

# MC3<sup>™</sup>

## Studio Monitor Controller



# User Guide

Radial Engineering Ltd.  
1588 Kebet Way, Port Coquitlam  
British Columbia, Canada, V3C 5M5  
Tel: 604-942-1001 • Fax: 604-942-1010  
Email: [info@radialeng.com](mailto:info@radialeng.com)

# Radial® MC3™ User Guide

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**Congratulations and thank you** for purchasing the Radial MC3 Studio Monitor Controller. The MC3 is an innovative tool designed to make managing audio signals easy in the studio while adding the convenience of an on-board headphone amplifier.

Even though the MC3 is super simple to use, as with any new product, the best way to get to know the MC3 is by taking a few minutes to read the manual and familiarize yourself with the many features that are built-in before you begin connecting things together. This could save you time.

If by chance you find yourself seeking an answer to a question, take a few minutes to log onto the Radial website and visit the MC3 FAQ page. This is where we post the latest information, updates and of course other questions that may be similar in nature. If you do not find an answer, feel free to write us an email at [info@radialeng.com](mailto:info@radialeng.com) and we will do our very best to get back to you promptly.

Now get ready to mix with greater confidence and control than ever before!

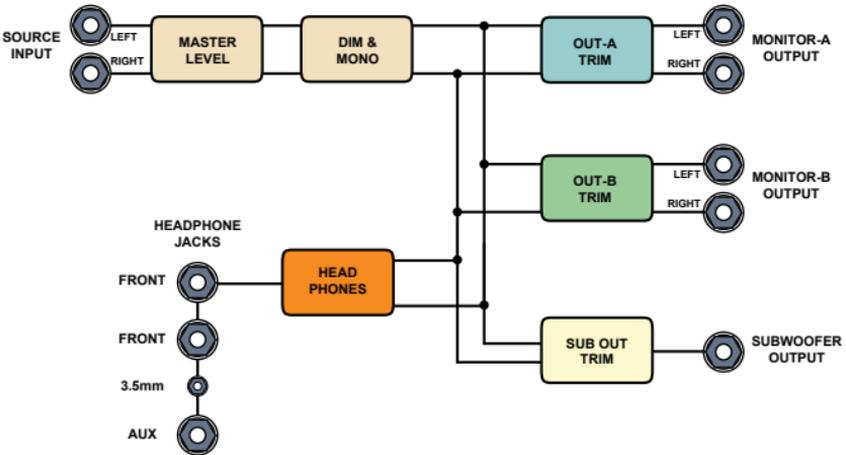
## OVERVIEW

The Radial MC3 is a studio monitor selector that enables you to switch between two sets of powered loudspeakers. This lets you compare how your mix will translate on different monitors which in turn will help deliver more convincing mixes to the audience.

Because most folks today listen to music with an iPod® using ear buds or some other type of headphones, the MC3 features a built-in headphone amplifier. This makes it easy to audition your mixes using different headphones and monitors.

Looking at the block diagram from left to right, the MC3 begins with stereo source inputs. At the other end are the stereo outputs for monitors-A and B, which are turned on or off using the front panel controls. The stereo output levels can be trimmed to match for smooth switching between different monitors without jumps in the listening level. The 'large' master level control makes it easy to adjust the overall volume using a single knob. Note that the master volume control sets the output going to all speakers and headphones.

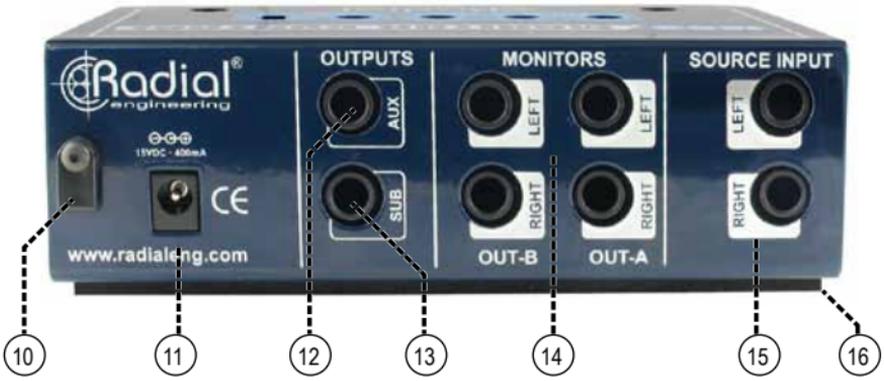
Using the MC3 is merely a matter of turning on the speakers you want, adjusting the level and listening. All of the extra cool features in between are icing on the cake!





