



# NILES®



## INSTALLATION GUIDE



HOME THEATER MAIN SYSTEM UNIT

# HT-MSU

## CONGRATULATIONS!

Thank you for purchasing the **HT-MSU Home Theater Main System Unit** from Niles. With proper installation and operation, you should enjoy years of trouble-free use.

Niles manufactures the industry's most complete line of custom installation components and accessories for audio/video systems. To see the complete Niles product assortment, visit us on the Internet at: [www.nilesaudio.com](http://www.nilesaudio.com)

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## INTRODUCTION

Thank you for purchasing the Niles HT-MSU Home Theater Main System Unit. The HT-MSU addresses an essential need of today's consumers—the ability to easily control and manage the assortment of entertainment sources found in the home theater environment.

Home theater systems are often controlled entirely by the remote. The result is a big, bulky, remote control with small, complicated buttons or screens that only a “mad scientist” could figure out. The Niles Home Theater Main System Unit (HT-MSU) ends the confusion by placing power and control in an interface box and using the remote to “trigger” desired activities.

The Niles HT-MSU can be used with the Niles R-8 Handheld IR Remote Control or any learning IR remote control programmed with Niles single-touch activity keys. With the Niles HT-MSU, users gain levels of control that are simply not possible with traditional “universal” remotes. Infrared, RS232, voltage triggers, and contact closures make the HT-MSU a complete control and automation system for displays, surround receivers, cable boxes, satellite receivers, DVD players and more. In addition, the HT-MSU can automate functions like lighting control, TV lifts, draperies, and projection screens.

Home entertainment systems should be fun, not frustrating, and Niles has always recognized the need for simple-to-use, cost-effective solutions. The Niles HT-MSU Home Theater Main System Unit gives end users one-touch control of their home theater systems and reflects the high quality fit and finish that meets the standards of today's consumers.

## FEATURES AND BENEFITS

### **SIMPLE CONTROL OF COMPLEX SYSTEMS**

The Niles HT-MSU Home Theater Main System Unit simplifies entertainment by allowing one-touch control of home theater components. Ordinary home theater system controllers require users to turn on (and off) multiple components, resulting in a confusing situation of hunting down the fugitive component that is “off,” when it really should be “on.”

The HT-MSU eliminates the confusion by shifting control to an interface box. The remote initiates commands to the HT-MSU, so whether you’re playing a DVD or watching a program recorded on your DVR, the HT-MSU provides one-touch access to all your entertainment.

### **INTELLIGENT MAIN SYSTEM UNIT**

The HT-MSU incorporates an infrared sensor port to control sources that use original remotes or “all-in-one” programmable universal remotes, even if the system is hidden from view. The HT-MSU has both video and 12 Volt sync inputs to manage the “power state” of your home theater system components. These synch ports, along with IR flasher ports, RS232 control ports, and an expansion port, allow the HT-MSU to control up to 22 devices from your home theater system and even “share” sources with a house-wide distributed audio system. The HT-MSU also includes “dry contact closure” relays and 12V trigger outputs that can be used to control devices like projector lifts, screens, drapes or lighting. An ethernet expansion port is also included for system expansion, communication to Niles MultiZone Receivers, and future upgrades.

### **INSTALLATION FLEXIBILITY**

With a low profile design, easy-to-access connections, and rack-mount-hole wings, the HT-MSU can be wall-mounted behind theater components or attached to the back of metal professional racks.

### **QUICK AND EASY SET-UP WITH WIZARD-BASED NILES QUICKCONFIG™ PC CONFIGURATION SOFTWARE**

An HT-MSU configuration can be programmed, saved, and edited using the Niles QuickConfig PC Configuration Software and Niles IR-CS Infrared Capture Station. The QuickConfig PC Configuration Software is Wizard-based and guides the installer/programmer through basic and advanced system designs.

### **ASSIGNABLE RELAYS AND 12V OUTPUTS**

Three dry contact closures and three 12V DC trigger outputs can be independently programmed to give installers greater control of mechanical devices or voltage-triggered power strips and dispersion controlled home theater loudspeakers.



## **INTELLIGENT INTEGRATION WITH MULTI-ZONE SYSTEMS**

The HT-MSU includes control ports that allow it to “share” sources with whole-house distributed audio systems. The power state of these “shared” sources can be completely managed so that sources are always powered-on when they need to be and powered-off when both whole-house and home theater systems are turned off.

## **PROGRAM MEMORY PROTECTION**

The entire system profile is stored in non-volatile memory within the HT-MSU. This safeguards against accidental loss of the configuration programming.

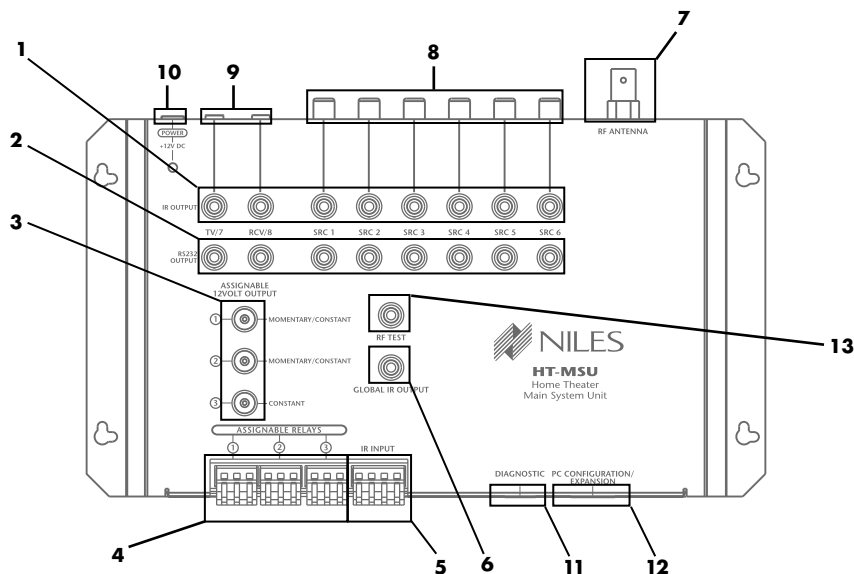
## **CONTENTS**

Check that your HT-MSU Home Theater Main System Unit contains the following:

- Home Theater Main System Unit (HT-MSU)
- HT-MSU Power Supply
- RF Antenna
- 10 ft. Antenna Extension Cable
- Antenna Wall Bracket
- System Configuration Worksheet

## PARTS GUIDE

### THE HOME THEATER MAIN SYSTEM UNIT (HT-MSU)



**Figure 1.** HT-MSU Top View

**1) IR Outputs** - SRC1 – SRC6, TV/7, RCV/8 are eight dedicated 3.5mm jacks that output IR data specifically for that source

**2) RS232 Outputs** - SRC1 – SRC6, TV/7 and RCV/8 are eight dedicated 3.5mm jacks that output RS232 data specifically for that source

**3) Assignable 12V Outputs** - Three 3.5mm jacks, output 12V DC 150mA when activated:

- a. 12V outputs 1 & 2 are independent of each other and are programmable to output 12V momentarily or constantly when activated.
- b. 12V output 3 is assignable and outputs 12V constantly when active.

