



MCD360

3 WAY ELECTRONIC CROSSOVER
WITH SUBWOOFER LEVEL CONTROL

OWNER'S MANUAL

Please read carefully before using



INTRODUCTION

Congratulations and thank you for purchasing MCD360 Crossover MH audio original, The MH MCD360 is a full-featured Three-Way Crossover. When used to build a 2-way system with front and rear fader capability or a full three-way system, the MH MCD360 electronic crossover allows you to choose from a wide range of crossover points between the front, rear and subwoofer outputs.

To achieve optimal performance of your system, please take a few moments to read over this Owner's manual or visit authorized dealer if needed before starting your installation.

FEATURES

1. 6-channel electronic crossover
2. Continuously variable crossover frequency with Multiplier Switch
3. Separate inputs for front, rear and subwoofer
4. Front and rear high-pass outputs
5. Non-fade low-pass output
6. Adjustable low-pass gain
7. Subwoofer Bass Boost
8. ground loop isolation input circuit
9. Gold-plated RCA input/output connectors
10. Power-on LED

SPECIFICATIONS

Power Source:	14.4 volts DC negative ground
Input current:	0.5 amp max
Disortion:	0.01% THD at 1V output level
Frequency Response:	10Hz - 30KHz - 3dB
S/N Ratio:	>100dB
Separation:	60dB
Crossover Slope Rate:	18dB per octave 3rd order butterworth
Input Impedance:	20K Ohms
Output Impedance:	100 Ohms
Output Gain:	1:2(+6dB)
Output Voltage level:	5 volts max
Dimensions:	170mm x 155mm x 46mm

All features are subject to change in the continuing effort to improve the products without notice.

DESCRIPTION

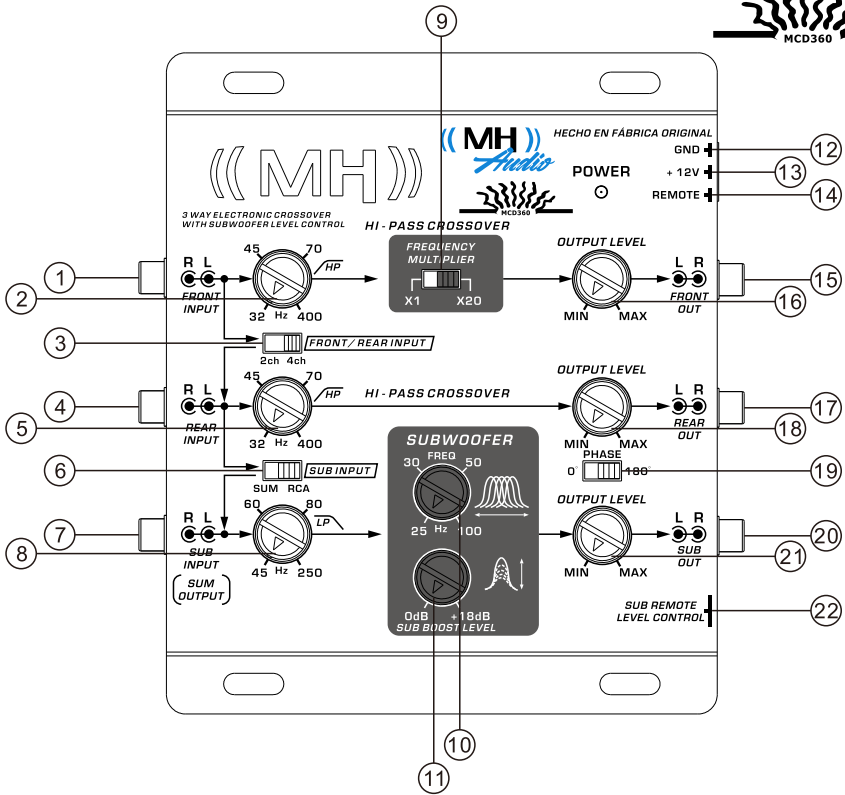
The MH MCD360 has the ability to accept one, Two or three sets of RCA cables as an input. Both the front and rear outputs of the MCD360 make use of a built-in 18dB per octave electronic crossover that is continuously variable from 32Hz to 8KHz. The subwoofer output also uses an 18dB electronic crossover, and it is adjustable from 45Hz to 250Hz.