## FRONT PANEL FEATURES

1. **DIM:** When engaged, the DIM toggle switch temporarily reduces the playback level in the studio without having to adjust the MASTER level control. The DIM level is set using the top panel LEVEL ADJUSTMENT control.
2. **MONO:** Sums the left and right inputs to test for mono-compatibility and phase problems.
3. **SUB:** Separate on/off toggle switch lets you activate the subwoofer.
4. **MASTER:** Master level control used to set the overall output level going to the monitors, subwoofer and AUX outputs.
5. **MONITOR SELECT:** Toggle switch activates the A and B monitor outputs. Separate LED indicators illuminate when outputs are active.
6. **HEADPHONE CONTROLS:** Level control and on/off switch used to set the level for the front panel headphone jacks and the rear panel AUX output.
7. **3.5MM JACK:** Stereo headphone jack for ear-bud style headphones.
8. **1/4" JACKS:** Dual stereo headphone jacks let you share the mix with the producer when listening to playback or for overdubbing.
9. **BOOKEND DESIGN:** Creates protective zone around the controls and connectors.



### REAR PANEL FEATURES

10. **CABLE CLAMP:** Used to secure the power supply cable and prevent accidental power disconnection.
11. **POWER:** Connection for a Radial 15VDC 400mA power supply.
12. **AUX:** Unbalanced ¼" TRS stereo auxiliary output controlled by the headphone level. Used to drive an auxiliary audio system like a studio headphone amplifier.
13. **SUB:** Unbalanced ¼" TS mono output used to feed a subwoofer. The output level may be trimmed using the top panel LEVEL ADJUSTMENT controls to match the level of other monitor speakers.
14. **MONITORS OUT-A & OUT-B:** Balanced/unbalanced ¼" TRS outputs used to feed active monitor speakers. The level of each stereo output may be trimmed using the top panel LEVEL ADJUSTMENT controls to balance the level between monitor speakers.
15. **SOURCE INPUTS:** Balanced/unbalanced ¼" TRS inputs receive the stereo signal from your recording system or mixing console.
16. **BOTTOM PAD:** A full pad covers the underside, keeps the MC3 in one place and won't scratch your mixing console.

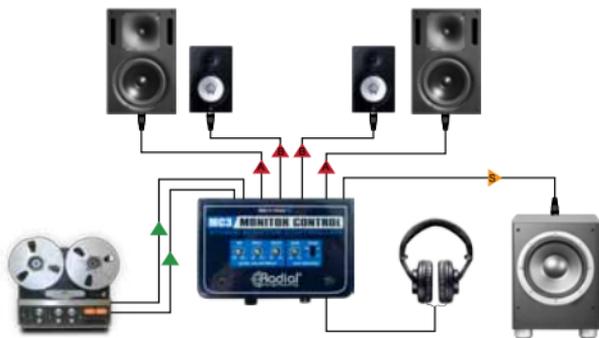
### TOP PANEL FEATURES

17. **LEVEL ADJUSTMENT:** Separate set & forget trim controls on the top panel make it easy to adjust A and B monitor levels for optimal balance between different monitors.
18. **SUB WOOFER:** Level adjustment and 180° PHASE switch for the subwoofer output. The phase control is used to reverse the polarity of the subwoofer to counter the effect of room modes.