**4) Assignable Relays** - There are three, 3-position removable quick-connect plugs labeled 1, 2 and 3 for connecting either NO (normally open) or NC (normally closed) contact closure devices to the HT-MSU.

**5) IR Input** - A 4-position removable quick-connect plug for connecting an IR sensor to the HT-MSU. This connection allows IR control of the HT-MSU and/or IR pass-through for connected sources

**6) Global IR Output** - A 3.5mm jack provides all IR codes that the HT-MSU generates and all IR codes that come in through the IR Input connection and can be configured via Niles QuickConfig Software for Normal or High output. Normal output is designed for a Niles MF1 IR MicroFlasher®; high output is designed for a Niles IRB1 High-Output IR Flasher

**7) RF Antenna Socket** - The BNC connector accommodates the supplied antenna. The antenna must be installed perpendicular to the ground for best results. A 10 ft. (3 meter) antenna extension cable and mounting bracket are included if remote installation of the antenna is necessary. The antenna is used when the HT-MSU is being controlled via a Niles compatible RF Remote

**8) Status 12V or Video** - Six video and voltage-sensing RCA synch inputs for sources 1 through 6 detect when a source is on/off for reliable system activation

**9) Status 12V** - Two voltage-sensing 3.5mm jacks for sources TV/7 and RCV/8 detect when those sources are on/off for reliable system activation

**10) Power 12V DC** - A barrel connection for the provided 12V DC power supply

**11) Diagnostic** - A USB A connection for Niles Service Center

**12) PC Connection/Expansion** - A RJ45 connection used to plug in a computer for system configuration programming or expanding the system design out to future Niles multizone receivers. Niles QuickConfig PC Configuration Software is used for system configuration

**13) RF Test** - A 3.5mm jack used to connect the optional Niles IR/RF tester for testing RF reception

## SYSTEM DESIGN CONSIDERATIONS

The Niles HT-MSU Home Theater Main System Unit is a highly flexible tool that allows system designers to create home theater systems that will delight their customers. The following section explains just some of the system design features of the Niles HT-MSU Home Theater Main System Unit. To fully understand the system configurations, it's important to understand the basic control sections of the HT-MSU.

## IR INPUT PORT

This connection is used to control the HT-MSU and all of the home theater sources connected to it. Each of the system configurations that follow must include an Infrared Sensor connected to this port and a learning remote programmed with the Niles HT-MSU codes or the Niles R-8 Remote control. This port also allows for IR pass-through of IR codes from the original remotes of the connected sources. (Refer to the Accessories section on page 19 for more information on Niles IR sensors.)

## IR OUTPUT PORTS

IR (Infrared) codes are stored in the HT-MSU during configuration programming. The labels of the IR Outputs identify what source number these ports are designed to operate. SRC1 means source 1. The outputs are labeled SRC1 through SRC6, TV/7 and RCV/8. If the TV is to be controlled via IR codes, then the IR Output TV/7 port should be used. However, if the TV will be controlled via RS232, then the TV/7 IR output can be used to control an alternate IR source. These IR outputs are dedicated and routed, meaning IR codes stored for source number 3 (i.e., a DVD player) can only be emitted from the IR output port labeled SRC3. RCV/8 can be used either for the receiver in the home theater or a source number 8.

## RS232 OUTPUT PORTS

RS232 is a serial device control protocol that allows sources to be controlled via a transmit-receive cable. (See the Installation section for wiring information.) RS232 codes are stored in the HT-MSU as string codes during configuration programming. The labels of the RS232 Outputs identify what source number they are designed to operate. SRC1 means source 1. The outputs are labeled SRC1 through SRC6, TV/7 and RCV/8. If the TV is to be controlled via RS232 codes, then the RS232 TV/7 port should be used. However, if the TV will be controlled via IR, then the RS232 TV/7 port can be used to control an alternate RS232 source. These RS232 outputs are dedicated and routed, meaning RS232 codes stored for source number 3 (i.e., a DVD player) can only be emitted from the RS232 output port labeled SRC3. RCV/8 can be used either for the receiver in the home theater or a source number 8.

## SOURCE POWER STATUS CONNECTIONS

To properly automate home theater sources, the HT-MSU needs to “know” when the source is powered On or Off. There are three ways that sources are powered on:

- 1. Toggle Power:** *A source via its remote control has one button for turning that source On and Off. When trying to automate such a device, you must provide the HT-MSU the “Power Status” as feedback using the Status connection on the HT-MSU’s top edge (detailed below).*
- 2. Separate On and Off Power:** *A source via its remote control has one button to turn the source On and a different button to turn the source Off. When trying to automate such an IR device, you should provide the HT-MSU the “Power Status” as feedback so the IC2 System will act faster using the Status connection on the HT-MSU. If a source is to be controlled via RS232 and it has separate On and Off codes, you do not need to provide the HT-MSU feedback.*
- 3. Latching Power:** *Latching power is an industry term that means the source has no power command/s on its remote control. A latching power source may have a “hard” power button on the front panel. To determine if a source is latching power, push its “hard” power button in, take its power cord and plug it into a live AC power outlet. If it turns on when plugged into the outlet and turns off when unplugged from the outlet, it is a latching power source. Latching power sources do not need a Power Status*



connection, but you will want to do one of two things:

- a. Plug it into the switched outlet of the receiver, or
- b. Use a Niles AC-3 Voltage Triggered Power Strip connected to one of the assignable 12V outputs on the HT-MSU. Use the QuickConfig PC Configuration Software to program the assigned 12V output to turn on when that source is selected. (See QuickConfig manual for more details on programming 12V outputs.)

Along the top edge of the HT-MSU are the source-specific status connections labeled SRC1 through SRC6. These RCA jacks are designed to sense either 12 Volts or video so the HT-MSU “knows” when the source is On or Off. You must use these connections if the source you are trying to automate is IR controlled and uses toggle power (see **1.Toggle Power** above).

