LUTRON INTEGRATION
FOR MIRAGE AUDIO SYSTEM

COMPATIBLE WITH

MMS·5A & MMS·2A

M·800 & M·400

MIRAGE

THE SOURCE OF PURE SOUND

1.0 Overview

The Autonomic Mirage Audio System (MAS) is a robust, multi-room streaming music platform that is designed to work with automation and control systems. The MAS system consists of a Mirage Media Server (MMS-2A or MMS-5A) and one or more Mirage digital multi-room amplifiers (M-400 or M-800).

The implementation of the HomeWorks QS interface allows easy integration and playback of your customer's music libraries and streaming services such as **Pandora®**, **Spotify**, **Napster®**, **SiriusXM** and several others.

The completed integration will allow your customers to:

1. Set and recall presets in specific rooms or groups of rooms
2. Control Volume
3. Transport
4. Power of individual rooms or groups of rooms
5. Lighting scenes and audio commands can be combined on the same button or sequence

While it is possible to utilize either Mirage Media Servers or Mirage Digital Amplifiers as stand alone solutions, the most complete and satisfying customer experience will be achieved by using both Mirage components in concert. This document will cover the integration of MAS with HomeWorks QS, but can also serve to document the integration of the individual components for stand alone configurations.

This guide covers the setup and programming of the HomeWorks QS system to control MAS. For additional information on the setup and configuration of MAS and/or its individual components please refer to the documentation provided by Autonomic, available on their website at **www.autonomic-controls.com/support**.

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Table of Contents

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2.0 Introduction

Lutron and Autonomic have collaborated to offer a series of device interfaces designed to allow control of MAS for multi-room audio playback of streaming and local music content.

3.0 Mirage Audio System Integration with HomeWorks QS

Autonomic Mirage Media Servers and Digital Amplifiers allow for control from 3rd party and mobile applications. The interface connects directly to the LAN within the residence allowing for direct integration with the HomeWorks QS system over the IP network.

Virtually all features of Autonomic Mirage Media Servers and Mirage Digital Amplifiers (collectively the Mirage Audio System) are available for integration with Lutron HomeWorks QS. For convenience, Autonomic has provided exported Command Lists (Lutron Designer version 8.1 or later) for the most frequently utilized functions, however any command available in the Mirage Media Server or Mirage Amplifier control protocols may be leveraged by adding new commands in the command list for the device.
The command lists and more information about Autonomic device protocols are available at: **www.autonomic-controls.com/support**.

Commands that have been pre-programed into the supplied command lists are listed below.

DEVICE	COMMAND NICKNAME	DESCRIPTION
Mirage Media Server	Play Pause	Toggles between playback and pause
	Play	Discrete Play command
	Pause	Discrete Pause command
	Store Preset {1,2,3,4…16}	Stores the current radio station, streaming station, or music queue as a recallable preset numbered 1-5
	Recall Preset {1,2,3,4…16}	Recalls a previously stored preset.
Mirage Digital Amplifiers	Zone {1,2,3,4…16}, Source {1,2,3,4…16}	Sets specified audio zone to specified source input
	Zone {1,2,3,4…16}, Power Off	Powers off the specified zone
	Zone {1,2,3,4…16}, Power On	Powers on the specified zone
	Zone {1,2,3,4…16}, Volume Up	Increases the volume 4db in the specified zone
	Zone {1,2,3,4…16}, Volume Down	Decreases the volume 4db in the specified zone
	Zone {1,2,3,4…16}, Mute Toggle	Toggles between mute / un-mute in the specified zone
	All Off	Turns all zones in the system off
Mirage MRAD Mode	Party Mode {S1,S2,S3,S4,S5,S6}	Powers on all zones in the system and sets their input to the specified source

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3.1 Connecting Autonomic Devices to the HomeWorks QS System

Both Autonomic devices and HomeWorks QS Processors must be connected to the same local area network.

3.2 Implementing Mirage Audio System into a HomeWorks QS Database

In order to implement the MAS system, it is necessary to add three **Control 3rd Party** devices to the HomeWorks QS database. One device will represent the Mirage Media Server and another will represent the Mirage Digital Amplifiers.The third device is for party mode this device will contain the command set to allow the user to extend the currently playing source in all zones in the system commonly used in a party to listen to the same music everywhere. Note, it is only necessary to add one device for Mirage amplifiers even when utilizing multiple amps. The master amplifier will relay commands to the other amplifiers on the QS network, enabling HomeWorks to communicate with the entire stack as though it were a single device.

