

INSTALLATION & OPERATION GUIDE



MVC 100IR

INFRARED SENSING VOLUME CONTROL



BLENDING HIGH FIDELITY AND ARCHITECTURE®



NILES®

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MVC100IR

Infrared Sensing
Muting Stereo
Volume Control

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Introduction

The MVC100IR is an infrared sensing, automatic muting stereo speaker volume control that combines a plasma proof IR sensor with a premium impedance magnifying volume control in a single, easy to use component.

A perfect application for the MVC100IR is adjusting the volume of a speaker pair; as well as muting and unmuting them while providing IR control of your A/V system from a remote location. The MVC100IR adjusts the volume of speakers connected to it by attenuating the amplifier signal. To assure minimal dissipation of internal power with virtually no power wasted as heat, Niles volume controls use autoformers instead of L-pads as the volume-controlling element.

The MVC100IR is an impedance-magnifying (IM) volume control. Unlike other brands, it has additional autoformer windings that magnify the impedance of connected speakers, while allowing all 12 steps to adjust the volume of the sound. A front panel switch selects the correct setting.

With the volume control providing impedance protection for your amplifier, you can create systems with no additional impedance-matching devices between the volume control and the amplifier.

In a typical application of IM controls, a system has up to eight pairs of 8-ohm speakers throughout the house and in outdoor

locations. Connect each pair of speakers to an MVC100IR volume control with its switch in the 8x position, eliminating the need for an external impedance-matching device to protect the amplifier. Even when playing all eight speaker pairs at once, the amplifier runs at normal operating temperatures.

Installed in a remote room location, the MVC100IR receives the IR commands transmitted from your existing hand-held remotes in that room. The commands are carried via a category 5 cable to a main system unit in another room, and instantly “repeated” to your A/V equipment.

The MVC100IR is compatible with all current Niles infrared systems. It may be used along with, or as an alternative to, the Niles TS100, WS100, MS100, MS200 and CS100 IR sensors or the IntelliPad®.

The MVC100IR is just one part of the three building blocks necessary to complete a Niles IR repeating system:

- IR Main System Unit—Models MSU140, MSU250, MSU480 and MSU440Z.
- IR Sensors/Keypads—Models WS100, TS100, MS100, MS200, CS100, MVC100IR and the IntelliPad.
- IR Flashers—Models MF1, MF1VF, MF2, MF2VF and the IRB1.

An IR sensor expansion hub, Model IRH610, is available to provide additional sensor inputs to your system.

IMPORTANT

Refer installation to a professional custom installer if you are unfamiliar with any of the following procedures.

**TOOLS
REQUIRED**

- 1/8" Standard Slotted Screwdriver
- Wire Stripper

Features and Benefits

The MVC100IR offers a number of improvements over other volume controls:

- Plasma-proof performance— allows placement of the MVC100IR near plasma displays.
- CFL interference resistant— expands installation flexibility to areas with fluorescent lighting.
- Works under most lighting conditions, including indirect sunlight— eliminates environmental restrictions.
- Universal system— compatible with virtually all brands of A/V equipment and remote controls.
- Excellent IR receiving range— you get 18' to 30' of remote control range (depending upon the strength of your hand-held remote).
- 100% factory tested.
- A universal impedance-magnifying design enables the MVC100IR to act as both a stereo and an impedance magnifying volume control. You can magnify the speakers' impedance by a factor of two, four, or eight.
- Unlike other impedance-matching volume-control products, Niles IM volume controls maintain a 12-position adjustment regardless of how much impedance magnification you use, with total attenuation >54dB.
- Interchangeable Decora-style inserts for fast, easy color change. Inserts and knobs (sold separately) are available in a variety of colors.

- Optional remote muting capability available. See your authorized Niles dealer for details.
- Pop-free switching between all steps.
- Precision autoformers provide superior sonic performance, exceeding the audio quality of non-impedance magnifying volume controls.
- Isolated left and right-channel grounds ensure safety with any amplifier.
- May be used with 4-, 6-, or 8-ohm speaker systems.
- UL rated to comply with all local building codes.
- Ideal for home and commercial sound installations.
- Available colors: almond, black, bone, brown, and white.
- Mounting depth of only 2-3/4". Fits into standard 18-cubic-inch one-gang junction boxes.
- Installation requires only a screwdriver and wire stripper.
- Power handling: 100W/channel RMS.
- Frequency response: 20Hz to 20kHz \pm 2dB.
- 2 years parts and labor warranty.