If the source has a video out jack, connect the video output to the corresponding SRC Status RCA jack on the HT-MSU. If the source has no video output jack, you may use one of the Niles external-sensing devices that provides 12V output (i.e., the CS12V Current Sensor or the LS-1 Light Sensor) connected to the RCA Status jack.

## ASSIGNABLE 12 VOLT OUTPUTS

These three ports are completely assignable and can be used to trigger out-board automation devices such as:

- 12V Triggered AC Power strips like the Niles AC-3
- 12V Triggered subwoofers like the Niles SW300, SW12, SW10, and Pro15SW
- 12V Triggered Dipole/Bipole rear effects speakers like the StageFront IW650FX
- Motorized drapery systems and projection screens

12V Output #1 has a default setting to output 12V DC whenever the home theater receiver is turned on by the HT-MSU Master Key activity setting.

12V Output #2 has a default setting to output 12V DC whenever the HT-MSU Master Key activity setting turns on the TV.

12V Output #3 has no default and is completely assignable.

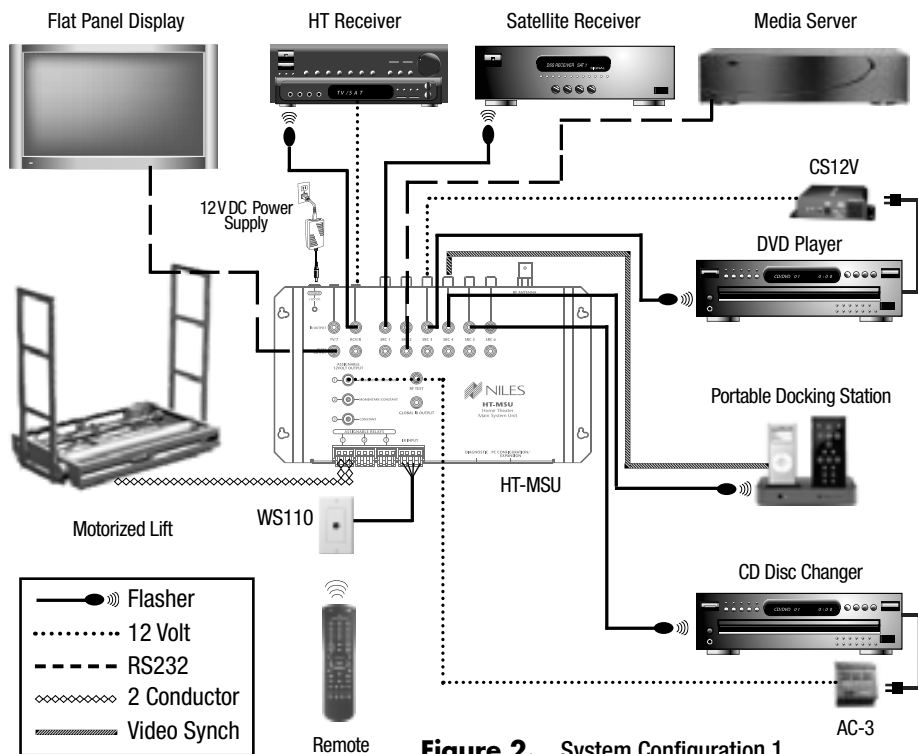
The three assignable 12V outputs can be configured (programmed) using the Niles QuickConfig PC Configuration Software.

## ASSIGNABLE RELAYS

There are three independently assignable dry contact closures/relays. These connections can be used to trigger lights, curtains, screen lifts, and other devices. Use the Normally Open or Normally Closed side of the contact closure to complete the circuit to control the device.