3.2.1 Adding the Mirage Media Server to the HomeWorks QS Database

To add the Mirage Media Server to the database, go to the **Design** tab of the software and use the dropdown menu to select **Equipment**. Next, find the **Control 3ʳᵈ Party** device in your toolbox and click on the plus sign to add the device.
(Note: the default toolbox may not contain this device so it maybe necessary to edit or create a toolbox to include the **Control 3ʳᵈ Party** device)
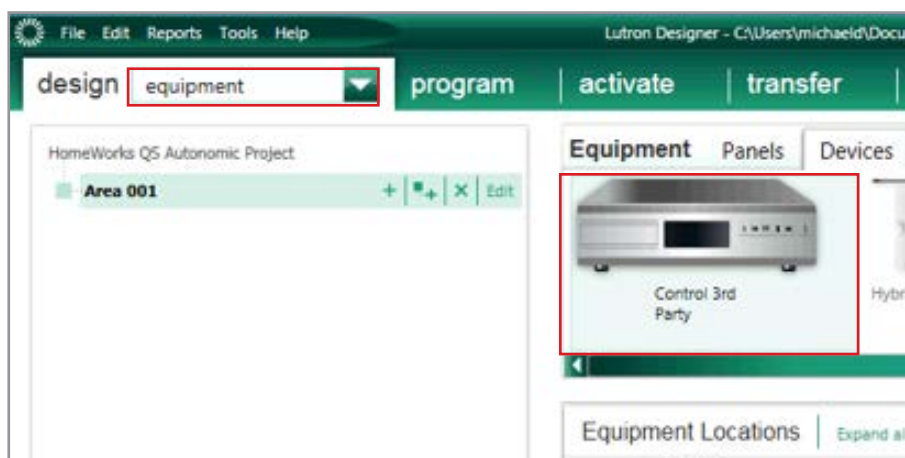

Once the **Control 3rd Party** device has been added to the **Equipment Locations** area, name the device **Mirage Media Server**, and set the **Port Number** to 5004, and the **Inter Message Delay** to 50 milliseconds.

The **Address** value should be set to the IP address of your Mirage Media Server. The Mirage Media Server has a built-in Ethernet port and connects directly to the network without the need for a converter. By default, Mirage Media Servers will automatically request an IP address from a DHCP server on the LAN. Alternatively, the IP address can be manually configured using the web configuration interface on the MMS. It is recommended to use a static IP address by setting a reservation on your DHCP server (typically the router). Type this IP address into the Controller Settings for the MMS. Again the port number will be 5004 and no username or password is required.

MirageAudioSystem.com
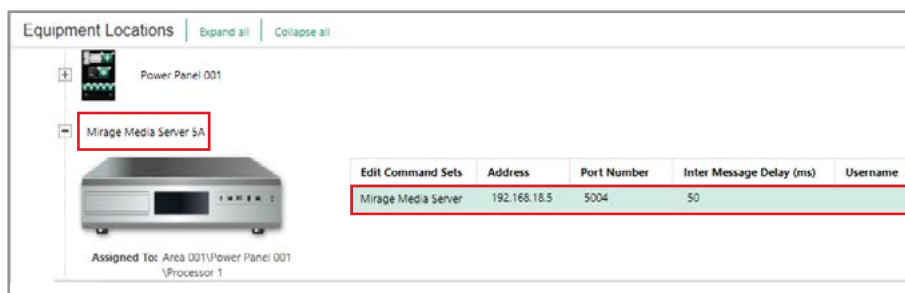
Next, select the **Edit Command Sets** function and import the supplied command set titled Mirage Audio System Command Sets. The command set can be downloaded from **http://www.autonomic-controls.com/support_downloads.php** and includes commands for both the Mirage Media Server and Mirage Digital Amplifiers and Party mode.
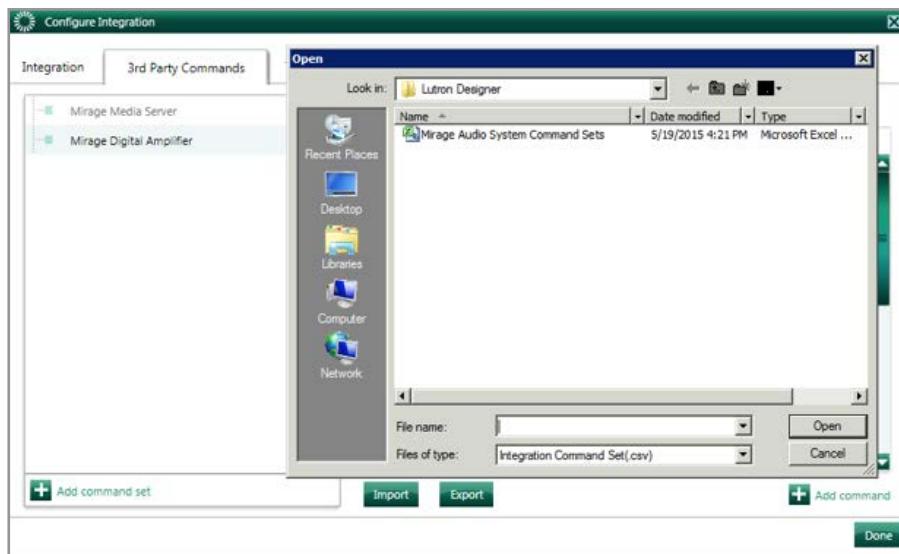
After the command sets have been imported, assign the Mirage Media Server command set to the device. Repeat the above steps to add the Party Mode command set using the Mirage Media Server's IP address and port number 5006. The Party Mode Command set will be added to this device.

