Input C, regardless of the position of INPUT SELECT Switch ①. If you wish to monitor equipment connected to Inputs A or B make sure INPUT SELECT Switch ② is in the UP position.

7. **INPUT TRIM Control** – Can be used to add or reduce system gain once the MSC1 VOLUME control is operating in a comfortable range. If the CLIP LED (see #8 below) illuminates frequently or steadily, reduce the setting of the INPUT TRIM control by turning it counter-clockwise.

When you first use the MSC1, we recommend you take a moment to set the INPUT TRIM control using this procedure.

1. Set the INPUT TRIM control to minimum (full counter-clockwise)
2. Set the MSC1 VOLUME control to the 12:00 position.
3. Press "Play" on the device connected to the selected input ("A", "B", or "C")
4. While listening to program material, adjust the INPUT TRIM control to achieve a comfortable listening level.
5. If the red CLIP LED illuminates, reduce the setting of the INPUT TRIM control.
6. Listen to each connected device and adjust the INPUT TRIM control to a setting that works best for all connected equipment. To achieve best balance of all sources, adjust the individual output level controls on connected equipment.

The INPUT TRIM Control can be readjusted whenever required.

Section 5: Features and Operation

8. **INPUT LEDs** – These LEDs (Light Emitting Diodes) provide visual indication of incoming signal. The SIGNAL LED illuminates whenever signal of any strength is present at the selected input (see #6 above). The CLIP LED illuminates when signal is within 3 dB of the MSC1 maximum level output. It is acceptable for this LED to illuminate occasionally. If the CLIP LED illuminates frequently or continuously, reduce the setting of the INPUT TRIM Control or use available level controls on the connected equipment to reduce the equipment output level.
9. **RMC ON Control** – Once RMC calibration has been performed this button allows you to quickly and easily compare the "A" SPEAKER OUTPUT signal with and without Room Mode Correction. When illuminated, signal is sent to speakers connected to "B" SPEAKER OUTPUTS with RMC processing applied. (See the MSC1 Control Center Software User's Guide.) Press this button again (no illumination) to hear the signal without RMC.
10. **EQ ON Control** – Activates or deactivates MSC1 EQ available for speakers connected to the "A" SPEAKER OUTPUT. When illuminated, an equalized signal is sent to the speakers connected to "A" SPEAKER OUTPUT. Press again (no illumination) to listen to the "A" speakers without equalization. (See the MSC1 Control Center Software User's Guide.)

◀ Note: EQ is applied to the Left and Right speakers connected to "A" SPEAKER OUTPUTS only. Equalization does not affect Speakers connected to "B" SPEAKER OUTPUTS nor the Subwoofer or headphones.

◀ Note: If enabled, the RMC and / or EQ Controls flash repeatedly instead of illuminating steadily when "B" SPEAKER OUTPUTS are selected because EQ processing is available on "A" SPEAKER OUTPUTS only.

Section 5: Features and Operation

11. SUB ON control – If a subwoofer is connected to the SUB Output "A", and the "A" speakers are being monitored, this control allows you to quickly and easily listen to "A" speakers with and without a subwoofer. When the subwoofer is included in the system, Bass Management Crossover filters are applied that route low frequency signals below the crossover frequency to the subwoofer and signals above the crossover frequency to the Left and Right speakers. When the SUB control is illuminated, the subwoofer is heard. When the control is not illuminated, the subwoofer is muted and the Left and Right speakers play a full range signal. Subwoofer Level and Bass Management crossover are set using MSC1 Control Center software. Three Bass Management crossover frequencies are provided and the MSC1 ships with an 80 Hz Bass Management crossover selected and subwoofer gain set to 0 dB (no additional boost or attenuation). (See the MSC1 Control Center Software User's Guide.)

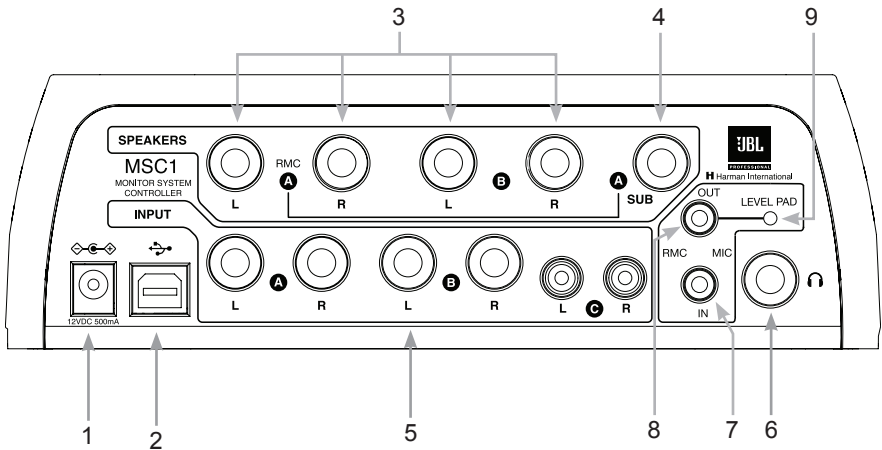
◀ Note: If your subwoofer has a crossover frequency control, the control should be set to the highest available frequency.