The dash mounted bass level control provides a convenient way to adjust the bass to suit your taste without having to leave your seat.

INPUT/OUTPUT CONNECTIONS AND AUDIO CONTROLS

The top panel of MCD360 contains the controls for the crossover and output levels as shown below.





- | | | |
|--------------------------------------|------------------------------------|--------------------------------|
| 1. Front RCA Input | 8. Sub Crossover Frequency Control | 16. Front Output Level |
| 2. Front Crossover Frequency Control | 9. Frequency Multiplier Switch | 17. Rear RCA Output |
| 3. Front/Rear Input Selection Switch | 10. Sub Bass Boost Frequency | 18. Rear Output Level |
| 4. Rear RCA Input | 11. Sub Bass Boost Level | 19. Phase Switch |
| 5. Rear Crossover Frequency Control | 12. Ground Input Connector | 20. Sub RCA Output |
| 6. Sub Input Selection Switch | 13. Battery +12V Input Connector | 21. Sub Output Level |
| 7. Sub RCA Input | 14. Remote Turn-On Input | 22. Remote Sub Level Connector |
| | 15. Front Output | 23. Remote Sub Level Control |

• Front High-Pass Crossover Frequency Adjustment

Adjusts the crossover to match your speaker system. The crossover frequency can be adjusted from 32Hz - 400Hz or from 640Hz - 8kHz with the crossover frequency multiplier switch.

• Rear High-Pass Crossover Frequency Adjustment

Adjusts the crossover to match speaker your system. The crossover frequency can be adjusted from 32Hz - 400 Hz.

• Subwoofer Crossover Frequency Adjustment

Adjusts the crossover to match your speaker system. The crossover frequency can be adjusted from 45Hz - 250 Hz.

• Frequency Multiplier Switch

When engaged, this switch increases the crossover frequency by a factor of 20. Example: If the frequency is set for 70Hz, moving the frequency multiplier switch to X20 changes the setting to 1.4kHz.





• Output Level Controls

Separate Front, Rear and Subwoofer Output Level Controls allow you to set the nominal operating level of the crossover. The crossover's output level ranges can accommodate virtually any brand of amplifier.

• Subwoofer Boost Control

The crossover also features a "high-Q" (i.e. narrow frequency band) Bass Boost circuit. It acts much like an equalizer, with adjustable gain (from 0 - +18dB) with a center frequency adjustable from 25Hz - 100Hz. Use this feature to tune low-frequency audio response to compensate for a less than ideal subwoofer enclosure design. The added boost produces rich, full bass tones that are normally difficult to reproduce in the car audio environment. Use the Freq dial to set the Boost Freq and the Sub Boost Level dial to set the amount of boost. Note: If Bass Boost is undesired, set Sub Boost Level to 0dB.

• Phase Switch

When set to 180 degrees, this switch reverses the phase of the subwoofer output signal. This is used for fine tuning the bass response after the installation is complete.

• Power Indicator

The power indicator will light up when the crossover is on.

• Front/Rear Input Switch

This switch allows use of a 2 channel input to drive both the front and rear inputs.

• Sub Input Switch

This switch allows the signal from the front and rear channels to be directed to the sub input when a dedicated sub input is not available.

• Remote Sub Level Control

When the remote sub level control is plugged into the MCD360, the sub output level control on the MCD360 will be defeated. Instead the remote sub level control will set the sub output level.

MOUNTING PRECAUTIONS

The MCD360 crossover can be mounted in any convenient location in your vehicle that allows access to the controls and is away from moisture. The flanges on the chassis have mounting holes which can be used as a template for screw holes. For easy system set-up, mount the crossover so the front panel controls will be accessible after installation. In addition, observe the following precautions:

1. Mount the crossover on a rigid surface. Do not install the crossover on plastic or other combustible materials.
2. Prior to drilling, make sure proposed mounting holes will not cut into the fuel tank, fuel lines, brake lines (under chassis), or electrical wiring.
3. Avoid mounting to subwoofer enclosures or areas prone to vibration.