Repeat the above steps to add the Party Mode command set using the Mirage Media Server's IP address and port number 5006. The Party Mode Command set will be added to this device. Note, the MMS will need to be On the latest firmware release 5.2.19572.46 or above to support the Party Mode command set.
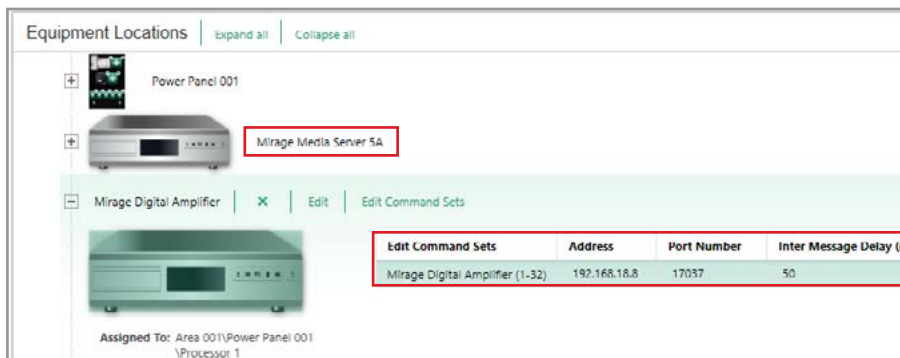
3.2.2 Adding the Mirage Digital Amplifiers to the HomeWorks QS Database

Follow the same procedure to add the Mirage Digital Amplifier to the HomeWorks QS Database. Go to the **Design** tab of the software and use the dropdown menu to select **Equipment**. Next, find the **Control 3rd Party** device in your toolbox and click on the plus sign to add the device. (**Note:** the default toolbox may not contain this device, so it maybe necessary to edit or create a toolbox to include the **Control 3rd Party** device)
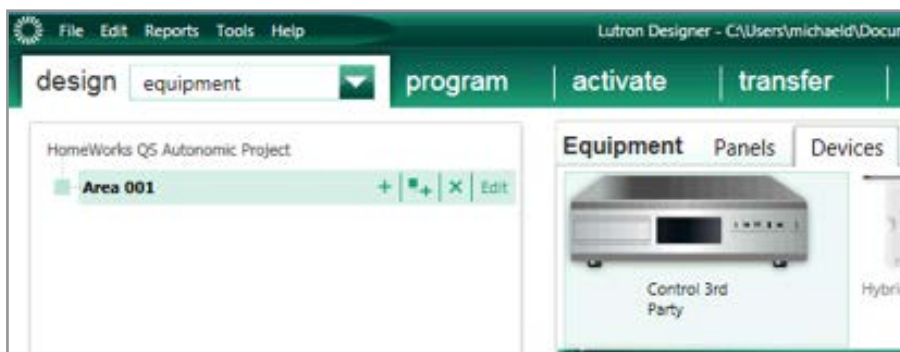
It is only necessary to add one device for Mirage amplifiers even when utilizing multiple amps. The master amplifier will relay commands to the other amplifiers on the network, enabling HomeWorks QS to communicate with the entire stack as though it were a single device.

Once the **Control 3rd Party** device has been added to the **Equipment Locations** area, name the device Mirage Digital Amplifier, and set the **Port Number** to 17037, and the **Inter Message Delay** to 50 milliseconds.

The **Address** value should be set to the IP address of the Mirage Digital Amplifier (or the master amplifier if using multiple Mirage amplifiers). The Mirage amplifier has a built-in Ethernet port and connects directly to the network without the need for a converter. Mirage amplifiers are set to DHCP by default and will automatically receive an IP address once it is connected to the DHCP server on the LAN. The IP address can be configured using the web configuration interface on the amplifier accessed through a browser on the same network. It is recommended to use a static IP address for the amplifier. To set the device to static, set a DHCP Reservation in the router. Type this IP address into the Controller Settings for the amplifier. Again, the port number will be 17037 and no username or password is required.

The last step is to assign the Mirage Digital Amplifier command set to the device. If you have not yet imported the Mirage Audio System Command Set file, you will have to complete that step before assigning the command set to the amplifier.
Refer to section 3.2.1.
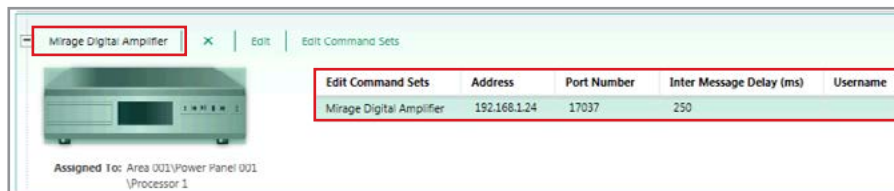
3.2.3 Link Assigning Autonomic devices to Processor Ethernet Connections

The Autonomic components can communicate to the HomeWorks QS processor by sending and receiving information via Ethernet directly. As a result, the interfaces must be assigned to an **Ethernet** connection on one of the 16 possible processors.