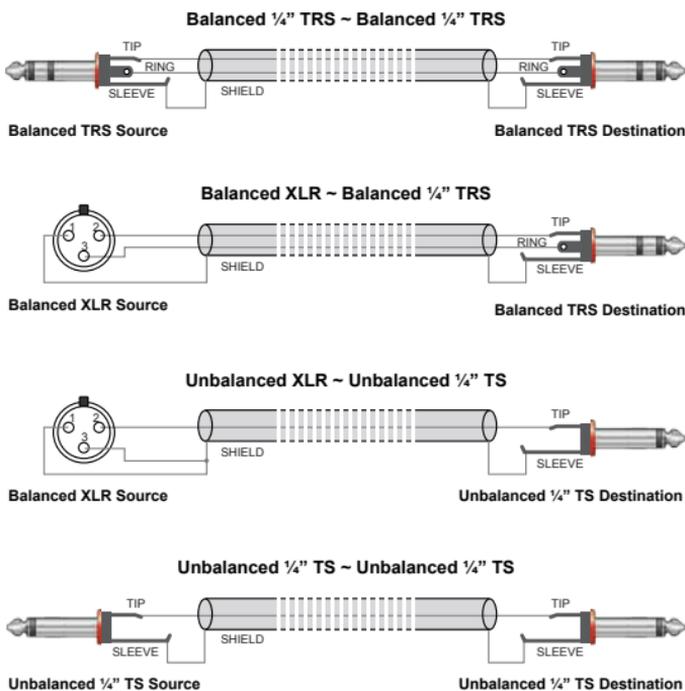
### TYPICAL MC3 SETUP

The MC3 Monitor Controller is typically connected to the output of your mixing console, digital audio interface or laptop computer represented as a reel-to-reel machine in the diagram. The outputs of the MC3 connect two pairs of stereo monitors, a subwoofer and up to four pairs of headphones.



### BALANCED VS UNBALANCED

The MC3 can be used with either balanced or unbalanced signals. Because the main stereo signal path through the MC3 is passive, like a 'straight-wire', you should not mix balanced and unbalanced connections. Doing so will ultimately 'un-balance' the signal through the MC3. If this is done, you may encounter crosstalk or bleed. **For proper performance, always maintain either a balanced or unbalanced signal flow through the MC3 by using appropriate cables for your equipment.** Most mixers, workstations and near-field monitors can work either balanced or unbalanced so this should not pose a problem when used with the proper interface cables. The diagram below shows various types of balanced and unbalanced audio cables.

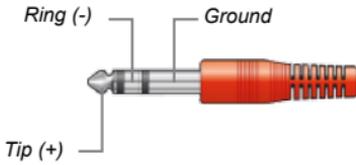


### CONNECTING THE MC3

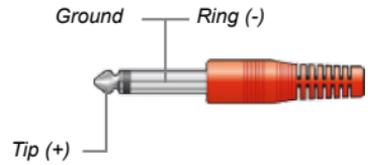
Before making any connections always ensure levels are turned down or equipment is turned off. This will help avoid turn-on transients that could harm sensitive components like tweeters. It is also a good practice to test signal flow at a low volume before turning things up. There is no power switch on the MC3. As soon as you plug in the power supply it will turn on.

The SOURCE INPUT and MONITORS-A and B output connection jacks are balanced 1/4" TRS (Tip Ring Sleeve) connectors that follow the AES convention with tip positive (+), ring negative (-), and sleeve ground. When used in unbalanced mode, the tip is positive and the sleeve shares the negative and ground. This convention is maintained throughout.