WIRING PRECAUTIONS

Read all wiring precautions. If you are not sure of the connections, contact your authorized Clarion dealer.

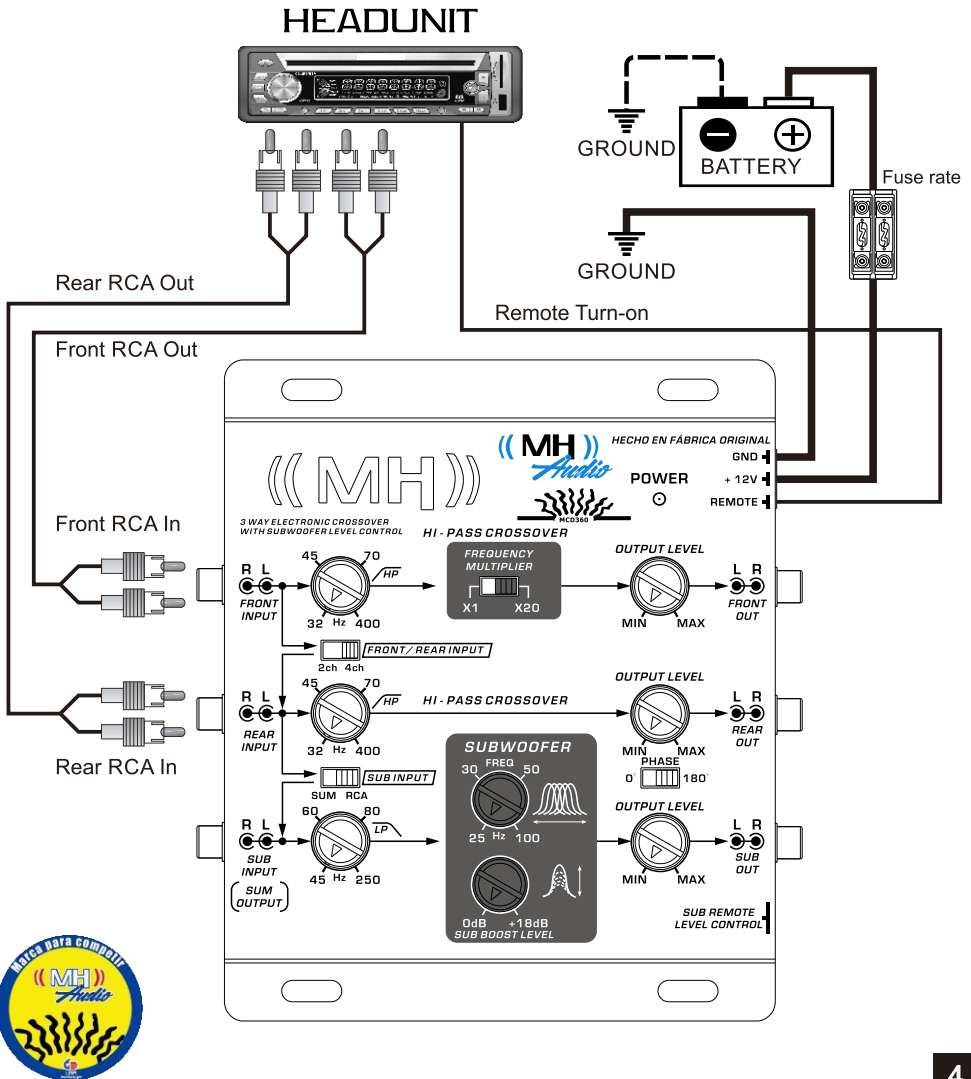
If you are using a source unit, without a remote turn-on lead, the MCD360 can be turned on with a switched accessory lead. You can find this accessory power source in the factory harness at the back of the radio. It is the lead that turns on and off with the key.

1. Before installation, make sure the source unit Power switch is in the OFF position.
2. Disconnect the negative (-) lead of the battery before making any power connections.
3. A clean chassis ground connection is critical to the performance of your Clarion crossover. Use the shortest ground wire possible and securely connect to the car chassis to minimize resistance and avoid noise problems.
4. Refer to the Figure 3 when making electrical connections. Connect the crossover's positive(+) lead via a fuse directly to the positive (+) terminal on the battery. Use red-insulated 18-gauge (or larger) wire for the crossover's positive (+) power lead and the same-gauge black insulated wire for the ground.