# SYSTEM CONFIGURATION 1

## SINGLE TV WITH A COMBINATION OF IR AND RS232 CONTROLLABLE SOURCES

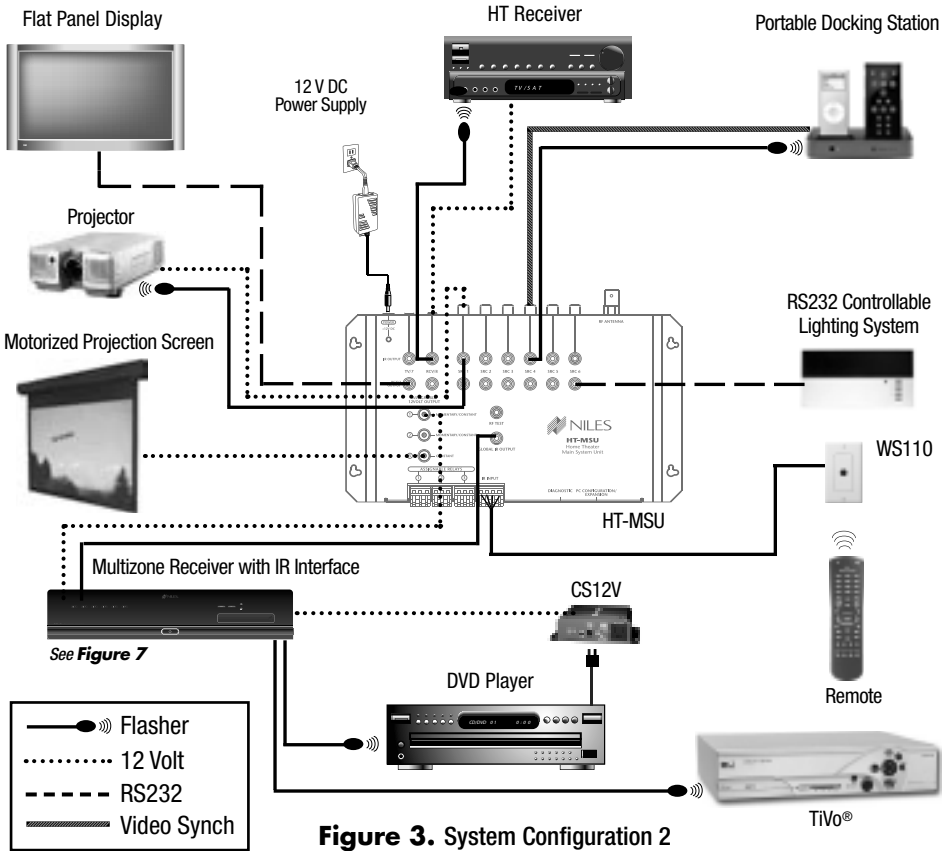


**Figure 2.** System Configuration 1

In System Configuration #1 (**Figure 2**), a Niles IR sensor must be connected to the IR sensor input and a learning IR remote (programmed with the HT-MSU codes) is used to activate the HT-MSU. In this configuration, a flat panel TV is controlled via the RS232 connection TV/7 on the HT-MSU. A motorized lift to raise and lower the TV is being activated with the programmable Relay #1. The surround receiver is being controlled via IR flasher connected to the RCV/8 connection on the HT-MSU. The surround receiver's power status is being monitored by a Niles 12V DC power supply plugged into the receiver's switched AC outlet and then plugged into RCV/8 Status 12V connection on the HT-MSU. In addition to the TV and receiver, there are five sources. The DSS Satellite receiver is being controlled via IR from the IR SRC1 port. There is no status connection to the HT-MSU because it has separate On/Off codes. The Media Server is being controlled via the RS232 SRC2 port. The DVD player is being controlled via the IR SRC3 port, and a CS12V Current Sensor connected to the SRC3 Status RCA jack is providing the status. IR connected to the IR SRC4 is controlling the portable Music Player in its dock, and video is providing the status connected to the SRC4 Status RCA jack. IR connected to the IR SRC5 port is controlling a latching power CD player and, using the 12V Output # 1, triggering a Niles AC-3 to power it On and Off.

# SYSTEM CONFIGURATION 2

## DUAL TV MODE AND INTEGRATION WITH AN IR CONTROLLED MULTIZONE RECEIVER



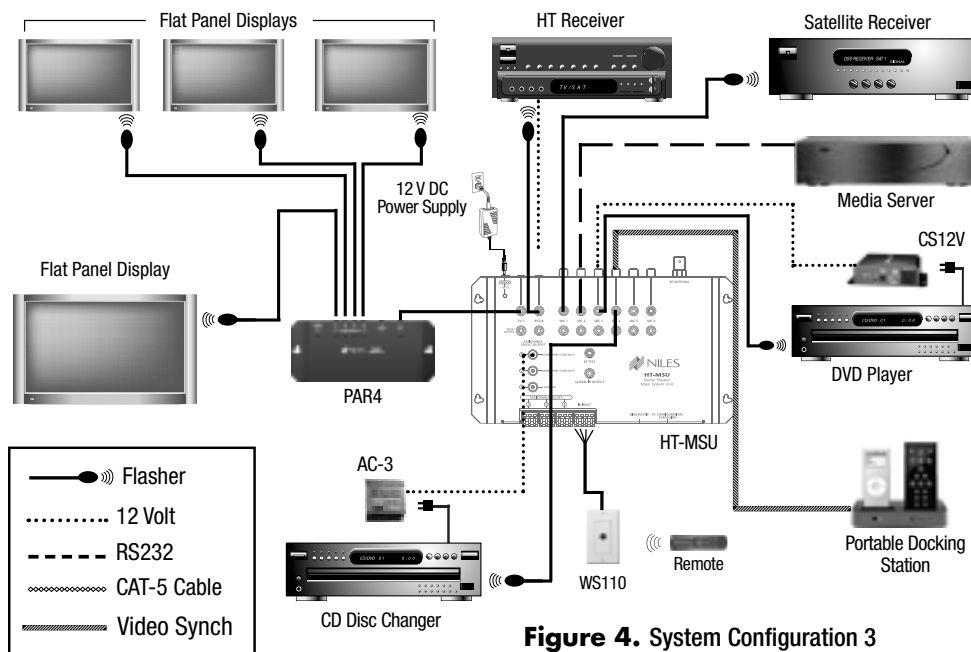
**Figure 3. System Configuration 2**

System Configuration #2 (**Figure 3**) demonstrates the Dual TV Mode feature of the iC2 System. The flat panel TV is controlled via RS232 on the HT-MSU RS232 TV/7 port. This is considered the default TV. The customer also has a projector and screen used only when the theater room is dark. The projector is configured (programmed) with Niles QuickConfig PC Configuration Software to be TV2 and is wired for IR control to the HT-MSU IR SRC1 port. The Status of TV2 is connected to the HT-MSU IR SRC1 RCA connection using the 12V output of the projector (usually used to trigger the screen). The projection screen is being triggered by the HT-MSU 12V Output #3. When the first Master Key on the iC2 Remote is pressed from an all-off mode, the default TV (the flat panel TV, TV1) is turned on. Master Key 8 is labeled SWAP TV. When the SWAP TV Master Key is pressed, TV1 (flat panel) is turned off and TV2 (the projector) is turned on, and the screen is lowered for viewing. The Dual TV Feature is not limited to IR controllable TVs. Either TV can be RS232 controllable.

**NOTE: IN DUAL TV MODE, ONLY ONE TV IS ON AT A TIME. BOTH TVS CANNOT BE ON AT THE SAME TIME.**

System Configuration #2 also shows an RS232 controllable lighting system connected to the HT-MSU RS232 SRC6 port. In this configuration, there are 2 sources (a DVD and a DSS satellite receiver) being “shared” with the house-wide multizone distributed audio receiver. The HT-MSU sends IR codes for both of the shared sources out of the Global IR Output port into the multizone’s IR IN port. The HT-MSU’s 12V Output #1 is connected to the multizone’s HT SYNC port, which ensures that the “shared” sources are turned On and Off correctly. The multizone “knows” that the home theater system is On or Off via this 12V connection.

## SYSTEM CONFIGURATION 3 TV ARRAY MODE



**Figure 4.** System Configuration 3

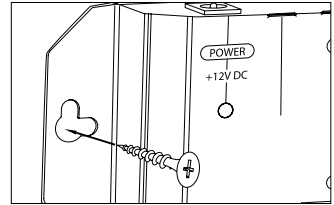
System Configuration #3 (**Figure 4**) shows two more system design features of the Home Theater Main System Unit. The HT-MSU has a design feature called TV Array. Here, a Niles PAR4 Simplified IR Router is used with the HT-MSU to control an array of identical televisions. (In order to use the TV Array feature, all of the TVs must be identical or respond to the same IR codes. Additionally, the TVs must have separate On and Off power commands and direct access input commands.) A Niles 3.5mm to 3.5mm cable connects the PAR4 to the HT-MSU’s IR TV/7 port. On the Niles PAR4, Niles MicroFlashers are connected to the numbered outputs 1 through 4. The main TV should be connected to the PAR4 #1 output. When the end user presses any Master Key from an All Off situation, the Main TV (PAR4 #1) turns on. Master Key 8 is labeled TV Array. Press the TV Array Master Key (Master Key 8), then press one of the number keys 1, 2, 3 or 4. This allows the end user to control that TV in the array of TVs. Two Niles PAR4’s can be used for a maximum of eight TVs in the TV array.