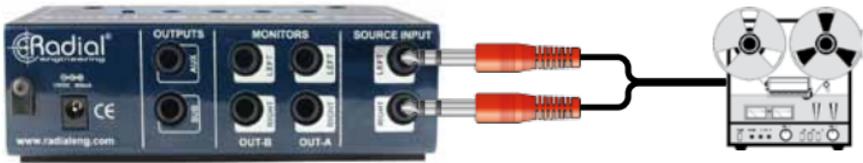
**Balanced TRS 1/4" Phone**



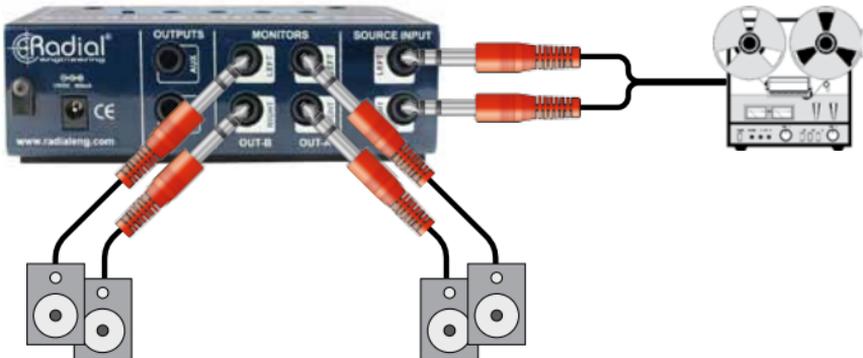
**Unbalanced TS 1/4" Phone**



Connect the stereo output of your recording system to the 1/4" SOURCE INPUT connectors on the MC3. If your source is balanced, use 1/4" TRS cables to connect. If your source is unbalanced, use 1/4" TS cables to connect.



Connect the stereo OUT-A to your main monitors and OUT-B to your second set of monitors. If your monitors are balanced, use 1/4" TRS cables to connect. If your monitors are unbalanced, use 1/4" TS cables to connect.



Turn the A and B outputs on or off using the front panel selectors. The LED indicators will illuminate when the output is active. Both stereo outputs can be active at the same time.



## SETTING THE TRIM CONTROLS

The MC3 top panel is configured with a series of recessed trim controls. These set & forget trim controls are used to fine tune the output level going to each component so that when you switch from one set of monitors to the other, they play back at relatively similar levels. Although most active monitors are equipped with level controls, getting to them while listening is difficult. You have to reach around the back to make the adjustments, go back to the engineer's seat, listen and then fine tune again which can take forever. With the MC3 you adjust the level while sitting in your chair! Easy and efficient!

Except for the active headphone and subwoofer outputs, the MC3 is a passive device. This means it does not contain any active circuitry in the stereo signal path to your monitors and therefore does not add any gain. The MON-A and B LEVEL ADJUSTMENT controls will actually reduce the level going to your active monitors. The overall system gain can easily be made up by increasing the output from your recording system or increasing the sensitivity on your active monitors.



1. Start by setting the gain on your monitors to their nominal level setting. This is usually identified as 0dB.
2. Set the recessed LEVEL ADJUSTMENT controls on the MC3 top panel to the full-clockwise position using a screwdriver or guitar pick.
3. Before you hit play, make sure the master volume is turned all the way down.
4. Turn on monitor output-A using the MONITOR SELECTOR switch. The output-A LED indicator will illuminate.
5. Hit play on your recording system. Slowly increase the MASTER level on the MC3. You should hear sound from monitor-A.
6. Turn off monitor-A and turn on monitor-B. Try going back and forth a few times to hear the relative volume between the two sets.
7. You can now set the trim controls to balance the level between your two monitor pairs.

## CONNECTING A SUBWOOFER

You can also connect a subwoofer to the MC3. The SUB output on the MC3 is actively summed to mono so that the stereo input from your recorder sends both the left and right bass channels to the subwoofer. You would of course adjust the sub's crossover frequency to suit. Connecting the MC3 to your subwoofer is done using an unbalanced ¼" cable. This will not affect the balanced monitor-A and B connections. Turning on the subwoofer is done by depressing the SUB toggle switch on the front panel. The output level may be adjusted using the top mounted SUB WOOFER trim control. Again, you should set the relative level so that it sounds balanced when played with your monitors.



On the top panel and next to the SUB WOOFER LEVEL control is a PHASE switch. This changes the electrical polarity and inverts the signal going to the subwoofer. Depending on where you are sitting in the room, this can have a very dramatic effect on what is known as room modes. Room modes are basically places in the room where two sound waves collide. When the two waves are at the same frequency and in-phase, they will amplify each other. This can form hot spots where certain bass frequencies are louder than others. When two out-of-phase sound waves collide, they will cancel each other out and create a null spot in the room. This can leave the bass sounding thin.