5. To avoid noise problems, run the crossover's positive (+) power lead and the amplifier's positive (+) power lead along one side of the vehicle to the battery. Run the remote turn-on wire and RCA audio cables down the center, and route the speaker wires along the remaining side. If wires must cross, run them perpendicular to each other.
6. When creating passage holes for the power wire, use grommets to eliminate any sharp edges created during drilling. This will protect the wire from being nicked and causing a short circuit.
7. Extra cable can cause signal loss and act as an "antenna" for noise. Use only high-quality RCA cables that are no longer than necessary to make a direct connection with the source unit and amplifiers.

ELECTRICAL CONNECTIONS



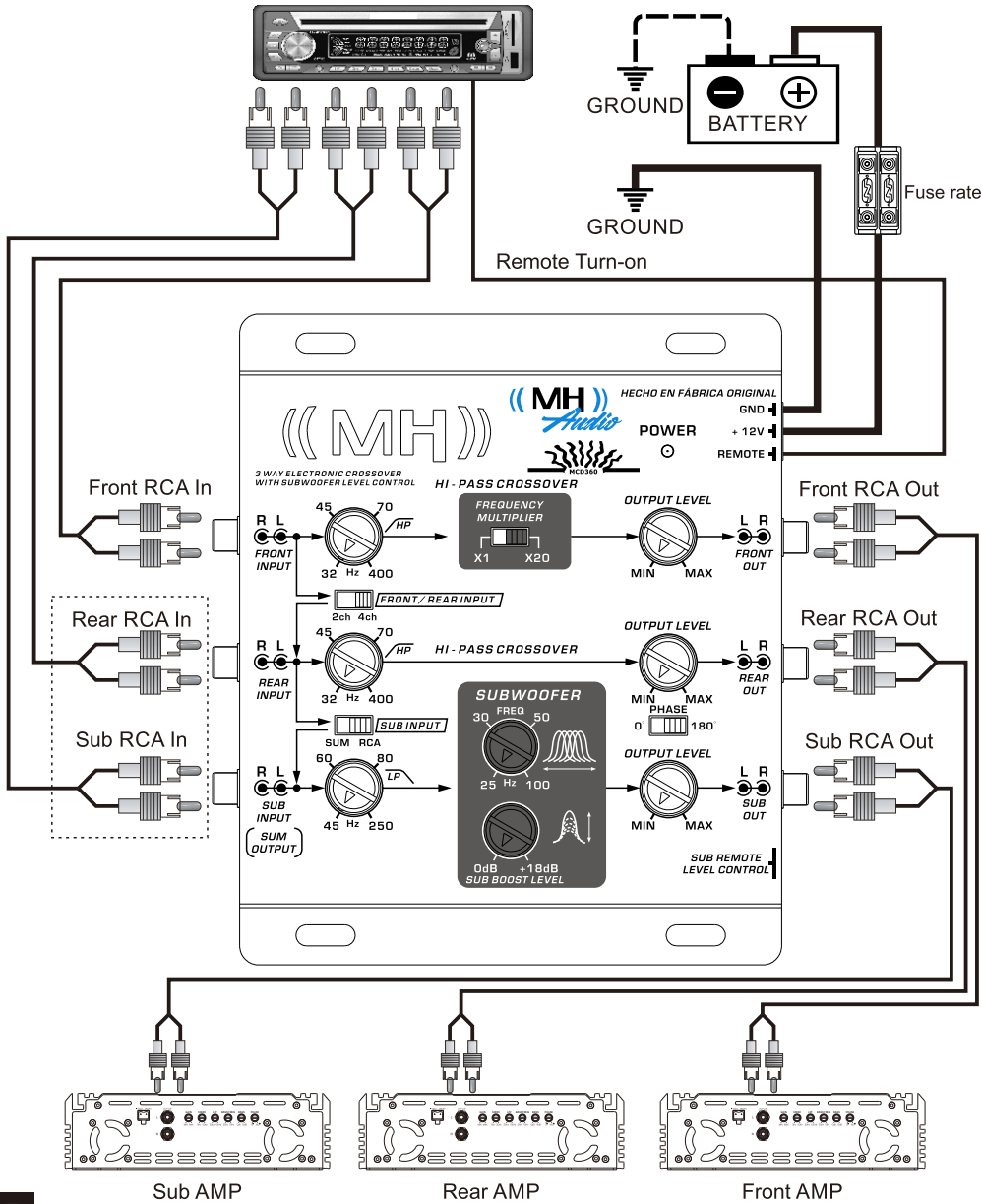
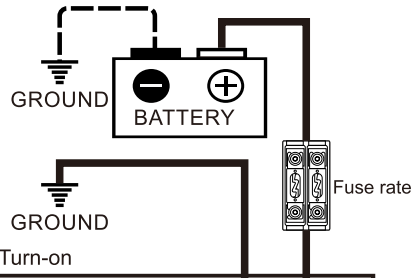
APPLICATIONS