“TECH TIP”

Do not install the MVC100IR next to a light dimmer.

TECH TIP

Some speakers have selectable impedance. Before you proceed, please confirm that any selectable-impedance speakers in your system are properly set for the system you are installing.

Installation Considerations**Calculating the Impedance Magnification Setting**

Use the following instructions and the accompanying charts to select the correct switch setting for the number and type of speakers in your system.

CAUTION! Every speaker pair in the system must be connected to an impedance-magnifying volume control and all the volume controls must be set to the same magnification.

1. Count the number of pairs of 4-ohm speakers and the number of pairs of 8-ohm speakers you are connecting. Count pairs of 6-ohm speakers as 4-ohm pairs.
2. Determine whether the amplifier should see a 4-ohm load or an 8-ohm load. This information is typically found in the owner's manual of the amplifier.
3. Read the correct switch position from the charts on page 13. See Figure 6 if your amplifier can drive a 4-ohm load. See Figure 7 if your amplifier must have an 8-ohm speaker load.
4. Set the switch on each control to the same position (1x, 2x, 4x, or 8x). See Figure 9.

Limitations in Volume with High Magnification Settings

Using an 8x setting limits the power to each speaker pair to one-eighth of the amplifier's output.

In a typical application of IM volume controls, a system has eight pairs of 8-ohm speakers throughout the house and in adjacent outdoor locations. Each pair of speakers is connected to an IM volume control with its switch set for 8x.

With eight pairs of speakers, one-eighth of the amplifier's power is available to any pair. Therefore, an amplifier rated at 100W per channel RMS into 8 ohms will deliver up to 12.5W to each of the eight pairs – whether you play all eight pairs or just one pair. This translates into a drop in the maximum volume capability of about 9dB at the 8x setting.

IR Receiving Range and Pickup Angle

The receiving range of the MVC100IR will vary according to the IR output strength of the remote control being used. Remote strength varies among brands depending on the number and size of batteries used, and how many IR emitters the remote has. For example, remotes that operate on two small AAA batteries and have only one IR emitter are generally not as strong as remotes that use the larger AA size batteries and have two emitters. Tests with various manufacturers' remote controls have shown that the operating range can vary from a minimum of 18' to a maximum of about 30'.

Infrared signals travel essentially line-of-sight. They will not pass through or around solid objects. Do not rely on an IR signal being able to “bounce” off a wall or object to the MVC100IR.

The IR pickup angle of the MVC100IR is 30° off-axis (horizontal and vertical) at 20'.

Avoiding Electrical Interference

Avoid locating the MVC100IR near any potential sources of electrical or optical noise, such as light dimmers, low-voltage lights, and neon lights.

DO NOT INSTALL THE MVC100IR INTO ELECTRICAL BOXES WITH 110 VOLT DEVICES.

Some states or municipalities allow devices such as the MVC100IR to be installed into the same electrical box as 110 volt devices, provided a “low-voltage partition” is used between the devices. We do not recommend this. The cable connected to the MVC100IR can act as an “antenna” for electrical noise. Locating the MVC100IR cable too close to a light dimmer or switch may interfere with the MVC100IR. If you must locate the MVC100IR near electrical devices, install it in a separate metal electrical box, ground the box to the electrical system ground, and route the MVC100IR cable several feet away from all electrical wiring.

Avoiding Optical Feedback

If installing the MVC100IR in the same room as an IR flasher, it is possible for the flasher's IR output to be picked-up by the MVC100IR. This effect, known as an optical feedback loop, can cause erratic operation. Optical feedback is similar to acoustical feedback: the howling or whistling sound heard in a P.A. system when the microphone is too close to the speaker. To avoid optical feedback:

1. Re-position the flasher(s) and/or the sensor.
2. Use Niles MF1 or MF2 MicroFlashers and cover them with the supplied IR blockers.

Using Speaker Selectors with IM Volume Controls

Although IM controls provide volume and on/off at the volume-control location, they do not give you central control of speakers playing throughout the house.