◀ Note: The SUB control will flash repeatedly instead of illuminating steadily when Speaker Output B is selected because a connected subwoofer can be heard only when Speaker Output A is selected

12. MUTE control – When illuminated, mutes all output signal from the MSC1, including the headphone output.

Section 5: Features and Operation

Reference: Rear Panel



- 1. POWER CONNECTOR** – Connect the supplied 12VDC 500mA power supply here. Note that when the MSC1 is first plugged in, the front panel POWER LED will flash twice, after which the MSC1 enters stand by mode. When in stand by mode, no indicators are illuminated and audio output is not available.
- 2. USB CONNECTOR** – Universal Serial Bus connector for computer connection when using the provided MSC1 Control Center software.
- 3. SPEAKER OUTPUTS (A, B)** – Two pairs of balanced 6.5mm (1/4 inch) TRS connectors labeled A and B for connection of two stereo speaker systems.

⚠ Note: The processing functions of the MSC1 (Room Mode Correction, EQ, and subwoofer capabilities) are only applied to the "A" SPEAKER OUTPUTS. Flat, unprocessed signal is routed to "B" SPEAKER OUTPUTS.

- 4. SUB A OUTPUT** – A dedicated balanced 6.5 mm (1/4 inch) TRS connector for the addition of a subwoofer to System A.

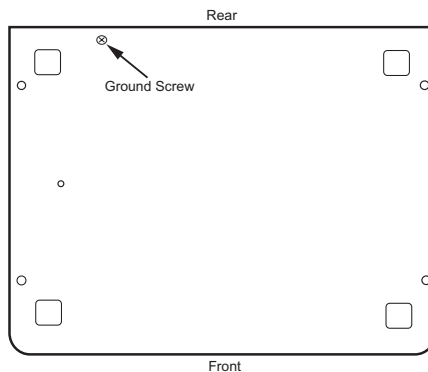
Section 5: Features and Operation

◀ Note: If the Subwoofer has Left and Right inputs, connect the MSC1 SUB "A" Output to either the Left or Right Subwoofer input. Set the Subwoofer crossover control to the highest available frequency. If the Subwoofer has a LFE (Low-Frequency Effects) input or a direct input, connect the MSC1 SUB "A" output to this input. The SUBWOOFER OUTPUT is derived from the sum of the Left and Right "A" SPEAKER OUTPUTS.

- 5. INPUTS ("A", "B", and "C")** – Allow connection of up to three signal sources: two pairs of balanced 6.5mm (1/4 inch) TRS connectors, labeled A and B, for the connection of professional (+4 dBu) equipment, plus one unbalanced pair of PHONO (RCA) connectors, labeled C, for the connection of consumer (-10 dBV) equipment.
- 6. HEADPHONE OUTPUT** – Connect a standard pair of stereo headphones to this 6.5mm (1/4 inch) stereo jack for private monitoring of the MSC1 output.

◀ Note: For private monitoring of the MSC1 signal over headphones with all speakers off, turn the main MSC1 VOLUME control to its fully counterclockwise ("∞") position and use the dedicated HEADPHONE VOLUME control to set the desired listening level.

- 7. RMC MIC IN** – Connect the supplied microphone here when performing an RMC calibration. For more information, see the MSC1 Control Center Software User's Guide.
- 8. RMC MIC OUT** – Used to connect your MSC1 to the audio input of your computer's audio interface or soundcard when performing an RMC calibration. For more information, see the MSC1 Control Center Software User's Guide.
- 9. LEVEL PAD** – When depressed, increases the level of the signal being sent from the RMC MIC OUT jack (see #8 above) by 8 dB. For more information, see the MSC1 Control Center Software User's Guide.
- 10. GROUND CONNECTION** – Grounding point (See Trouble Shooting Section)



Section 6: Installing the MSC1 Control Center Software

Minimum System Requirements - Windows

Hard Drive: 200 MB available space

RAM: 1 GB minimum

CPU: Pentium (4) 1.6 GHZ or better (Core™ 2 Duo recommended)

Operating System: Windows XP or Vista, 32-bit and 64-bit

Internal Soundcard or External Audio Interface, compatible with DirectX 9

Minimum Screen Resolution: 1024 x 768

The following applications are installed:

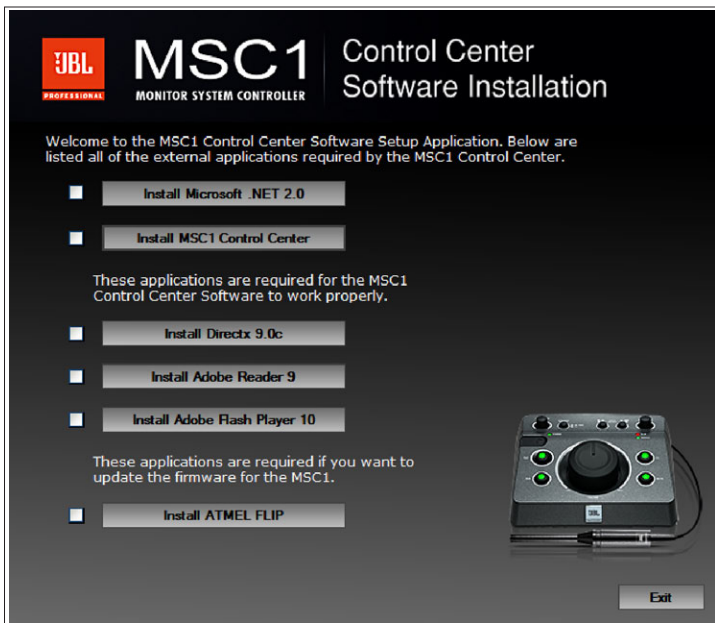
Microsoft® .NET 2.0

Directx 9.0c

Adobe® Flash 9 or later

Adobe Acrobat® Reader 7 or later

⏏ Note: Use on a Macintosh Computer requires Macintosh version MSC1 Control Center Software and Macintosh Operating System. Control Center for Macintosh availability date to be announced.



MSC1 Control Center Software Installation Menu

INSTALLATION - WINDOWS

From CD-ROM:

1. Insert the supplied CD-ROM in an available CD-ROM drive.
The installation application should launch automatically.

Section 6: Installing the MSC1 Control Center Software

2. In the event that the installation doesn't auto-launch, from the Start Menu, click RUN
3. Click BROWSE
4. Locate the drive containing the MSC1 Control Center Software CD-ROM.
5. Click on the file named MSC1_Application_Installer.EXE and the MSC1CC Installation Application will open.

If the Installer will not open after attempting to launch it:

- A. From the Start Menu Click RUN.
 - B. Click BROWSE.
 - C. Locate the drive containing the MSC1 Control Center Software CD-ROM.
 - D. Navigate to the MSC1 Installer Folder.
 - F. When the installation is complete, attempt to launch the MSC1 Installation software again.
6. There are several software components, listed in the MSC1CC Software Installation Screen, required to successfully run the MSC1 Control Center.

The MSC1 Installation Software checks your system and determines the current availability of each component. A checkmark appears in the check box adjacent to a given component's launch button if it is determined the component is already installed. Therefore a component that has a check mark in its check box does not require installation.

7. If you attempt to load an application previously installed on your computer, the instructions will ask you if you would like to repair, uninstall, or cancel the installation. At this point you should cancel the installation of that particular application.
8. Going down the list, for each component without a checkmark, press the corresponding launch button to begin installation.
9. During the MSC1 Control Center Software installation, a launch icon is placed on the desk top.
10. The DirectX 9.0c installation will ask you to choose a directory for the installation. Select any location on your C: Drive. For example, create a directory called C:\directx-9c on your hard drive and select this location for the install.

Section 6: Installing the MSC1 Control Center Software

11. The ATMEL FLIP installation will ask you if you want to restart your machine. If you select NO, then as you exit the MSC1CC Installation you will be reminded that you must restart your computer before using the MSC1CC Software.
12. After you restart your computer, you can launch the MSC1 Control Center.

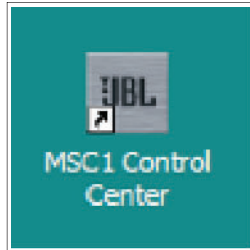
To Uninstall the MSC1 Control Center:

Launch Control Panel >Add or Remove Programs. From the “Currently Installed Programs” List, Find and highlight “MSC1 Control Center.” Then Click “Remove.”