## INSTALLATION CONSIDERATIONS

### PLACEMENT OF THE HT-MSU

Niles recommends placing the HT-MSU conveniently close to the equipment it is controlling. Generally, the unit should be placed in a concealed location because its indicator and connections are only used during installation. Placement possibilities include:

- 1) *Wall-mount (affixed to the back of the equipment cabinet or a nearby wall) (Figure 5)*
- 2) *Rack-mount (attached to the back of a professional 19-inch standard equipment rack that uses traditional 1, 2 or 3 "u" hole spacing (e.g. Middle Atlantic))*
- 3) *Table-top (on the floor or shelf behind the equipment)*

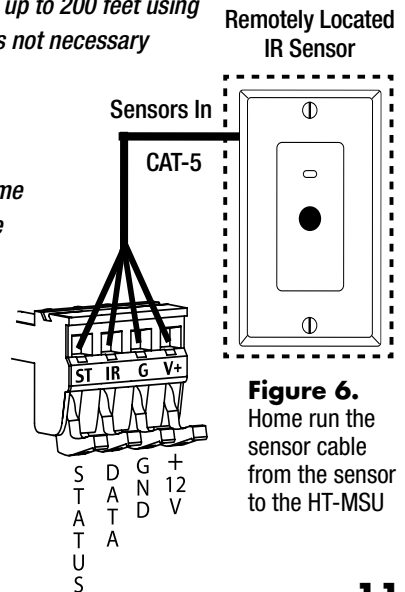


**Figure 5.** Wall-mount placement. Use sheetrock screws

### WIRING CONSIDERATIONS

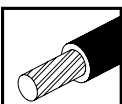
The HT-MSU requires several different types of wires runs:

- 1) **IR Sensor Wire:** *The HT-MSU has an infrared (IR) sensor input for connection to any type of Niles IR sensor. Niles IR sensors utilize 4-conductor wiring and have been designed for use with CAT-5 cable (4-pair twisted) (Figure 6).*
- 2) **Flasher Cable:** *Niles infrared flashers (not supplied with the IC2 System) include a 10 foot cable. Flasher wires can be extended up to 200 feet using 2-conductor 22 gauge ("zip-cord"). Shielding is not necessary for a flasher.*
- 3) **RS232 Cable:** *The HT-MSU can control home theater sources using one-way RS232 control cable. Niles does not supply RS232 cables. Home theater sources that are RS232 control capable will usually supply or recommend the wire and the pin-out that will control their devices. Traditionally, RS232 one-way communication can be sent over three wires (transmit, receive and ground), but not for very long distances. (Niles recommends placing the HT-MSU in close proximity to the sources it is controlling.)*



**Figure 6.** Home run the sensor cable from the sensor to the HT-MSU

**4) Status Wiring:** The Niles HT-MSU has status (power synchronization) ports for eight home theater sources. The status connections for sources 1 through 6 (labeled SRC1 – SRC6) are RCA jacks that can sense video or a 12V DC voltage signal. The TV/7 and RCV/8 (receiver) status connections are 3.5mm jacks that sense voltage signals. When using video for status, a standard RCA cable can be used from that source. Alternatively, when using 12V for status, a standard 22 gauge, 2-conductor cable (“zip-cord”) can be used. Niles Accessory Cables (FG00724 or FG00933) can also be used (SEE THE ACCESSORIES SECTION FOR MORE INFORMATION).



#### TECH TIP

WIRE SIZE IS EXPRESSED BY ITS AWG (AMERICAN WIRE GAUGE) NUMBER — THE LOWER THE NUMBER, THE LARGER THE WIRE, FOR EXAMPLE, 20 AWG IS PHYSICALLY LARGER THAN 22 AWG.

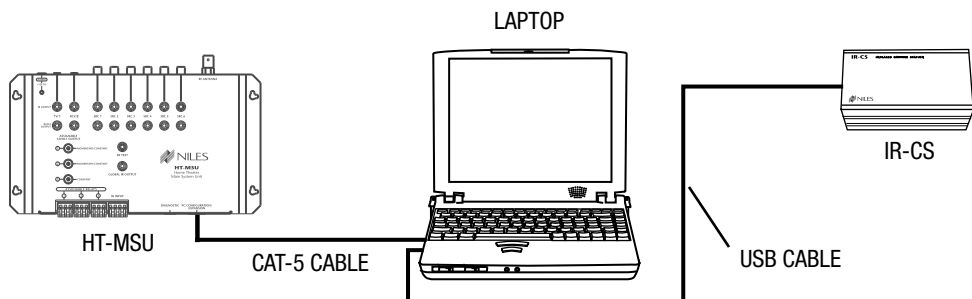
- 5) 12V Output and Relay Wiring:** The HT-MSU has three 12V and three “Dry Contact Closure” Relay Outputs that can activate mechanical devices such as motorized drapery and projection screen systems, as well as a number of other automation devices. For each device these outputs will control, standard 22 gauge 2-conductor cable (“zip-cord”) can be used. Niles Accessory Cables (FG00724 or FG00933) can also be used. Each relay is rated to handle 12V DC, up to 5 amps. (SEE THE ACCESSORIES SECTION FOR MORE INFORMATION).
- 6) Expansion Cable:** The HT-MSU has an Expansion connection that can be used to extend the built-in RF radio away from the HT-MSU and/or for connection to and “sharing” sources with future Niles multizone receivers (SEE SYSTEM CONFIGURATION #3 IN THE SYSTEM DESIGN CONSIDERATIONS SECTION). This cable must be CAT-5 terminated with RJ45 connectors (T568A TERMINATION PROTOCOL IS SHOWN IN THE INSTALLATION SECTION 7).
- 7) Antenna Cable:** The supplied extension cable is 10 foot long and is a RG59 CL rated cable so it can be run through the wall. Extending the cable or using longer cable is not recommended as this will drastically affect the RF reception. The antenna is only used if a Niles RF Remote issued to control the HT-MSU.

## PROGRAMMING PREPARATIONS AND WORKSHEET

The HT-MSU has a PC Configuration/Expansion port on the bottom edge that is used for configuring (programming) the system. If the HT-MSU is being used by itself, the PC Configuration/Expansion port will be empty and used to program the system (**Figure 7**).

A Worksheet is provided with the HT-MSU Home Theater Main System Unit and should be used to organize all of the information an installer will need to configure the HT-MSU. The HT-MSU worksheet is also available on the Niles website: [www.nilesaudio.com](http://www.nilesaudio.com).