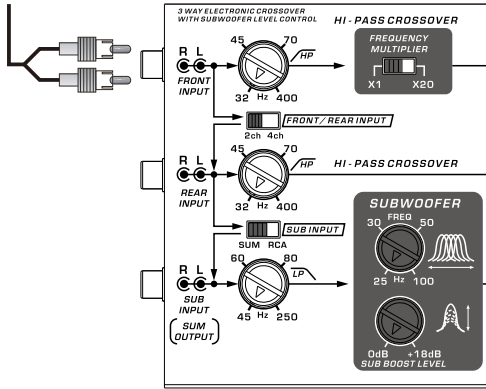
The MCD360 allows you to design either a 2-way system with front and rear output or a full 3-way system. After determining which system best fits your requirements, thoroughly read and follow the directions below for your system type.

2-Way System with Front and Rear Output

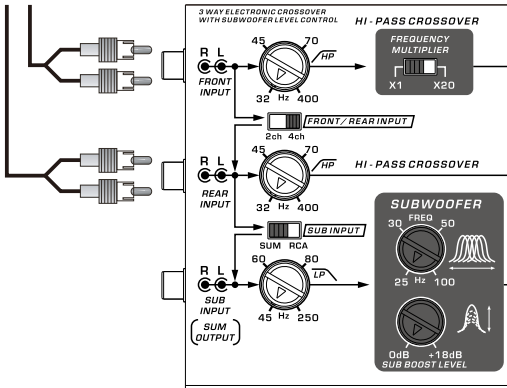
HEADUNIT



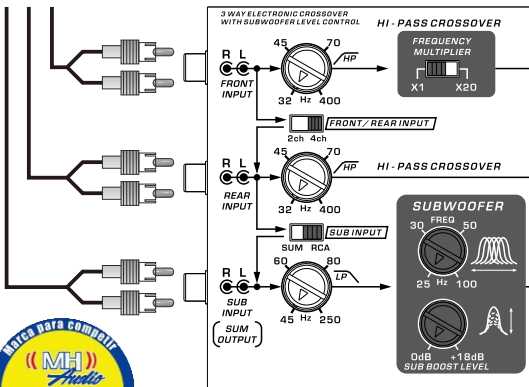
In this illustration, the MCD360 is configured for two channel input with dedicated amplifiers for front speakers, rear speakers and subwoofer(s). See Figure 5 for switch settings.



For 2 channel input, configure switches as shown.



For 4 channel input with front and rear fade, configure switches as shown.



For front and rear fade with dedicated subwoofer input, configure switches as shown.





2-Way System Application Notes

After all the wiring connections are made and before the system is turned on for the first time, you need to make some basic adjustments. It is important that the High-Pass and Low-Pass Frequency Controls are set correctly before turning on the system for the first time.

Setting the Crossover Frequency Controls

1. Set the crossover frequency controls to the frequency recommended by the speaker manufacturer. The following are some guidelines if this information is not available:
 - Most 6" speakers will operate down to 80 - 100Hz.
 - Most 5" or 4" speakers will operate down to 100 - 150Hz.
 - Most 3" speakers will not operate below 300Hz.
 - Most subwoofers have decreased sound quality when operated above 150Hz.