To assign the Autonomic devices to an ethernet connection, first select **Link Assignment** from the Design tab drop down menu. Click on **Ethernet** under the processor where the Autonomic devices are to be assigned.
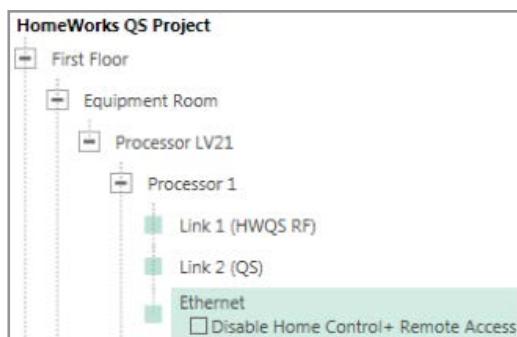
Select **Ethernet Devices** from the Show filter on the **Assignable Items** window on the right-hand side of the screen.
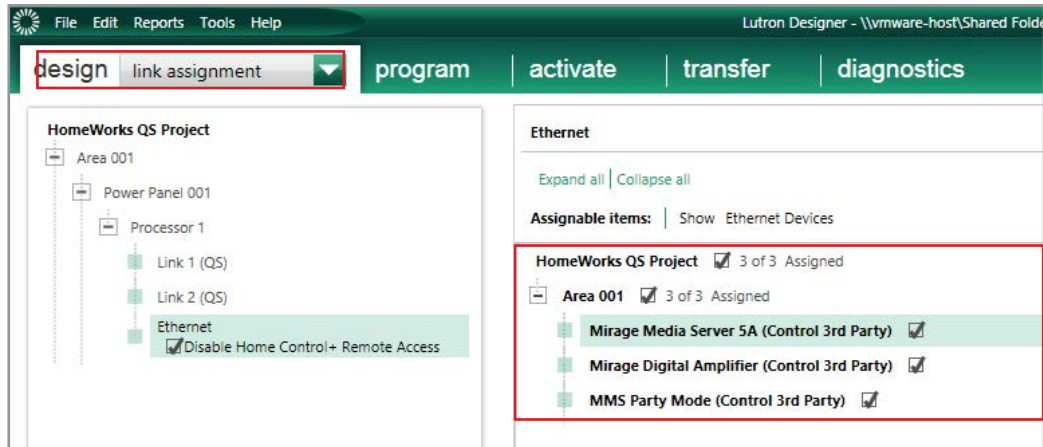

Check the boxes for the devices that you would like to Assign to an Ethernet Connection and they will appear in the list of assigned Ethernet Devices in the lower right-hand corner of the screen.

Each 3rd party device counts as 1 outbound connection in the HWQS system. In HWQS versions 7.0 and later, each processor is capable of communicating to a maximum of 5 Ethernet devices. For the first processor in the system, 2 of the 5 available Ethernet devices are reserved for remote access (without a VPN) for the Lutron Home Control+ app. If remote access (without a VPN) is not being used, you'll want to disable that option in order to free up the first two ethernet device slots on the first processor. To disable Home Control+ remote access, you'll need to check the box next to Disable Home Control+ Remote Access under the ethernet link for the first processor on the Design > Link Assignment screen:

Note: As of April 2015, Remote Access for the Lutron Home Control+ App is purchased from within the App and is only available in North America.
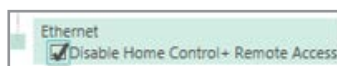
Or under the Home Control+ Remote Access field on the **Activate > Processors** screen:


In HWQS versions prior to 7.0, the first processor is capable of communicating to a maximum of 4 ethernet devices if remote access (without a VPN) for the Home Control+ app is not used. If remote access (without a VPN) is used, a maximum of 3 ethernet devices can communicate on the first processor. Each additional processor is capable of having a maximum of 5 ethernet devices. All ethernet devices are automatically load balanced in a round robin format, so the first 3rd party interface will be assigned to processor 1, the second 3rd party interface will be assigned to processor 2, etc. The same applies to any Control 3rd party devices in the project as well.