**Figure 7.** PC connection for programming



## HT-MSU TRIGGERING REMOTE CONTROL CONSIDERATIONS

Choosing the right IR remote to trigger the HT-MSU is very important. The HT-MSU is a component in the Niles IC2 Home Theater Automation and Control System. This system consists of the HT-MSU, the IC2 Remote, and a Zigbee RF remote that sends RF commands to the HT-MSU to trigger the activities.

When choosing an IR Remote, consider the functions of the IC2 Remote that you want to duplicate. The IC2 Remote uses eight Master Keys (Activities or Sources) and 36 function keys for each of the Master Keys. The IR remote you choose should have the following features:

1. *Eight Source buttons that can be programmed with the Niles Master Key commands.*
- 2) *Function Keys broken into the following categories:*
  - a. *Transport functions (Play, Stop, Pause, Fast Forward, Rewind and Record)*
  - b. *Numeric access the (numbers 1-0, Last, Enter and Favorites/Presets)*
  - c. *Menu Navigation functions (Cursor keys, Select, Guide, Info, Exit, menu application-specific keys Red, Green, Yellow and Menu)*
  - d. *Volume up/down, Mute and Channel up/down*

## INSTALLATION

Before you begin, make sure that all of the cables and wires, as well as the power supply cable will reach the proposed location of the HT-MSU. Mark the cables with labels that describe where the cable originates (rather than which terminal on the HT-MSU it connects to).

### STEPS:

#### 1) CONNECT POWER TO THE HT-MSU. CHECK LED, DISCONNECT POWER

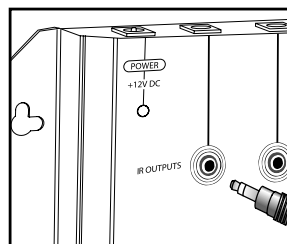
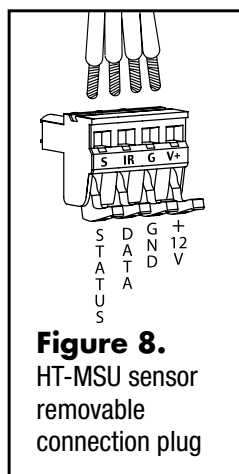
*Plug the supplied 12V DC power supply into an unswitched AC outlet. Plug the connector into the socket marked "Power" on the HT-MSU. If the Power LED does not light, test the unswitched AC outlet with another appliance. If the outlet tests OK, you have a defective power supply, which must be replaced for you to continue. Once you have completed the power supply test, unplug the power supply and continue hooking up the rest of the wires and cables.*

#### 2) CONNECT THE SENSOR CABLE TO IR INPUT

*Strip 1/4 inch of the insulation from the end of each wire. Tightly twist the end of each wire until no frayed ends remain. Use a small flathead screwdriver or your fingernail to raise the locking tabs, exposing the holes on the removable connector. Insert each wire into the appropriate hole on the removable connector plug (**Figure 8**) and snap the locking tab down. To help you, the connector plug is keyed. Insert the smooth side of the connector plug into the smooth side of the socket.*

#### 3) CONNECT ALL FLASHERS

*Route the connecting wire to the HT-MSU. Connect the 3.5mm mono plug into the corresponding SRC jack labeled "IR Output" from the installation worksheet. If you need to extend the wire, use a 2-conductor 16 gauge or larger (SEE "TECH TIP ON PAGE 12).*



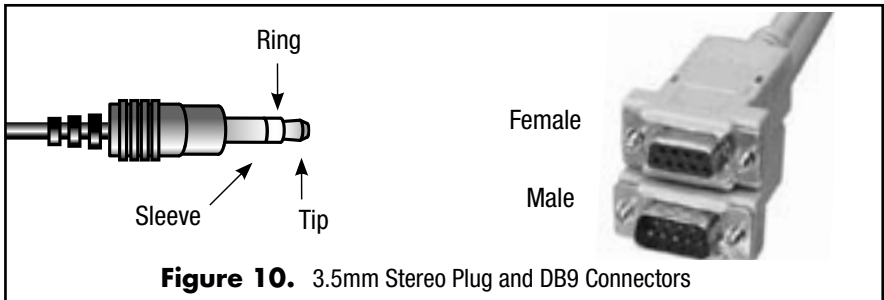


#### 4) CONNECT ALL RS232

The RS232 Output jacks use 3.5mm STEREO plug with standard TRS (Tip, Ring and Sleeve) configuration of Transmit, Receive, and Ground. This may require the installer to custom-make the connection to the corresponding source. Most RS232 controllable sources use one of the following as its RS232 input connector:

- a) A Male DB9 connector
- b) A Female DB9 connector
- c) A 3.5mm stereo input jack

Most sources that are RS232 controllable provide a protocol document (usually from their Tech Support Department) that will have all of the necessary information, including pin-out, to custom build the RS232 control cable (**Figure 10**).



**Figure 10.** 3.5mm Stereo Plug and DB9 Connectors

#### 5) CONNECT ALL STATUS

There are two types of status (power synchronization) ports on the HT-MSU: the TV/7 and RCV/8 status connections are 3.5mm mono ports; and SRC1 through SRC6 status connections are RCA jack ports. The TV/7 and RCV/8 status connections are voltage-sensing ports “looking for” 12V DC Volt input. The most common technique for “synching” the home theater receiver is to use a Niles 12V (FG01035) power supply plugged into the receiver’s switched outlet, and plugging the 3.5mm jack into the RCV/8 Status connection port. The most common way to “synch” the TV (which usually doesn’t have a switched AC outlet on the back) is to use one of the Niles synching accessories like the CS12V Current Sensor or LS-1 Light Sensor. Both of these synching accessories have 12V outputs that can be connected to the HT-MSU using a 3.5mm mono jack plugged into the TV/7 status port.

The SRC1 through SRC6 RCA connections are RCA jack ports that are “looking” for either voltage or a video signal from the source. If a DVD is to be hooked up as SRC2 (use the worksheets to help with source connection layouts), an RCA video cable would be used to connect the DVD’s composite video output to the SRC2 RCA Status connection port. If the DVD has only one composite video output, and that is being used to show video on the TV, an RCA Y-adaptor can be used to split the video output (of the DVD) for both

the TV signal and Status connection to the HT-MSU (**Figure 11**). If the source to be “synched” doesn’t have a video output, one of the Niles Synching Accessories can be used instead of video. Most Niles Synching Accessories use a 3.5mm jack as the output. This 3.5mm jack must be changed to mate with the RCA connector on the HT-MSU; use a Radio Shack 274-897 OR 274-330 mini-plug to male RCA adaptor.