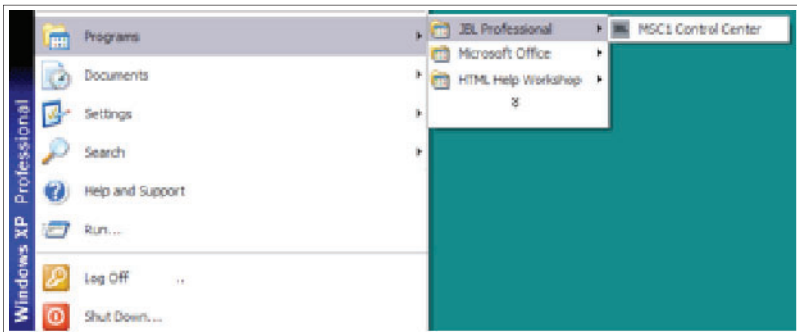
◀ Note: From time to time, JBL will issue software updates that enhance MSC1 Control Center functionality. If your computer is connected to the internet, software updates can be downloaded at www.jblproservice.com; otherwise you can obtain the update by contacting JBL Professional Customer Service at (800) 8JBLPRO (800-852-5776), Monday-Friday, 8am-5pm P.S.T.

Section 7: Launching the MSC1CC Software

Following installation, a shortcut to the MSC1 Control Center Software is placed on your desktop and in your computer's Start Menu under Programs > JBL Professional > MSC1 Control Center.



Start Menu Launch Icon



Start Menu Launch Icon

- ▶ Your MSC1 must be connected to your computer with the supplied USB cable and powered on before launching the MSC1 Control Center Software.

Prior to launching the MSC1 Control Center Software, make sure your MSC1 is connected to your computer with the supplied USB cable and powered on. Then double-click on the desktop icon (or single-click on the Start menu icon) to launch the software. See the Features section in the MSC1 CC Software User's Guide for details about all MSC1 Control Center Software display and menu options.

- ▶ To protect your speakers, it is good practice to complete audio connections with the MSC1 and all connected equipment powered off.

Section 8: Reference

JBL RMC™ Room Mode Correction:

About RMC

The biggest challenge for anyone producing audio is creating a mix that sounds great on all playback systems. If you think of a monitoring system as a kind of "lens" through which you hear sound, the object is to have the lens be crystal-clear and transparent so that it imparts no coloration whatsoever to the signal being played back. However, every loudspeaker system, no matter how well designed, interacts with the room in which it is installed. Lack of correct acoustic treatment (or, worse yet, lack of any treatment at all) can result in anomalies such as low-frequency "standing waves"—the aural equivalent to the lens being "smeared." Trying to create a mix in such an environment can be as frustrating and difficult as trying to paint a masterpiece while blindfolded.

JBL's exclusive RMC Room Mode Correction technology is designed to solve the problem. It uses the power of your computer to analyze the acoustic conditions of your room RMC then compensates for low frequency inaccuracies in the listening space by having the MSC1 precisely insert filters so that signals arrive at the mix position with the intended frequency response. By making precise corrections, RMC allows you to create reliable mixes that translate to any environment. Space limitations in the work environment may prevent ideal positioning of the Left and Right speakers and subwoofer. The MSC1 allows you to precisely trim the level of each connected speaker, and apply delay to compensate for differences in placement relative to the mix position, ensuring balanced mixes regardless of speaker placement.

Performing an RMC Calibration

The supplied MSC1 Control Center software, MSC1 Calibration Microphone, and accessory cables are required to perform an RMC calibration. Refer to the supplied MSC1 Control Center Software Users Guide for full instructions.

Subwoofer Bass Management Crossover

Adding a subwoofer to your system will extend the frequency response of the main speakers. "Bass management" is a term that refers to the practice of removing bass signals from the Left and Right speakers and sending them to the subwoofer. Because of the physiology of the human ear, low frequencies are largely non-directional: given an adequate listening distance, we can't easily tell where bass signals are coming from. Thus, it makes little or no difference to the listening experience whether the bass component of a sound comes from the Left or Right channel speaker or from a dedicated subwoofer which is better equipped, and better positioned in the room, to reproduce low frequencies than even a full range monitor. Beyond the fact that a subwoofer is designed for the optimal reproduction of low frequencies, bass management can also be used to solve acoustic problems in a room: having all the low frequency signals come from a single source can eliminate low frequency phase cancellation that occurs when the same low frequency signal is reproduced by multiple speakers. The MSC1 SUB Control allows you to easily enable or disable the Subwoofer and Bass Management system.

Section 8: Reference

In addition to allowing connection of a subwoofer, the MSC1 includes sophisticated Bass Management Crossover with a choice of three crossover frequencies, to precisely integrate the subwoofer into your system. When the SUB Control is illuminated, the SUB output is enabled and the MSC1 Bass Management Crossover is engaged. When the control is not illuminated, the subwoofer output is muted and the Left and Right speakers return to full-range operation. Three crossover settings are provided and can be set using the MSC1 Control Center software: 60 Hz, 80 Hz and 120 Hz. Also, using the software, the subwoofer level can be increased or decreased by 10 dB. Finally, during RMC calibration, the sub is automatically balanced to the speaker system.