Depending upon the size of the front and rear speakers and the type of subwoofer system, fine tuning these adjustments may be required after the initial system set-up. Study the system design pages of this manual to determine the proper settings for these controls. Speakers are easily damaged if they are crossed over at a frequency below their usable range.

2. When making the high frequency adjustments, adjust the Low-Pass frequency control and the low frequency amplifier gain. Usually, the Low-Pass frequency should be set the same as the High-Pass frequency.

NOTE: An exception will be when the front/rearspeaker is too small to play down to a very low frequency and the subwoofer sounds distorted trying to "play up" to meet the front/rearspeaker. This may require a gap or difference between the high and low settings. Although not ideal, this is sometimes necessary to make the system work as well as possible.

Setting the Front Output Level

Before setting front level controls, disconnect both the rear output and the subwoofer output and follow the directions below.

1. Turn the output control level to the minimum setting.
2. Turn the amplifier gain controls to the minimum setting.
3. Turn the source unit on and increase the volume until distortion is heard, then reduce volume to just below this point.

NOTE: This is the maximum usable musical signal for this source unit. turning the volume beyond this point will increase noise and distortion without an increase in musical signal. If you can increase the source unit volume to maximum without audible distortion, raise the output level controls slightly and begin again.

4. With the amplifier gains still at minimum and the source unit set at maximum volume without distortion, raise the front output level control until distortion is heard, then reduce gain to just below this point. This is the maximum output level for this system. For best performance do not increase beyond this point.



Setting the Rear Output Level

Before setting rear level controls, disconnect both the front output and the subwoofer output and follow the directions below.

1. Turn the output control level to the minimum setting.
2. Turn the amplifier gain controls to the minimum setting.
3. Turn the source unit on and increase the volume until distortion is heard, then reduce volume to just below this point.

NOTE: This is the maximum usable musical signal for this source unit. turning the volume beyond this point will increase noise and distortion without an increase in musical signal. If you can increase the source unit volume to maximum without audible distortion, raise the output level controls slightly and begin again.

4. With the amplifier gains still at minimum and the source unit set at maximum volume without distortion, raise the rear output level control until distortion is heard, then reduce gain to just below this point. This is the maximum output level for this system. For best performance do not increase beyond this point.

Setting the Sub Output Level

1. Make sure all outputs are connected and the front and rear output levels are set correctly. Unplug the Remote Sub Level control cable.
2. Be sure the sub output level and amplifier gains are at their minimum settings.
3. With the volume set at a medium level, slowly increase the sub level control to the point where the subwoofer volume blends with the system.
4. If maximum sub output level does not provide enough subwoofer volume, slightly increase the subwoofer amplifier gain until desired level is reached.
5. Fine tune the bass response using the Sub Boost Controls.
6. Plug the Remote Sub Level Control cable back into the MCD360 crossover.

Setting the Sub Boost Level

1. Initially set the sub boost level to the minimum setting (i.e. 0dB).
2. Listen to a variety of music styles (e.g. Rock, Rap, etc.) and slowly increase the Sub Boost control until a noticeable increase in low bass response is perceived.
3. Slowly adjust the Sub Boost Frequency control (up or down) to realize the best bass response.

CAUTION: This feature can make a subwoofer put out more energy at very low frequencies. Be cautious with this control because with too much boost at low frequencies the power handling of the subwoofer will be decreased. This is a subjective setting and will depend on your personal listening preferences. If you hear a "pop" (due to speaker over-exursion), lower the Sub Boost to prevent speaker damage. If the system sounds muddy and distorted (due to amplifier clipping), lower Sub Boost to avoid shutdown from overheating