**IMPORTANT NOTE: RCA SOURCE STATUS INPUTS ARE DESIGNED WITH HIGH-INPUT IMPEDANCES IN ORDER TO PRESERVE THE QUALITY OF THE VIDEO SIGNAL WHEN USING A RCA Y-ADAPTOR.**

## 6) CONNECT 12V

The 12V trigger output jacks use 3.5mm mono plug with standard “Tip and Collar” configuration. The tip is 12V DC 150mA when activated and the collar is ground. Niles has two accessory cables for use with these 12V output jacks (FG00724 or FG00933). Simply plug one of these cables with a 3.5mm mono plug into one of the three assignable jacks. Plug the other end of the cable into the device that will be triggered or activated.

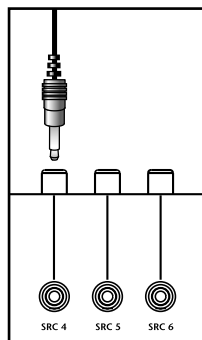
The Niles QuickConfig PC Configuration Software is used to assign (program) the functionality of these jacks. The configuration software allows the 12V output to be programmed as follows:

- a) Output #1 can be configured to output 12V constantly or momentarily. A momentary output would be used to activate a device that requires a pulse of 12V instead of a constant 12V. The pulse can be programmed for 1, 3 or 5 seconds, then off when activated. The constant mode will output 12V continuously when activated, and no 12V when deactivated.
- b) Output #2 can be programmed just like Output #1, but completely independent of output #1.
- c) Output #3 configured for constant output only when activated, but is also completely independent of outputs 1 and 2.

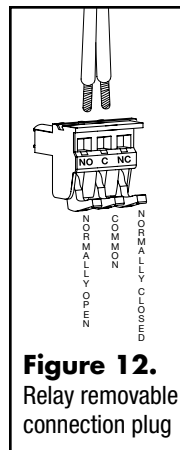
Please refer to the Niles QuickConfig Configuration manual for more information about the 12V output programmability.

## 7) CONNECT RELAYS

The “Dry Contact Closure” relays use 2-conductor wire to pair either the NO “Normally Open” or NC “Normally Closed” side of the removable connector plug with the “Common”. NO or NC is determined by which device you are triggering. Strip 1/4 inch of the insulation from the end of each wire, and tightly twist the end of each wire until no frayed ends remain. Use a small flathead screwdriver or



**Figure 11.**  
RCA Jack Status Connection

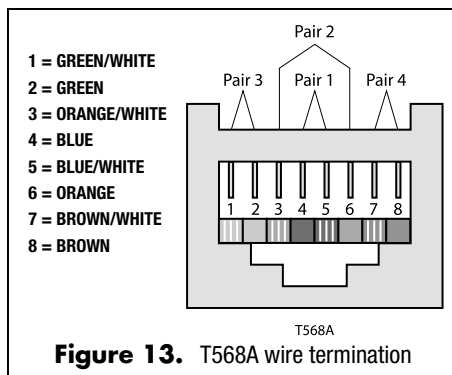


**Figure 12.**  
Relay removable connection plug

your fingernail to raise the locking tabs, exposing the holes on the removable connector. Insert each wire into the appropriate hole on the removable connector plug (**Figure 12**) and snap the locking tab down. To help you, the connector plug is keyed. Insert the smooth side of the connector plug into the smooth side of the socket.

## 8) CONNECT EXPANSION CAT-5 CABLE

If connecting the HT-MSU to a Niles network controllable multizone receiver and/or if using a Niles Radio Frequency Gateway instead of attaching the supplied antenna (SEE THE SYSTEM DESIGN CONSIDERATION SECTION, CONFIGURATION #3), use CAT-5 cable terminated with RJ45 connection plugs. The CAT-5 cable must be terminated using the T568A standard wiring (**Figure 13**).



## 9) RE-CONNECT POWER TO THE HT-MSU

## 10) PROGRAM A LEARNING REMOTE

Program a learning remote with Niles HT-MSU control commands available from the Niles Technical Support Website.

**YOU ARE NOW READY TO PROGRAM THE NILES HT-MSU HOME THEATER MAIN SYSTEM UNIT.**

## TROUBLESHOOTING

The HT-MSU Home Theater Main System Unit is a configurable system (i.e., the product arrives “empty” and must be programmed by the installer). Troubleshooting generally occurs after the HT-MSU is programmed; however, troubleshooting can be divided into two main areas, some of which can occur prior to programming:

- 1) *Hardware Issues*
- 2) *Programming (refer to the Niles QuickConfig Configuration Software Manual for more information on programming troubleshooting)*

## HARDWARE ISSUES

There are two basic issues that can prevent proper operation of the HT-MSU system. These issues are presented in the order of probability and are as follows:

### PROBLEM:

#### 1. Bad Connections or Wiring

*If the connections or wiring are wrong, loose, shorted or open, the system will not*

*operate properly. The symptoms could include: Power LED flickers or is off, IR/RF Test LED is continuously flickering or on without any Niles RF remote use, intermittent operation or no operation.*

**SOLUTIONS:**

- *Test your power supply connections*
- *Test your Flasher connections*
- *Test your Sensor connection*
- *Test your cable for shorts and opens*

**2. Source Powering On or Off Incorrectly**

*To automate sources correctly, the HT-MSU requires Status feedback from sources that have a single-toggle power command. The HT-MSU either “sees” or doesn’t “see” control signals at the Status ports. If the HT-MSU sees improper or intermittent status feedback (i.e., the HT-MSU may “think” that the source is off when it may really be powered on), the operation of the HT-MSU is compromised.*

*The symptoms could include: sources staying on when the System Off button is pressed; a source turns on for a Master Key and off when that Master Key is pressed again; and sources not turning on at all. The most important tool for troubleshooting this issue is knowledge. Knowing the functionality of the sources being used with the HT-MSU is paramount. For example, we know that most DVD players require choosing composite/component video output, even digital HDMI or DVI output. When set for component or digital video output, the composite video output is sometimes disabled. If a DVD player is set for digital video output and it disables the composite video output, you cannot use the composite video output for status connection to the HT-MSU. Because there will never be a signal at the composite output, the HT-MSU will think that the DVD is always off and issue the power command. This will cause the DVD player to be turned on the first time a Master Key is pressed and turned off the second time the same Master Key is pressed.*

*Status feedback is tested when configuring the HT-MSU using the Niles QuickConfig PC Configuration Software. After the transfer screen in the software, there is a Functionality Test Screen that allows the software to test the configuration stored in the HT-MSU while providing feedback on the screen of the programming laptop. The feedback provided is real-time status feedback for Status Ports SRC1 through SRC6 as well as the TV/7 and RCV/8 ports. The Functionality Test Screen also allows for feedback on the Assignable 12V Output and relay ports.*