4.0 Programming the Mirage Audio System with HomeWorks QS

4.1 Controlling Music Playback with Keypad Buttons, Contact Closure Inputs, Sensors, or Timeclock Events

The first step, as with any keypad button or CCI, is to select the Program Type, Button Type, and LED Logic for the button.
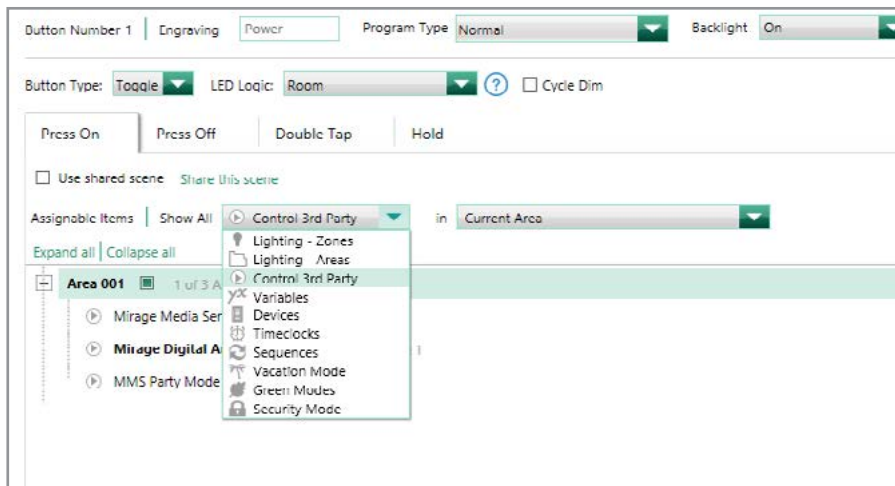
After the button has been configured, select Control 3rd Party from the Assignable Items drop down menu. Find the Autonomic device that you would like to add to the button and roll your cursor over the checkbox to the right of the device name. In the window that appears, select the command that you want to execute on the button press. You can turn a zone on or off, pause or play music, recall a preset, and any other command in the Autonomic control protocols with button presses and CCIs. MMS commands can be combined with Lutron lighting commands if desired on a button or sequence.
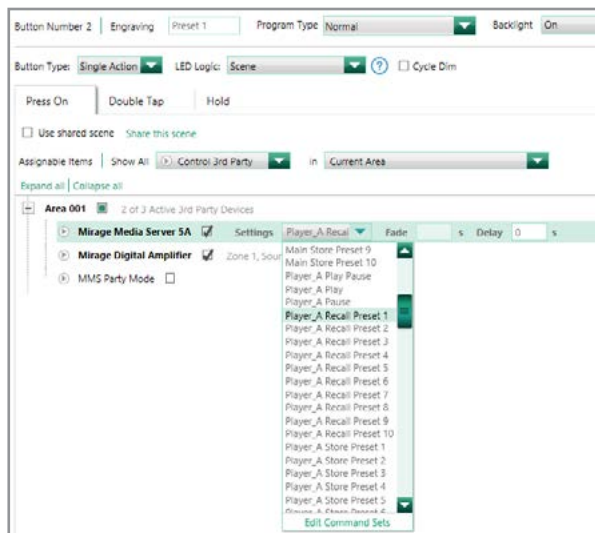

To program an Occupancy or Vacancy sensor to control a Mirage Audio System zone, first select **Occupancy** from the **Program** tab drop down menu and then select the sensor that is to be programmed.
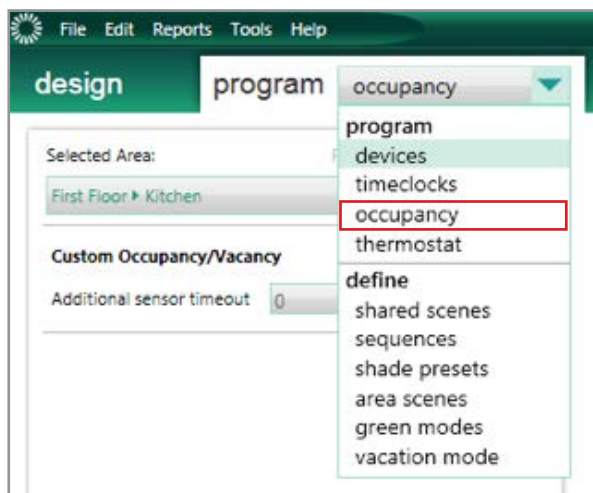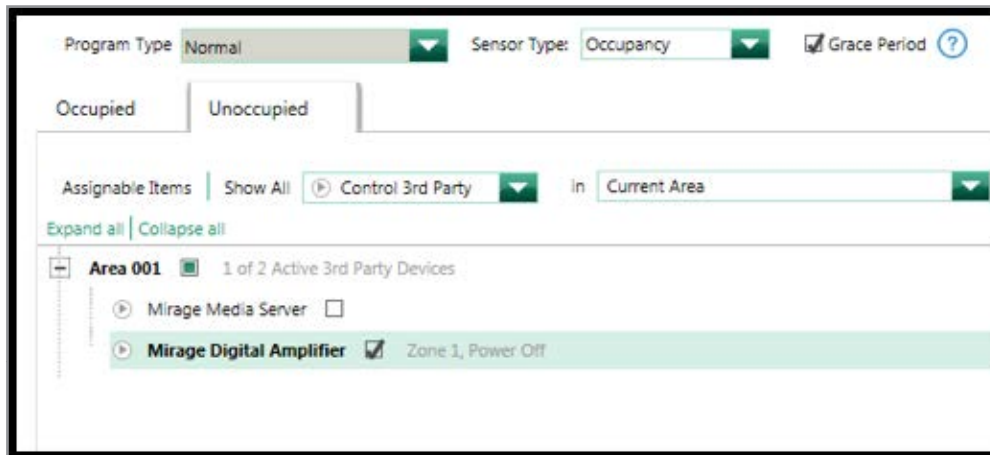
While music schedules can be created directly within the Mirage Audio System, there may be times when you want to incorporate music into a scheduled whole house scene. To program a Timeclock Event to control music, select **Timeclocks** from the **Program** tab drop down menu.
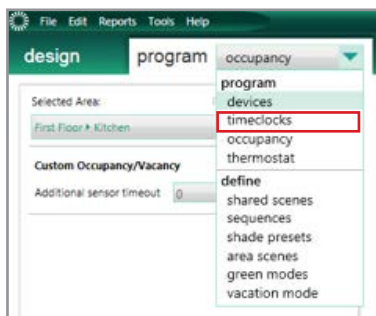