Speaker-selection systems give you central control, but some speaker selectors have non-defeatable impedance-protection circuits. Combining IM controls with such a selector will reduce your maximum volume substantially. To solve this problem, specify a speaker selector with a defeatable protection circuit (Niles models HPS4, HPS6, SS-4, or SS-6). Keep the protection circuit off at all times.

Junction Boxes

The mounting depth of the MVC100IR is 2-3/4". When installed, the unit extends 2-1/4" behind the sheetrock wall (assuming 1/2" sheetrock). For installation, use a standard 18-cubic-inch (or larger) junction box. Suitable junction boxes are available from your Niles dealer or local electrical-supply company.

Type of Speaker Wire

We recommend 16-gauge stranded copper speaker wire for most connections, and 14-gauge wire for runs longer than 80'. Don't use speaker wire larger than 14-gauge, because larger wire may not fit into the connectors. Never use solid-core, aluminum, or Romex wire with an IM volume control. For speaker-wire runs within walls, most U.S. states and municipalities require a special type of speaker wire with a specific "CL" fire rating, such as "CL-2" or "CL-3". Consult your Niles dealer, building contractor, or local building-inspection department if you aren't sure what kind of wire is best for your application.

12 AWG



14 AWG



"TECH TIP"

Wire size is expressed by its AWG (American Wire Gauge) number. The lower the AWG number, the larger the wire. Thus, 12 AWG wire is physically larger than 14 AWG.

Type of Infrared Cable

The MVC100IR connects to the Niles infrared main system unit with an individual home run of category 5 cable.

Mounting Locations

Some states or municipalities allow installation of devices such as Niles speaker volume controls in the same junction box as 110V devices, with a low-voltage partition between the devices. We do not recommend this, because speaker wires can act as an antenna for electrical noise. Locating speaker wires too close to a light switch or dimmer may cause the speakers to emit a popping or buzzing sound. If you must locate the volume control near electrical devices, install it in a separate metal junction box, ground the box to the electrical system ground, and route the speaker wires several feet away from the electrical wiring.

Convenient mounting locations include:

- Near doorways.
- Near a desk.
- At your bedside.
- Close to a telephone.
- Near other wall-mounted controls.

Decora® Faceplates

The MVC100IR is designed to use Decora-style faceplate mounting hardware. You can combine multiple Decora-style modules (if all are low-voltage controls) within one Decora faceplate (up to six-gang) with color-matched plate screws. Decora plates and screws are available from your Niles dealer.

Changing the Color of the Knob and the Decora Insert

The Decora-style insert and knob on the MVC100IR is removable, allowing fast and easy color changes as needed. Inserts and knobs are available in a variety of colors. To change the color of your unit:

1. Obtain the appropriate knob and Decora-style insert in the desired color from your Niles dealer.
2. Pull the knob off the shaft. (Figure 1)
3. Next, locate the two plastic mounting tabs at the top rear of the Decora-style insert. Using two fingers, simultaneously press both tabs down (towards the center of the insert) and forward (away from you) until the insert pops free from its mounting slots.
4. Locate the new Decora-style insert. Hold the volume control facing you. Insert the two bottom tabs into the bottom slots first, then the two tabs on the top (Figure 2). Press carefully on the front of the insert to snap it into place.
5. Locate the new knob. Align its flat side to the flat side of the shaft, and push the knob onto the shaft. Holding the unit as shown in Figure 1, check the alignment of the knob by turning it through all positions.