3-Way System

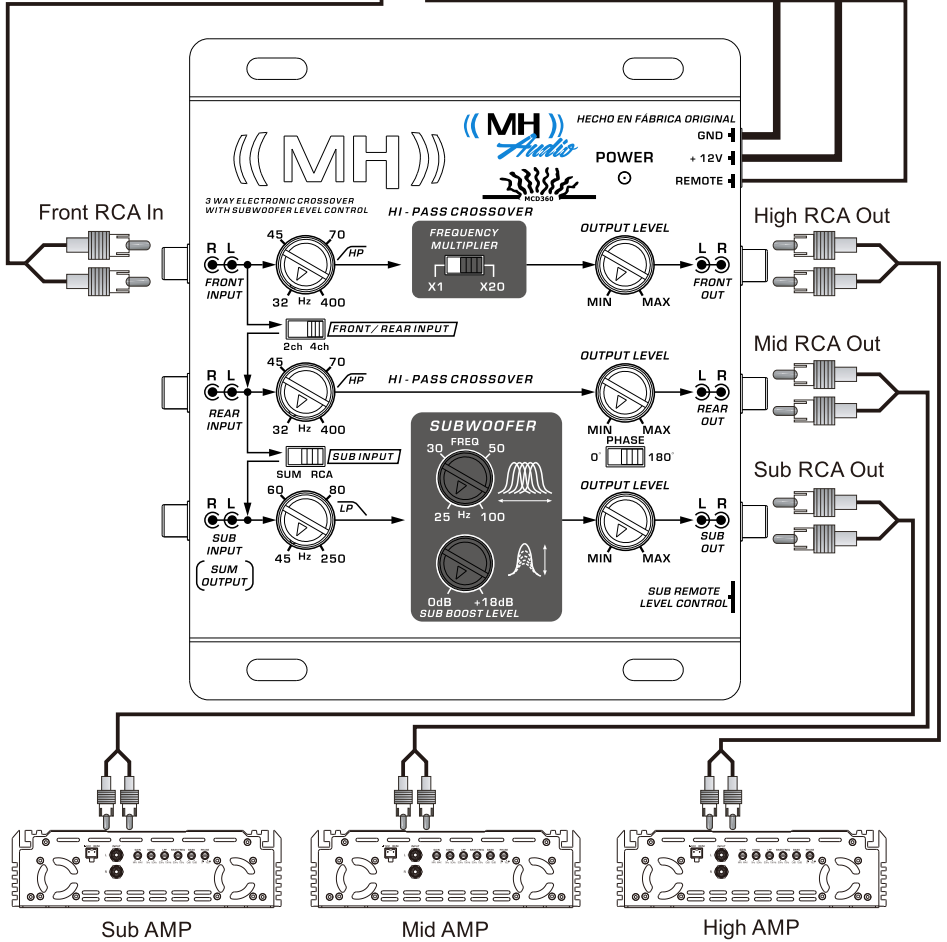
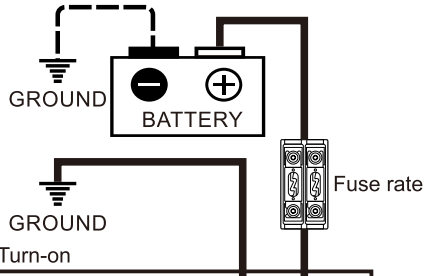


HEADUNIT



Front RCA Out

Remote Turn-on



In this illustration, the MCD360 is configured for single channel input with dedicated amplifiers for tweeters, midranges and subwoofer(s).

3-Way System Application Notes

After all the wiring connections are made and before the system is turned on for the first time, you need to make some basic adjustments. It is important that the High-Pass and Low-Pass Frequency Controls are set correctly before turning on the system for the first time.

Setting the Crossover Frequency Controls

1. Set the crossover frequency controls to the frequency recommended by the speaker manufacturer. The following are some guidelines if this information is not available:
 - Most tweeters will not operate below 5000Hz.
 - Most 6" midranges will operate down to 80-100Hz.
 - Most 5" or 4" midranges will operate down to 125-200Hz.
 - Most subwoofers have decreased sound quality when operated above 150Hz.

Depending upon the size/type of the midranges and tweeters and the type of subwoofer system, fine tuning these adjustments may be required after the initial system set-up. Study the system design pages of this manual to determine the proper settings for these controls. Midranges and tweeters are easily damaged if they cross at a frequency below their useable range.