Equalization

Equalization can be applied to speakers connected to the Left and Right "A" SPEAKER OUTPUTS to tailor response to preference, or acoustic conditions in the room.

The MSC1 offers two bands of equalization (high and low frequency shelving type), with up to 3 dB of attenuation or boost in each band. Using the supplied MSC1 Control Center software, the corner frequency for each band is adjustable from 34 Hz to 1.1 kHz (LF) and 2.5 kHz and 17 kHz (HF).

To turn equalization on, press the EQ button so that it is illuminated. Equalization settings are accomplished, and presets can be created using the supplied MSC1 Control Center software.

Delay and Level Trim

Left and Right Speakers and a subwoofer connected to the "A" SPEAKER OUTPUTS can be level-matched and independently delayed to compensate for differences in placement relative to the listening position. These adjustments can be made using a computer and supplied MSC1 Control Center software.

Left and Right speaker levels can be independently attenuated up to 12 dB in .25 dB increments. The subwoofer level can be adjusted +/- 10 dB in .25 dB increments, allowing it to be finely balanced in the system.

Left and Right speakers and the subwoofer can also be independently delayed which can be useful if, out of necessity, the left and right speakers differ in distance from the listening position. The application of delay to the closer of the two speakers will restore strongest possible stereo image by allowing sound from both speakers to arrive at the ears at precisely the same time, regardless of physical positioning. Delaying the subwoofer, or the Left and Right speakers relative to the subwoofer, can enhance the low frequency performance of the system by virtually aligning the subwoofer with the main speakers. Delay units are expressed in values of distance, from 0 feet (0 cm) to a distance of 3.75 ft. (114 cm) in 1 inch (2.54 cm) increments. The subwoofer can be delayed from 0 ft. (0 cm) to 3.17 ft (96.6 cm). For example, applying a delay value of 1 ft. (30.45 cm) to a speaker will cause the audio from that speaker to sound as if it originates 1 foot farther away relative to the other speakers.

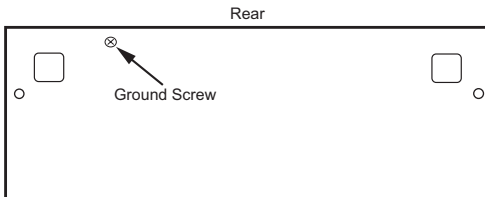
Section 9: Troubleshooting

No sound

- Confirm that the power cable is connected and that the MSC1 is powered on (POWER LED is illuminated).
- Confirm that a signal source is connected and producing sound and the INPUT SELECT switches are set correctly. (Note that if the INPUT SELECT switch ② is depressed [set to the C position], you will always be monitoring Input C, regardless of the position of the INPUT SELECT ①, even if no signal is physically connected to INPUT C.)
- Confirm connected speaker system is powered on and the SPEAKER SELECT switch is set correctly.
- Confirm that the MUTE button is not illuminated.
- Make sure the MSC1 VOLUME control is not set to the fully counter clockwise ("-∞") position.

System "hum"

- If you hear "hum" noise in your system, try connecting all signal source equipment, the computer and speakers to the same electrical power outlet. (Do not connect equipment with total power requirements that exceed the capabilities the provided power source). If after doing this you still hear hum, you can try "grounding" the MSC1 to an available ground source. To do this, use a Philips head screw driver to loosen the ground screw on the bottom of the MSC1. Attach an insulated wire to the screw and tighten the screw. Connect the other end of the wire to different ground points of your audio system to find and achieve the best performance.



Left and Right Speakers lack low frequency response

- If no subwoofer is connected, confirm SUB Control is not illuminated.

No subwoofer signal

- Confirm that a subwoofer is connected to Sub "A" output and is powered on, it's volume control is set to maximum, and it's crossover control is set to the highest available crossover setting.
- Confirm that the SUB control is illuminated.
- Confirm that the SPEAKER SELECT switch is set to "A". (A connected Subwoofer is heard only when "A" SPEAKER OUTPUTS are selected)

Section 9: Troubleshooting

Subwoofer is not loud enough

- Use MSC1 Control Center software to adjust subwoofer level and Bass Management Crossover settings.
- If your system incorporates different models or brands of speakers and subwoofer it may be necessary to adjust the subwoofer level or Left and Right Speaker levels to balance the Sub in the system.

No difference in sound when the RMC control is activated or deactivated

- Using the supplied MSC1 Control Center software, confirm that RMC calibration has been performed.
- Confirm that the SPEAKER SELECT switch is set to "A". (RMC processing is available when the "A" SPEAKER OUTPUTS are selected.)