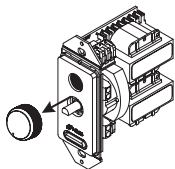


Figure 1

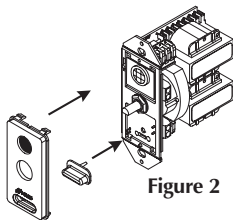


Figure 2

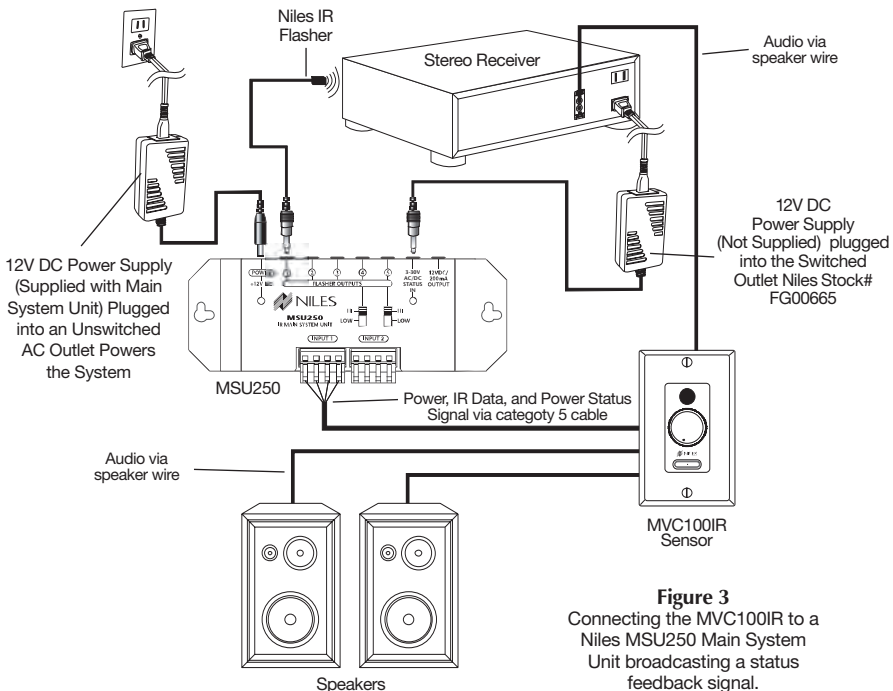


Figure 3
 Connecting the MVC100IR to a Niles MSU250 Main System Unit broadcasting a status feedback signal.

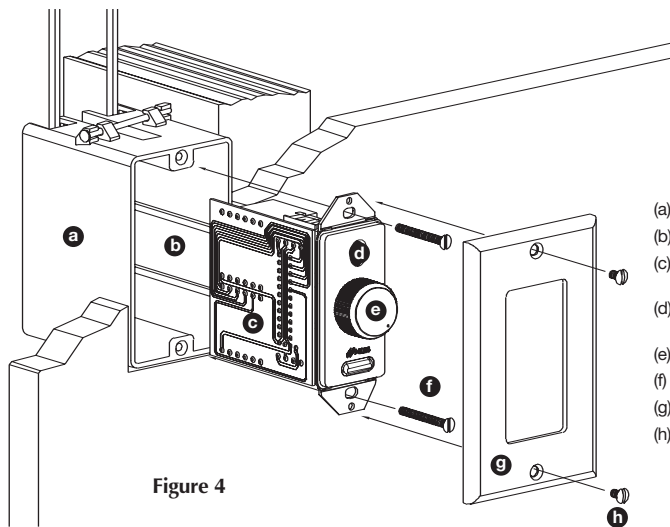
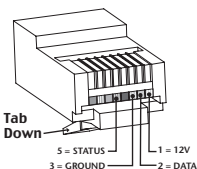


Figure 4

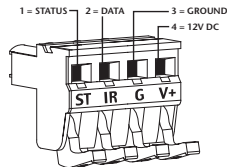
- (a) Electrical Box
- (b) Speaker Wire
- (c) MVC100IR Volume Control (supplied)
- (d) Snap-on Color Insert (supplied)
- (e) Knob (supplied)
- (f) Device Screws (2 supplied)
- (g) Decora Wallplate (supplied)
- (h) Faceplate Screws (2 supplied)

Figure 5

This color code is based on the industry standard T568A coding for the RJ45 connector. When connecting the MVC100IR to the Niles Intellipad Ci system observe this pin configuration



- 1 = Green/White - 12V
- 2 = Green - DATA
- 3 = Orange/White - GROUND
- 4 = Blue - EMPTY
- 5 = Blue/White - STATUS
- 6 = Orange - EMPTY
- 7 = Brown/White - EMPTY
- 8 = Brown - EMPTY