Create a new Timeclock event, setting the name, days of week, and time of the event. On the right hand side, select the **Program Type**. Select the audio zones to be affected by the event. Timeclock events can be used to adjust power status, transport controls, and recall presets.
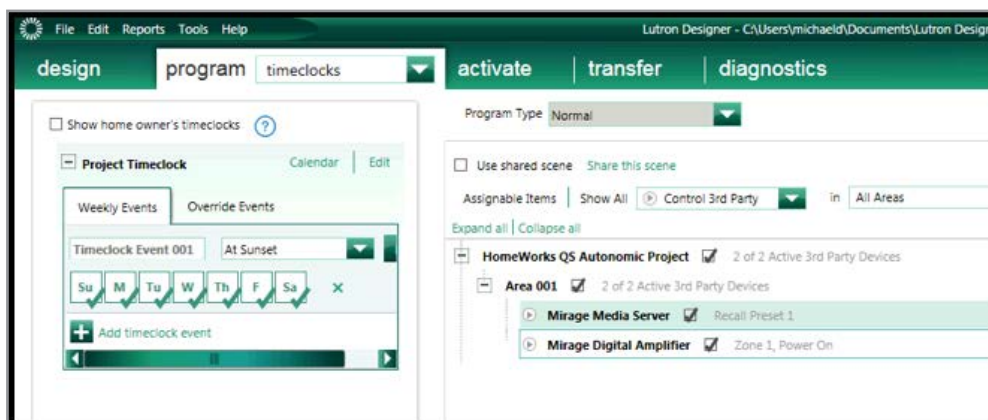
4.1 Adding Zone Volume Controls

To Program Volume Control you must first add the volume control commands as individual Automatic Sequences. This will enable the volume up or down commands to be repeated as the user holds the buttons down. Go to the **Program** tab of the software and use the dropdown menu to select **Sequences**. Select **Add Sequence** on the bottom left to add the first sequence for Zone 1 Volume up.
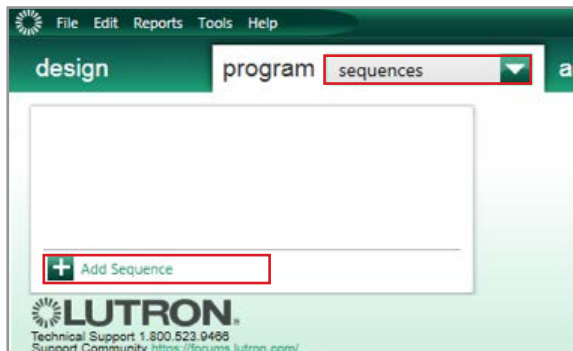
Next, the Zone 1 Volume UP command will need to be associated to Zone 1 Volume UP sequence that was just created.
Automatically go to the the next step after needs to be checked and set to **00:00:00:250**.
Select the **Zone 1 Volume Up** command in the settings box.
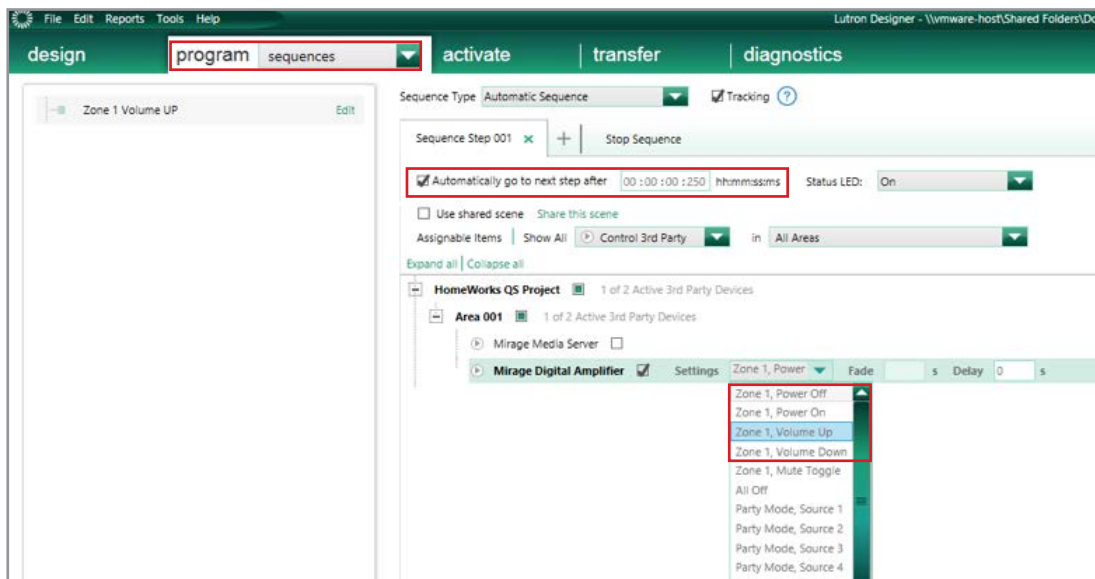
Repeat the steps in this section for Zone 1 Volume Down as well as for all the Zones you would like to have control of Volume Up and Down in your system.