No difference in sound when the EQ control is activated or deactivated

- Using the supplied MSC1 Control Center software, confirm that an EQ setting has been made. (See MSC Control Center Software User's Guide.)
- Confirm that the SPEAKER SELECT switch is set to "A". (EQ affects only signal sent to "A" SPEAKER OUTPUTS.)

RMC, EQ, and SUB buttons flash when pressed instead of illuminating steadily

- The SPEAKER SELECT switch is set to "B". (Processed signal (RMC and/or EQ) and subwoofer signal is heard only when routing signal to "A" SPEAKER OUTPUTS. Only flat, unprocessed signal is routed to "B" SPEAKER OUTPUTS.)

The CLIP LED is illuminated consistently and/or distorted sound is heard

- Output level of the equipment connected to the selected input is too high. To remedy this do one of the following:
 1. Reduce the setting of the INPUT TRIM control.
 2. Reduce the output level of the connected equipment using available output level control on the equipment.
 3. If the CLIP LED illuminates with input "C" selected, disconnect the equipment from Input C and reconnect the equipment to Input "A" or "B", which are designed to accept greater signal levels.

If the above measures do not correct the problem, please contact JBL Professional Customer Service (see page 26 in this manual for more information).

Section 9: Troubleshooting

Restoring Factory Settings

Some MSC1 features are set using MSC1 Control Center software. The Factory Reset procedure restores the features to original default settings. Using the Factory Reset procedure, the following features, available for speakers connected to "A" SPEAKER OUTPUTS, are reset:

- Equalization
- Sub Bass Management Crossover
- Subwoofer Level
- Subwoofer Polarity
- Individual level trim for Left and Right Speakers
- Speaker Delay settings

To perform Factory Reset, follow this procedure:

Press and hold the MSC1 front panel RMC control for 6 seconds, until the MUTE and RMC controls begin to flash. Continue to press the RMC control, and simultaneously press the MUTE control. Then release both buttons.

Completion of the process is confirmed when LEDs on the MSC1 illuminate in a pattern for 15 seconds, and the power LED illuminates.

If after performing Factory Reset, the MSC1 is interfaced to a computer and MSC1 Control Center Software is launched, the software will offer the option of returning the MSC1 to the settings last stored in software.

Note: The Factory Reset procedure erases all user settings, in the MSC1.

MSC1 Factory Settings

"A" Left and Right Speaker

Feature	Factory Setting
LF EQ Boost/ Cut	0 dB
HF EQ Boost/Cut	0 dB
LF EQ Frequency	580 Hz
HF EQ Frequency	7.75 kHz
Level Trim	0 dB
Delay	0 inches / mm

Section 9: Troubleshooting

Subwoofer Output

Sub Level	0 dB
Bass Management Crossover	80 Hz
Sub Polarity	0 degrees
Delay	0 Inches / mm

Firmware Update

From time to time, JBL may release a firmware update to correct a problem or enhance the feature set. If a firmware update is released, the update and installation instructions will be posted on the JBL website at www.jblproservice.com.

Section 10: Specifications

S/N, Dynamic Range:	110 dB typical, A-weighted, 20 Hz - 20 kHz
Frequency Response:	+0/-0.5dB, 20 Hz - 20 kHz
THD+N:	< 0.04% A/D/A, 20 Hz - 20 kHz
A/D Converters:	24 Bit 64-times Oversampling Delta-Sigma
D/A Converters:	24 Bit, 8-times Oversampling Delta-Sigma
Internal Processing:	48 Bit, 48 kHz
Maximum Input Level:	+24 dBu, 6.5mm (1/4-inch) TRS Inputs; +12 dBu, PHONO (RCA) Inputs
Maximum Output Before Clipping:	+17 dBu, 0.025% THD
Input Impedance:	20k ohms 6.5mm (1/4 inch) TRS Inputs; 10k ohms PHONO (RCA) Inputs
Output Impedance:	100 ohms
Power Requirements:	12 VDC, 0.5A
Dimensions (w x d x h):	198 x 165 x 83 mm (7.8 x 6.5 x 3.25 in)
Shipping Weight Including Accessories:	1.96 kg (4.3 lbs.)