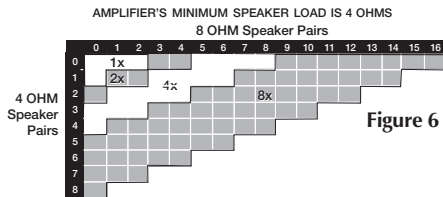


Figure 6

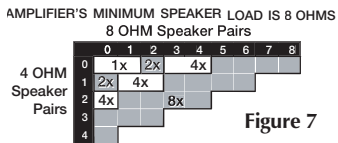


Figure 7

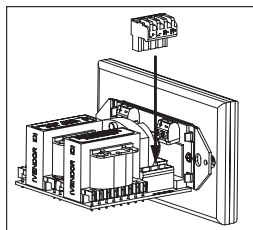


Figure 8

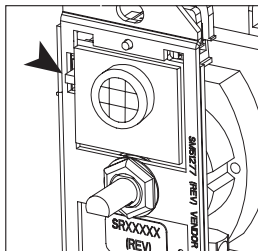


Figure 9

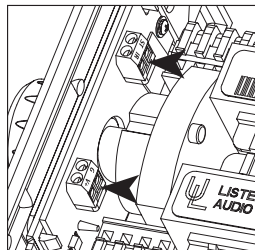


Figure 10

Preparing for Installation

NOTE: The MVC100IR requires separate wiring to operate the muting and infrared sensing functions. Therefore, category 5 cable must be run to each volume control location along with four conductor speaker wire.

Before you install the MVC100IR into an existing wall, consider the possibility of

hidden obstructions inside the wall, such as wood or metal studs, electrical, telephone, or other wiring, plumbing, AC or heating conduits, and old wall safes.

1. Install the junction box in the usual manner.
2. Run all necessary wiring to the volume control. Label the wires for future reference.

Using the MVC100IR with the Intellipad Ci system.

The MVC100IR is fully compatible with the Niles Intellipad Ci line, follow the wiring instructions in Figure 5. For specific information see your Intellipad Ci manual.

Installation

1. Locate the 4 pin speaker connector plugs (and remove them if they are plugged in).
2. Strip 1/4" of insulation from the end of each wire. Tightly twist the end of each wire until no frayed ends remain.
3. Use a small flathead screwdriver or your thumbnail to raise the locking tabs, exposing the holes on the removable connector plug.
4. Insert each wire into the appropriate hole on the removable connector plug, and snap the locking tab down.

NOTE: Maintain proper phasing. Connect the positive terminals on the volume control to the positive terminals on the amplifier and speakers, and connect the negative terminals on the volume control to the negative terminals on the amplifier and speakers. (Figure 3). To help you avoid improper phasing, the connector plug is keyed. Insert the smooth side of the connector plug into the smooth side of the socket. Don't force the scalloped side of the connector plug into the smooth side of the socket. (Figure 8).

5. Locate the dual 2 pin connectors (Figure 10). Strip 1/4" of insulation from the end of each wire and insert each wire into the appropriate hole on the connectors (ST, IR, G, V+). Use a small flathead screwdriver to tighten the screws in place.

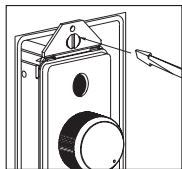


Figure 11
Loosening the Screws
for a Flush Fit

NOTE: Certain “old work” or “retro-fit” boxes, such as the Carlon B225R, have a plastic “lip” which interferes with the Decora plate screws. This lip prevents you from being able to tighten these screws completely. To make the clearance necessary for these screws, you must remove the parts of the lip causing the interference. There are two ways to accomplish this:

- a. Drill through the lip of the box at the screw points.
 - b. Cut notches into the lip with a pair of diagonal cutters.
6. Set the Impedance Magnification Switch (Figure 9) as determined by the IM charts (Figures 6 and 7).
 7. Plug the connectors into the volume control as shown in figure 8. The inputs of the IM volume control are the connector pins labeled AMPLIFIER. The outputs are the connector pins labeled SPEAKERS.

NOTE: If you reverse these connections, the volume control won’t function properly.

8. Connect the 4 conductor sensor wiring between the volume control (Figure 10) and the main system unit’s sensor input. (Figure 3). Refer to the main system unit owner’s manual for complete connection information.
9. Secure the volume control to the junction box. Insert the 1-1/4” device screws into the oblong screw holes on the top and bottom of the volume control. The oblong shape of the screw holes helps you place the volume control in a vertical position. Align the screws with the threaded holes in the junction box. Tighten the screws using a Phillips screwdriver.