# ACCESSORIES

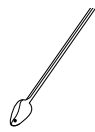
## FLASHERS

### MF1 IR MICROFLASHER®



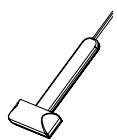
**FG01019**  
10 ft. cable with a 3.5mm plug.  
Includes elastomer-style blocking  
cover for curved surfaces

### MF1VF IR MICROFLASHER



**FG01020**  
10 ft. cable with a 3.5mm plug  
with visual feedback LED

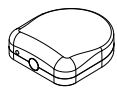
### IRB1 HIGH-OUTPUT IR FLASHER



**FG01023**  
IR Flasher can be mounted inside  
of cabinets or on top of equipment  
rack. Can control entire stack of  
A/V components

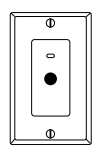
## SENSORS

### TS110 TABLE TOP IR SENSOR



**FG01413**  
Tabletop infrared sensor used for  
IR control and pass-through on  
HT-MSU

### WS110R WALL-MOUNT IR SENSOR



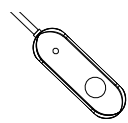
**FG01414 - White**  
**FG01415 - Bone**  
**FG01416 - Almond**  
**FG01417 - Black**  
Wall-Mount infrared sensor used  
for IR control and pass-through on  
HT-MSU

### MS110 FLUSH MOUNT IR SENSOR



**FG01409**  
Flush-mount infrared sensor used  
for IR control and pass-through on  
HT-MSU

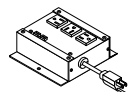
### MS210 MINIATURE SURFACE-MOUNT IR SENSOR



**FG01410- Silver**  
**FG01411- White**  
**FG01412- Black**  
Flush-mount infrared sensor used  
for IR control and pass-through  
on HT-MSU

## TRIGGERING ACCESSORIES

### AC-3 VOLTAGE-TRIGGERED AC POWER STRIP



**FG00242**  
AC power strip with two-voltage  
triggered AC outlets and one  
unswitched AC outlet

### 3.5 MM TO 3.5MM CABLE



**FG00933**  
Sends synch signal to the 12V  
synch inputs of the HT-MSU and  
to trigger auxiliary devices  
Connects with a 3.5 mm Mono  
Mini on each end

### 3.5MM TO FLYING LEADS



**FG00724**  
10 ft.. cable with 3.5mm mono mini-  
plug to 3.5mm mono mini-plug and  
two flying leads

## STATUS ACCESSORIES

### CS12V CURRENT SENSING 12 VOLT TRIGGER

#### FG01173



Activates voltage controlled devices by turning on another component. Current-sensing makes it compatible with any 110V electrical device

### LS-1 LIGHT SENSOR

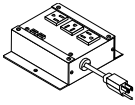
#### FG00728



Senses the brightness of a component's front-panel display and outputs a 12V DC sync signal when the display is brightest

### APC-2 CURRENT-SENSING OUTLET SWITCHER

#### FG00254



Accessory 12Volt DC power adaptor. Provides enough current to trigger up to six automated switchers; also used for status on receivers with switched outlets

### 1.25A 12VDC UNIVERSAL POWER SUPPLY



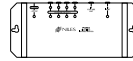
#### FG01035

Provides 12 V DC synch signal to HT-MSU via 3.5 mm jack

## EXPANSION ACCESSORIES

### PAR4 SIMPLIFIED INFRARED ROUTER

#### FG01172



Routes IR commands to four components. Used for IC2 TV Array feature

## REMOTE CONTROL

### R-8 HANDHELD IR REMOTE CONTROL

#### FG00939



Basic IR Remote Control for control over HT-MSU

## SPECIFICATIONS

### HT-MSU

**Power Requirements:** 12VDC 1.25A Regulated In-line Power Supply (Included)

**Unit Dimensions:** 10.52" x 5.85" x 1.01"  
(26.72 cm x 14.86 cm x 2.57 cm)

**Wiring Requirements:** RG59 CL Antenna Cable (included), CAT-5 cable, 3 conductor 22-gauge cable, and 2 conductor 22-gauge cable

**Trigger Output Voltage:** Three assignable outputs at 12VDC 150mA

**Contact Closures:** Three assignable Normally Open/Normally Closed contact closures rated to handle 12v @ 5 amps each

**IR Ports:** 8 Routed IR Flasher Ports and 1 Rutable Global IR Output Port

**RS232 Ports:** 8 Routed RS232 Output Ports

**IR & RS232 Code Memory:** 4000 commands depending on brand type and model of source

**Sequence capability:** 450 thirty-two step sequences

**Sequence Delays:** .1 to 20.0 seconds per step

**Component Synchs:** 8 Power Status Synch ports rated to sense 12V 150mA input signals or video voltage

**IR Bandwidth:** Compatible with virtually all brands of remotes using carrier frequencies between 26 and 105kHz

**RF Section:** 2.4-gigahertz frequency ZigBee® wireless mesh technology

**Signal Range:** 75 to 100 feet open air (22.86 to 30.48 meters)







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DETACH HERE AND RETURN TO: NILES AUDIO CORPORATION WARRANTY REGISTRATION DEPT. P.O. BOX 160818 MIAMI, FLORIDA 33116-0818

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Please take a moment to fill out our warranty registration card. The information helps us to get to know you better and develop the products you want

**Age:**

- Under 25
- 25-34
- 35-44
- 45-54
- 55 & over

**Income:**

- Under \$24,999
- \$25,000-\$34,999
- \$35,000-\$44,999
- \$45,000-\$59,999
- \$60,000-\$74,999
- \$75,000-\$99,999
- Over \$99,999

**Occupation:**

- Arts/Entertainment
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- Engineer
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- General Office
- Management
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- Sales/Marketing
- Student
- Tradesperson

**Musical tastes:**

*(Please check all that apply)*

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- Classical
- Country
- Jazz
- New Age
- Popular
- R&B
- Rock
- Other \_\_\_\_\_

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- Architect/Developer
- Custom Installer
- Direct Mail
- Friend/Family
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- Interior Designer
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- Product Brochure
- Product Review
- Retail Salesperson

**What magazines do you read?**

1. \_\_\_\_\_
2. \_\_\_\_\_
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**Which factor(s) influenced the purchase of your Niles product? (Please check all that apply)**

- Ease of Use
- Price/Value
- Product Features
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