2. The Low-Pass frequency should be set the same as the High-Pass frequency.

NOTE: An exception will be when the midrange is too small to play down to a very low frequency and the subwoofer sounds distorted trying to "play up" to meet the midrange. This may require a gap or difference between the high and low settings. Although not ideal, this is sometimes necessary to make the system work as well as possible.

Setting the Front and Rear Output Levels

Before setting front and rear level controls, disconnect the subwoofer output and follow the directions below.

1. Be sure the front and rear High-Pass crossovers are set properly.

NOTE: When the MCD360 is used in a 3-way system, the front outputs must be connected to the tweeter amplifier and the rear outputs must be connected to the midrange amplifier.

2. Turn the front and rear output level controls to their minimum setting.
3. Turn the amplifier gain controls to their minimum setting.
4. Turn the source unit on and increase the volume until distortion is heard, then reduce volume to just below this point.

NOTE: This is the maximum usable musical signal for this source unit. turning the volume beyond this point will increase noise and distortion without an increase in musical signal. If you can increase the source unit volume to maximum without audible distortion, raise the output level controls slightly and begin again.

5. With the amplifier gains still at minimum and the source unit set at maximum volume without distortion, raise the front and rear output level controls until distortion is heard, then reduce the gain to just below this point. This is the maximum output level for this system. For best performance do not increase beyond this point.





Setting the Sub Output Level

1. Make sure all outputs are connected and both the front and rear output levels are set correctly. Unplug the Remote Sub Level control cable.
2. Be sure the sub output level and amplifier gains are at their minimum settings.
3. With the volume set at a medium level, slowly increase the sub level control to the point where the subwoofer volume blends with the system.
4. If maximum sub output level does not provide enough subwoofer volume, slightly increase the subwoofer amplifier gain until desired level is reached.
5. Fine tune the bass response using the Sub Boost Controls.
6. Plug the Remote Sub Level Control cable back into the MCD360 crossover.

Setting the Sub Boost Level

1. Initially set the sub boost level to its minimum setting (i.e. 0dB).
2. Listen to a variety of music styles (e.g. Rock, Rap, etc.) and slowly increase the Sub Boost control until a noticeable increase in low bass response is perceived.
3. Slowly adjust the Sub Boost Frequency control (up or down) to realize the best bass response.

CAUTION: This feature can make a subwoofer put out more energy at very low frequencies. Be cautious with this control because with too much boost at low frequencies the power handling of the subwoofer will be decreased. This is a subjective setting and will depend on your personal listening preferences. If you hear a "pop" (due to speaker over-excitation), lower the Sub Boost to prevent speaker damage. If the system sounds muddy and distorted (due to amplifier clipping), lower Sub Boost to avoid shutdown from overheating.

TROUBLESHOOTING

1. Music is not loud enough with source unit turned up.

Output Level Controls are set incorrectly.

2. Music gets loud and distorted with source unit turned up only part way.

1. Output Level Controls are set incorrectly.
2. Gain Controls on amplifiers are set incorrectly.

3. Midrange speakers "pop" with loud passages.

1. High-Pass Frequency Control is set too low.
2. Gain Controls on amplifiers are set incorrectly. Reduce the gain setting on high frequency amplifier.

4. One channel does not operate.

1. Swap left and right connections at the source unit. If the problem trades sides in the vehicle, then the source unit is the defective. If the problem stays on the same side, proceed on.
2. Swap left and right connections at the input to the crossover. If the problem trades sides in the vehicle, then the wiring is defective between the source unit and the crossover. If the problem stays on the same side, proceed on.
3. Swap the left and right High-Pass RCAs at the output of the crossover. If the problem trades sides in the vehicle, then the crossover is defective. If the problem stays on the same side, proceed on.
4. Swap the left and right High-Pass RCAs at the amplifier input. If the problem trades sides in the vehicle, then the RCA cable is defective. If the problem stays on the same side, proceed on.
5. Swap the left and right speaker connections at the output of the High-Pass amplifier. If the problem trades sides in the vehicle, then the amplifier is defective. If the problem stays on the same side, then the speaker or speaker wiring is defective.
6. Green power indicator LED not on, there is no sound.
 1. Check the CONSTANT and REMOTE (Switched) wiring connections.
 2. Check the GROUND wiring for good connections.