DO NOT OVERTIGHTEN. If necessary, loosen these screws several turns so the volume control fits flush with the faceplate. (Figure 11).

10. Use the shorter plate screws to fasten the Decora faceplate to the volume control.
11. Align all the screws in the same direction for a clean, finished look.

System Volume Calibration

1. Make sure the amplifier or receiver power is OFF and set the volume to minimum.
2. Set the volume on the volume control to maximum (fully clockwise).
3. Turn ON the amplifier or receiver and select a source, such as the tuner or CD player.
4. Slowly turn up the amplifier or receiver volume and set it to a comfortable – not maximum – listening level. Don't overdrive or "clip" your amplifier. If the sound becomes muddy or distorted, you have reached the limit of your amplifier's volume capability. Reduce the volume at once to avoid damaging your speakers.
5. Use the volume control to adjust the volume of the speakers to the desired listening level. If all the speaker pairs in your system are equipped with Niles volume controls, you can set the amplifier or receiver volume at one position and use the Niles controls exclusively.

Operation

1. To turn OFF the speakers, turn the knob on the volume control fully counter-clockwise, or press the mute button on the volume control.
2. Operating the infrared portion of the MVC100IR is simple. Stand within the operational range of your MVC100IR. Aim your hand-held remote at the MVC100IR and press the button for the desired command. Your IR command is instantly repeated to your A/V equipment.
2. LED Indication Legend:

Blinking Blue: Remote Command being received

Green Solid: System on—not muted.

Solid Red: System on—muted.

Programming Muting Volume Controls

You can program individual Niles muting volume controls, allowing certain locations (such as the guest bedroom and porch) to remain muted when system activation turns on other locations (such as the kitchen and family room).

Place the volume control in the desired turn-on state (muted or unmuted) by pressing the mute button. Then press and hold the mute button for 8 seconds. The LED blinks to indicate that programming has occurred.

Niles muting volume controls come from the factory pre-programmed in the automatic mute mode.

Troubleshooting

This manual contains instructions for the MVC100IR only. For specific information on the adjustment and operation of your Niles infrared extender system, please refer to the instruction manual included with your Niles IR main system unit (MSU140, MSU250, MSU480, MSU440Z, IntelliControl).

The bi-color blue/green LED on the front of the MVC100IR is a useful troubleshooting aid.

The blue LED should light only when a remote command is being received. If the LED on the MVC100IR “flickers”, and the MVC100IR functions normally, there is no cause for concern, some stray IR signal are being received by the MVC100IR but are not being repeated.

1. Test the remote control(s) by operating the A/V equipment directly. Replace the batteries if needed.
2. Double check the cable connections on all MVC100IR's and on the main system unit. Look for open, shorted or reversed wires.
3. Test for interference from the following sources:
 - Neon or halogen lights in the room.
 - Light dimmers, beginning with those closest to the MVC100IR.

Observe the MVC100IR's LED while performing all the tests. It is possible to have interference from more than one source.

Eliminating optical feedback

In some installations, two conditions combine to create an optical feedback loop. Symptoms can include: poor range, intermittent operation or no operation.

The conditions which sometimes combine to create a feedback loop are:

1. Both a sensor and a flasher are located within the same room.
2. There is some low-level noise or interference on your system.

You can eliminate optical feedback by replacing any IRB1 “flooding flasher” with MF1 or MF2 MicroFlashers and covering all flashers with the supplied IR blocking covers.

If the MVC100IR does not work, and the LED does not light at all: Test the remote control(s) by operating the A/V equipment directly. Replace the batteries if needed. Double check the cable connections on all MVC100IR’s main system unit and on the IR main system unit. Consult your IR main system unit’s manual for more detail.

If the MVC100IR does not work, and the LED “flickers” or remains solidly lit: Cover up the Sensor with a piece of cardboard (your hand will actually create electromagnetic interference under some conditions). Observe the IR test LED.

IR Test LED Off:

Optical Interference.

IR Test LED On or Flickering:

Electromagnetic Interference.