"A" Left and Right Speaker

Feature	Range
LF EQ Boost/ Cut:	+/- 3 dB in 0.25 dB increments
HF EQ Boost/Cut:	+/- 3 dB in 0.25 dB increments
LF EQ Frequency:	34 Hz to 1.1 Hz
HF EQ Frequency:	2.5 kHz to 17 kHz
Level Trim:	+0/-12 dB in 0.25 dB increments
Available Delay:	0 to 114 cm (3 feet 9 inches) in 2.54 cm (1 inch) increments

Subwoofer "A" Output

Feature	Range
Sub Level:	+/-10 dB in 0.25 dB increments
Bass Management Crossover:	60 Hz, 80 Hz, 120 Hz
Sub Polarity:	0 degrees, 180 degrees
Available Delay:	96.5 cm (3 feet 2 inches) in 2.54 cm (1 inch) increments

RMC Parameters Filters

Left and Right Speakers:	5 filters. Range: 32 Hz to 350 Hz. Gain: +0/-18 dB
Subwoofer:	2 filters. Range: 28 Hz to 150 Hz. Gain: +0/-18 dB

MSC1 Control Center Software Specifications:

Use on a Macintosh Computer requires Macintosh version MSC1 Control Center Software and Macintosh Operating System. MSC1 Control Center for Macintosh availability date to be announced.

Electromagnetic Compatibility:

This unit conforms to the Product Specifications noted on the Declaration of Conformity. Operation is subject to the following two conditions: 1) this device may not cause harmful interference, and 2) this device must accept any interference received, including interference that may cause undesired operation.

Operation of this unit within significant electromagnetic fields should be avoided.

Use only shielded interconnecting cables.

Regulatory Information:

An example of this equipment has been tested and found to comply with the following European and international Standards for Electromagnetic Compatibility and Electrical Safety:

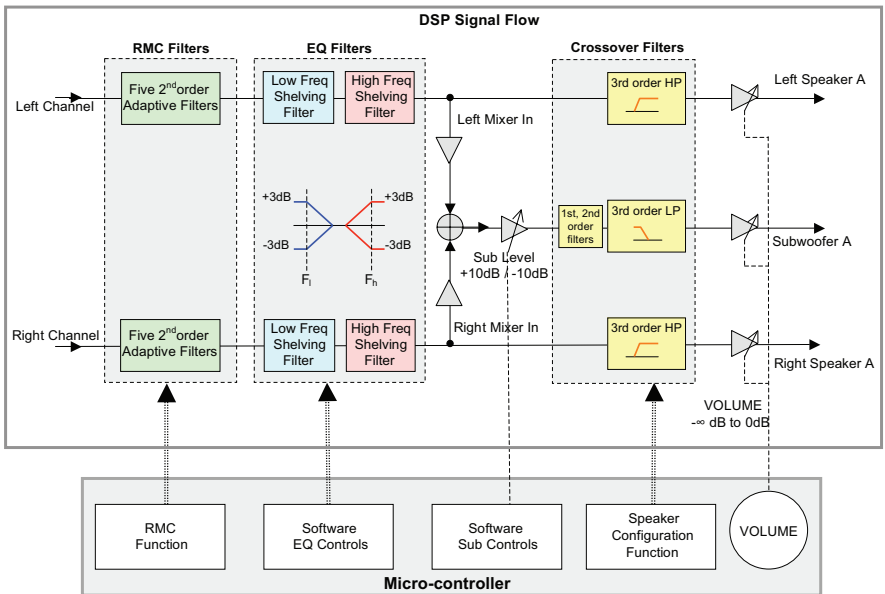
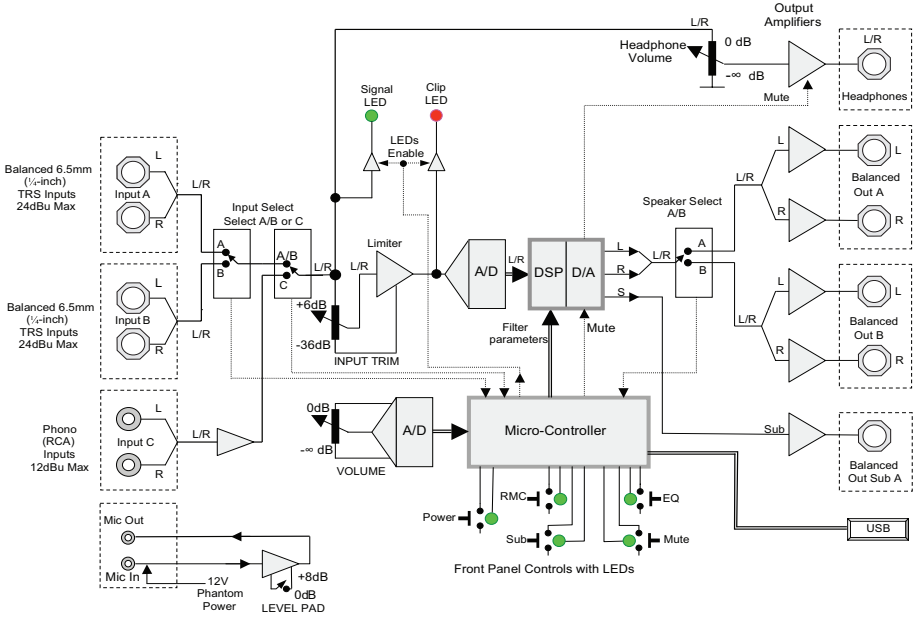
Conforms to:

- FCC Part 15, Subpart B, Class B
- EN61000-3-2
- EN55022 Class B
- EN61000-3-3
- EN55024

Section 10: Specifications

Block Diagram

Controller Signal Flow



Section 11: JBL Service Contact Information



Mailing Address:

JBL Professional
8500 Balboa Blvd.
Northridge, CA 91329

Shipping Address:

JBL Professional Customer Service
JBL Professional
8500 Balboa Boulevard, Dock #15
Northridge, CA 91329 USA

(Do not return product to this address without first obtaining prior authorization from JBL)

On The World Wide Web:

www.jblpro.com/LSR

Product Registration:

Register your product online at www.jblpro.com/registration

Customer Service:

Monday through Friday
8:00am - 5:00pm
Pacific Coast Time in the U.S.A.
(800) 8JBLPRO (800.852.5776)
www.jblproservice.com

Professional Contacts, Outside the USA:

Contact the JBL Professional Distributor in your area. A complete list of JBL Professional international distributors is provided at our U.S.A. website: www.jblpro.com

En Dehors des Etats-Unis:

Contactez votre Distributeur JBL Professionnel. Une liste complète de nos distributeurs internationaux est disponible sur le site web - www.jblpro.com

International:

Wenden Sie sich an Ihre örtliche JBL Professional Vertretung. Eine vollständige Liste der internationalen JBL-Vertretungen finden Sie auf unserem Website unter www.jblpro.com

Fuera de los Estados Unidos:

Comuníquese con el distribuidor de JBL Profesional de su zona. En nuestro sitio web, www.jblpro.com, encontrará una lista completa de distribuidores JBL.

Section 12: Product Warranty Information

The JBL Limited Warranty on the MSC1 Monitor System Controller remains in effect for one year from the date of the first consumer purchase.

Who Is Protected By This Warranty?

Your JBL Warranty protects the original owner and all subsequent owners so long as: A.) Your JBL product has been purchased in the Continental United States, Hawaii or Alaska. (This Warranty does not apply to JBL products purchased elsewhere except for purchases by military outlets. Other purchasers should contact the local JBL distributor for warranty information.); and B.) The original dated bill of sale is presented whenever warranty service is required.

What Does The JBL Warranty Cover?

Except as specified below, your JBL Warranty covers all defects in material and workmanship. The following are not covered: Damage caused by accident, misuse, abuse, product modification or neglect; damage occurring during shipment; damage resulting from failure to follow instructions contained in your Owners Manual; damage resulting from the performance of repairs by someone not authorized by JBL; claims based upon any misrepresentations by the seller; any JBL product on which the serial number has been defaced, modified or removed.

Who Pays For What?

JBL will pay all labor and material expenses for all repairs covered by this warranty. Please be sure to save the original shipping cartons because a charge will be made if replacement cartons are requested. Payment of shipping charges is discussed in the next section of this warranty.

How To Obtain Warranty Performance

If your JBL product ever needs service, write or telephone us at JBL Incorporated (Attn: Customer Service Department), 8500 Balboa Boulevard, PO. Box 2200, Northridge, California 91329 (818/893-8411). We may direct you to an authorized JBL Service Agency or ask you to send your unit to the factory for repair. Either way, you'll need to present the original bill of sale to establish the date of purchase. Please do not ship your JBL product to the factory without prior authorization. If transportation of your JBL product presents any unusual difficulties, please advise us and we may make special arrangements with you. Otherwise, you are responsible for transporting your product for repair or arranging for its transportation and for payment of any initial shipping charges. However, we will pay the return shipping charges if repairs are covered by the warranty.

Section 12: Product Warranty Information

Limitation of Implied Warranties

ALL IMPLIED WARRANTIES, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO THE LENGTH OF THIS WARRANTY.

EXCLUSION OF CERTAIN DAMAGES

JBL'S LIABILITY IS LIMITED TO THE REPAIR OR REPLACEMENT, AT OUR OPTION, OF ANY DEFECTIVE PRODUCT AND SHALL NOT INCLUDE INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND. SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS AND/OR DO NOT ALLOW THE EXCLUSION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATIONS AND EXCLUSIONS MAY NOT APPLY TO YOU. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS, WHICH VARY, FROM STATE TO STATE.

JBL Professional

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www.jblpro.com



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