The next steps will be to associate these sequences to the appropriate buttons on the keypads once the Volume Up and Down Sequences for all required zones are created.

In the **Program** tab of the software, use the dropdown menu to select **Devices**. Select the appropriate button on the keypad, in this case volume down. Set the button type to **Dual Action**, make sure you are within the **Press On** tab and set the **Show all** drop down list to **Sequences**. Check off the **Automatic Sequence** on the corresponding zone **Volume** sequence. Set the settings dropdown menu to **Sequence Start/Next.**
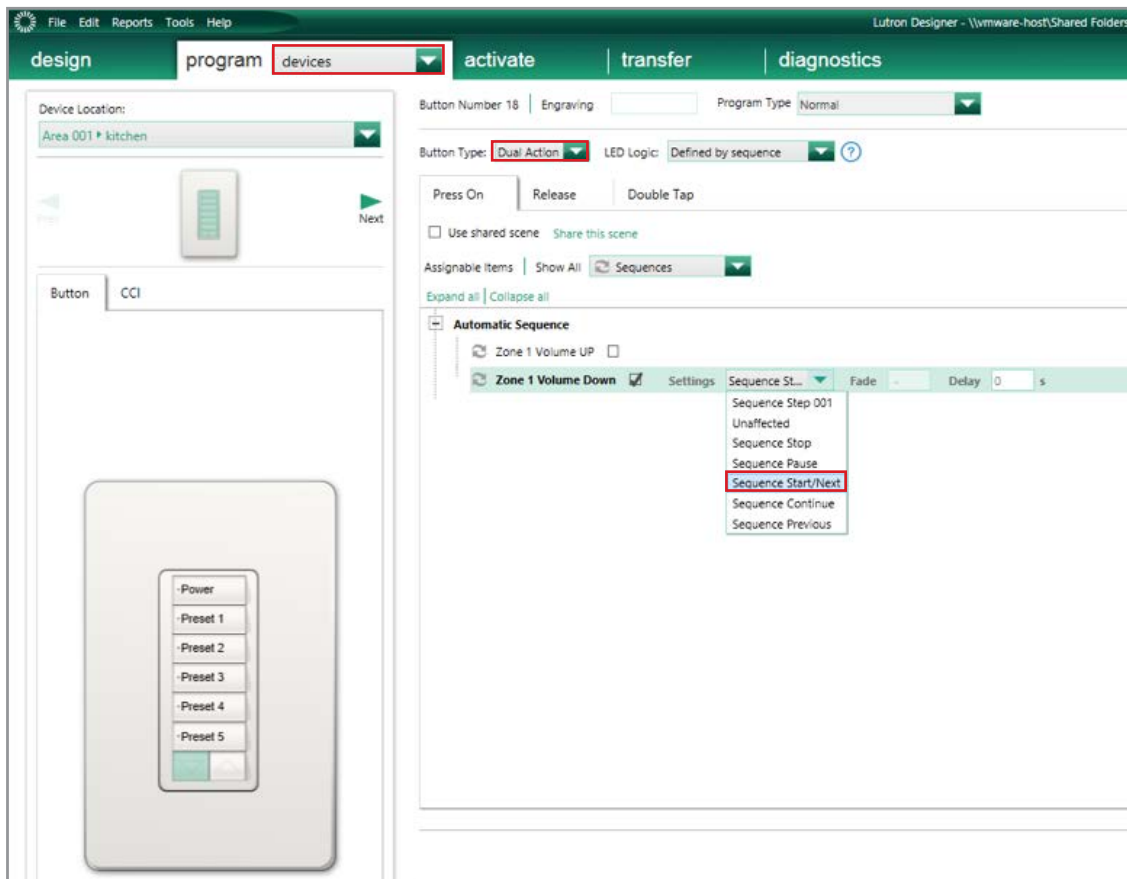
Next, select the Release tab, and ensure that the **Show all** drop down list is set to **Sequences**. Check off the **Automatic Sequence** on the corresponding zone Volume sequence. Set the settings dropdown menu to **Sequence Stop**.
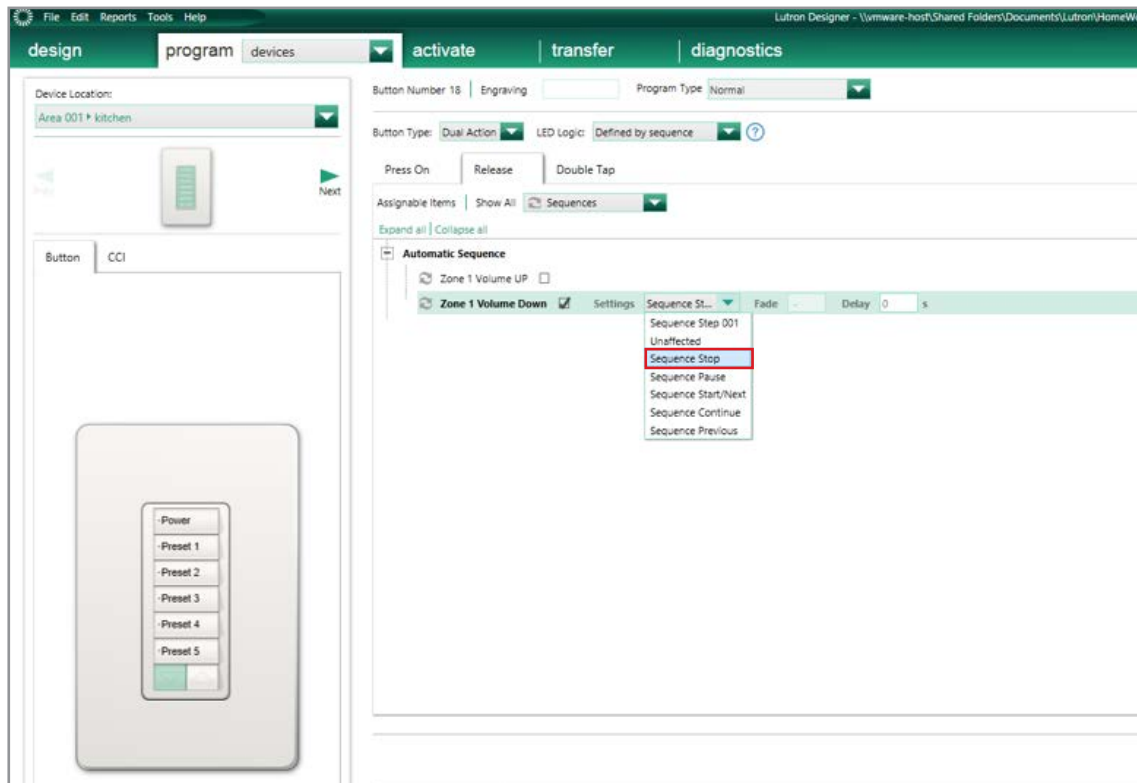
Repeat the previous steps for the volume Up button.

4.2 Implementing real-time feedback

Mirage Audio System components provide two way communications with HomeWorks QS. In addition to receiving commands from the HW QS system, it can send feedback to the system to indicate the status of various conditions in the system.