EMI (Electromagnetic Interference)

Identify the source of the interference. The most common sources of electromagnetic interference are listed in the Installation Considerations section on page 7. To eliminate EMI try the following methods:

1. Move the sensor or the sensor cable away from the EMI source **or** move the source of the EMI away from the sensor or the cable.
2. Connect the Sensor's GND terminal to true earth ground (if this isn't feasible use the main system unit's GND terminal).

There are many methods for reducing interference. Which solution is best for you depends on your situation. Contact Niles Technical Support at 1-800-289-4434 if you require further assistance.

Maintenance

Niles volume controls do not require any regular maintenance other than occasional cleaning. Use a damp soft cloth and simply wipe the knob and wallplate clean. Do not use an abrasive cleanser as this might scratch the surface of the wallplate.

“TECH NOTE”

The feedback LED can be disabled if it continues to flicker or visual feedback is not desired. Discrete on and off IR commands are available on the Niles Technical support website for disabling the feedback LED. The address is: nilesaudio.com/techsupport.

Specifications

Audio Power Handling

100W/channel RMS.

200W/channel peak music power.

Mounting

In-wall, fits into most 18-cubic-inch single-gang junction boxes at least 2-3/4" deep.

Wiring Requirements

14-16 gauge, two individual runs of two-conductor speaker wire, or one run of four-conductor speaker wire.

IR Wiring Requirements

Individual home-run of category 5 cable.

IR System

Compatible with virtually all brands of remotes using carrier frequencies between 26 and 105 kHz.

IR Receiving Range

Varies depending on remote strength; 18' to 30' typical.

IR Receiving Angle

30° off-axis (horizontal and vertical) at 20'.

Unit Dimensions

1-5/8" wide x 2-5/8" high.

Faceplate Dimensions

Faceplate: 2-3/4" wide x 4-1/2" high.

Depth Behind Faceplate

2-9/16".

Contents

MVC100IR

- MVC100IR volume control X1
- Snap-on Decora color insert X1
- Blank Decora wallplate X1
- Knob X1
- Device mounting screws X2
- Faceplate screws X2
- Removable speaker connector X2

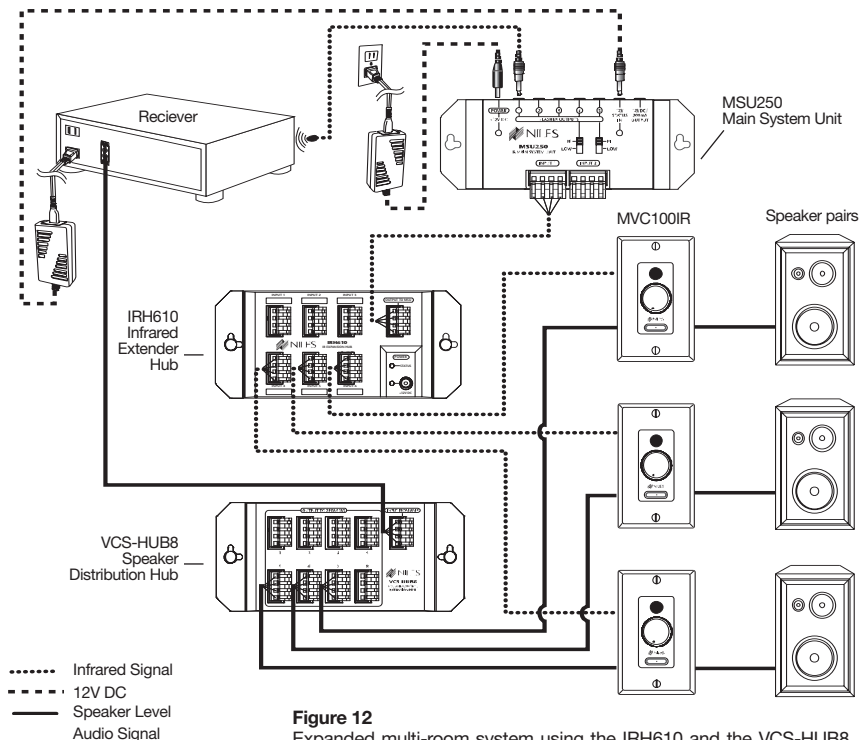


Figure 12
Expanded multi-room system using the IRH610 and the VCS-HUB8. This system gives you complete control of your A/V gear and can be further expanded to other rooms by adding MVC100IRs and speakers.