Try moving your subwoofer around the room following the manufacturer's recommendation and then try reversing the phase of the SUB output to see how it affects the sound. You will quickly come to realize that speaker placement is an imperfect science and that once you find a comfortable balance you will likely leave the monitors alone. Getting used to how your mixes translate to other playback systems takes some time. This is normal.

## USING THE DIM CONTROL

A cool feature built into the MC3 is the DIM control. This lets you reduce the level going to your monitors and subs without affecting the MASTER level settings. For instance, if you are working on a mix and someone comes in to the studio to discuss something or your cell phone starts ringing, you can temporarily lower the volume of the monitors and then instantly go back to the settings you had before the interruption.

As with the monitors and sub outputs, you can set the DIM attenuation level using the set & forget DIM LEVEL ADJUSTMENT control on the top panel. The attenuated level is usually set quite low so that you can easily communicate over the playback volume. The DIM is sometimes used by engineers who like to mix at low levels to reduce ear fatigue. Being able to precisely set the DIM volume makes it easy to go back to familiar listening levels with a push of a button.

## HEADPHONES

The MC3 is also equipped with a built-in stereo headphone amplifier. The headphone amplifier taps the feed after the MASTER level control and sends it to the front panel headphone jacks and the rear panel ¼" AUX output. There are two standard ¼" TRS stereo headphone outputs for studio headphones and a 3.5mm (1/8") TRS stereo out for ear buds.

The headphone amp also drives the rear panel AUX output. This active output is an unbalanced stereo ¼" TRS output that is set using the headphone level control. The AUX output can be used to drive a fourth set of headphones or as a line-level output to feed additional equipment.

**Be Careful:** The output of the headphone amp is very powerful. Always ensure the headphone level is turned down (fully counter-clockwise) before auditioning music through headphones. This will not only save your ears, but save the ears of your client! Slowly increase the headphone volume control until you reach a comfortable listening level.

### Headphone Safety Warning Caution: Very Loud Amplifier

As with all products capable of producing high Sound Pressure Levels (SPL) users must be very careful to avoid the hearing damage that may occur from prolonged exposure. This is particularly important as it applies to headphones. Prolonged listening at high SPLs will eventually cause tinnitus and can lead to partial or complete loss of hearing. Please be aware of the recommended exposure limits within your legal jurisdiction and follow them very closely. The user agrees that Radial Engineering Ltd. remains harmless from any health effects resulting from the use of this product and the user clearly understands that he or she is entirely responsible for the safe and proper use of this product. Please consult the Radial Limited Warranty for further details.

## MIXING IT UP

Top studio engineers tend to work in rooms they are familiar with. They know how these rooms sound and instinctively know how their mixes will translate to other playback systems. Switching speakers helps you develop this instinctive sense by allowing you to compare how your mix translates from one set of monitors to another.

Once you are satisfied with your mix on various monitor speakers you will want to try listening with a subwoofer as well as through headphones. Keep in mind that many songs today are downloaded for iPods and personal music players and it is essential that your mixes also translate well to ear bud style headphones.

## TESTING FOR MONO

When recording and mixing, listening in mono can be your best friend. The MC3 is equipped with a front panel MONO switch that sums the left and right channels together when depressed. This is used to check if two microphones are in phase, test stereo signals for mono compatibility, and of course help you determine if your mix will hold up when played on AM radio. Simply depress the MONO switch and listen. Phase cancellation in the bass range is the most noticeable and will sound thin if out of phase.

## SPECIFICATIONS\*

### Radial MC3 Monitor Control

Circuit type:	Passive stereo with active headphones and subwoofer outputs
Number of channels:	2.1 (Stereo with subwoofer output)
Frequency response:	0Hz ~ 20KHz (-1dB @ 20kHz)
Dynamic range:	114dB
Noise:	-108dBu (Monitor A and B outputs); -95dBu (Subwoofer output)
THD+N:	<0.001% @1kHz (0dBu output, 100k load)
Intermodulation distortion:	>0.001% 0dBu output
Input impedance:	4.4K Minimum Balanced; 2.2K Minimum Unbalanced
Output impedance:	Varies with level adjustment
Headphone max output:	+12dBu (100k Load)

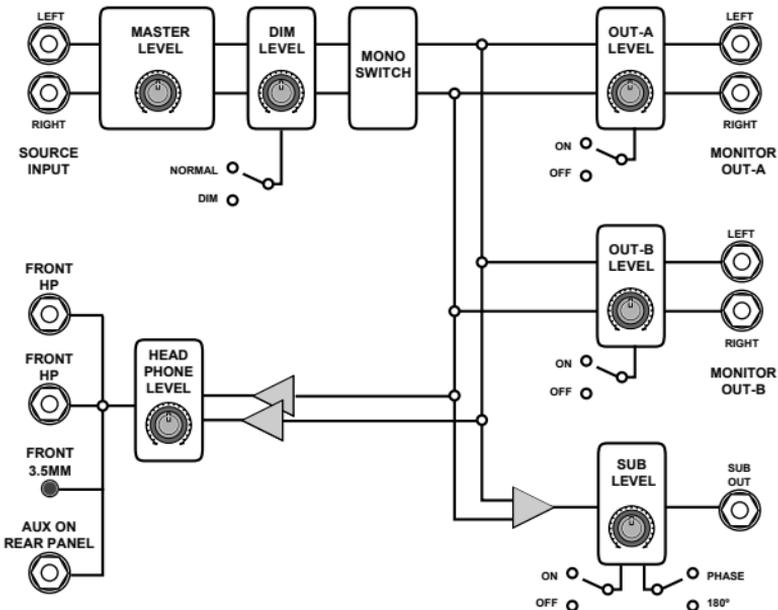
### Features

Dim attenuation:	-2dB to -72dB
Mono:	Sums left & right sources to mono
Sub:	Activates the subwoofer output
Source input:	Left & right balanced/unbalanced 1/4" TRS
Monitors output:	Left & right balanced/unbalanced 1/4" TRS
Aux output:	Stereo unbalanced 1/4" TRS
Sub output:	Mono unbalanced 1/4" TS

### General

Construction:	14 gauge steel chassis & outer shell
Finish:	Baked enamel
Size: (W x H x D):	148 x 48 x 115mm (5.8" x 1.88" x 4.5")
Weight:	0.96 kg (2.1 lbs)
Power:	15VDC 400mA power adapter (center pin positive)
Warranty:	Radial 3-year, transferable

## BLOCK DIAGRAM\*



\* Subject to change without notice.

## THREE YEAR TRANSFERABLE LIMITED WARRANTY

RADIAL ENGINEERING LTD. ("Radial") warrants this product to be free from defects in material and workmanship and will remedy any such defects free of charge according to the terms of this warranty. Radial will repair or replace (at its option) any defective component(s) of this product (excluding finish and wear and tear on components under normal use) for a period of three (3) years from the original date of purchase. In the event that a particular product is no longer available, Radial reserves the right to replace the product with a similar product of equal or greater value. In the unlikely event that a defect is uncovered, please call 604-942-1001 or email [service@radialeng.com](mailto:service@radialeng.com) to obtain a RA number (Return Authorization number) before the 3 year warranty period expires. The product must be returned prepaid in the original shipping container (or equivalent) to Radial or to an authorized Radial repair centre and you must assume the risk of loss or damage. A copy of the original invoice showing date of purchase and the dealer name must accompany any request for work to be performed under this limited and transferable warranty. This warranty shall not apply if the product has been damaged due to abuse, misuse, misapplication, accident or as a result of service or modification by any other than an authorized Radial repair center.

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To meet the requirements of California Proposition 65, it is our responsibility to inform you of the following:

**WARNING:** This product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

Please take proper care when handling and consult local government regulations before discarding.



True to the Music

[www.radialeng.com](http://www.radialeng.com)

Radial Engineering Ltd.

1588 Kebet Way, Port Coquitlam, British Columbia, V3C 5M5

Tel: 604-942-1001 • Fax: 604-942-1010 • Email: [info@radialeng.com](mailto:info@radialeng.com)

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