There are times when it is useful for the system to know the status of the MAS system and change its behavior accordingly. For example, when programming a power toggle button, and providing LED feedback that reflects the power state of a room.
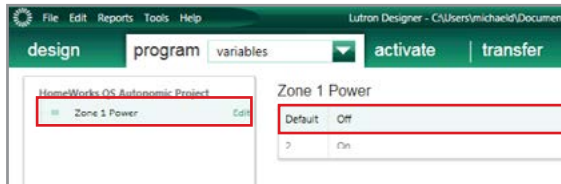
For this, we will utilize Variables and set the state of those variables based on feedback received from the Autonomic digital amplifier.

The first step is to create a variable. Using the program drop down menu, select **Variables**.
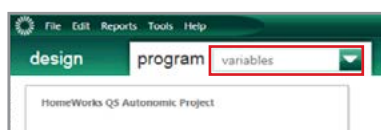
Create a new variable called Zone 1 Power with two states, Off and On.

The next step is to change the state of the variable when power feedback is received from the amplifier. Select devices in the program drop down, select the Mirage Digital Amplifier in the device section on the left side of the screen.

Now select the **Zone 1 Power Off** under Inbound Commands, and in the program area on the right, select the variable we created. Since we're programing for power off feedback from the amplifier, this action should set the variable state to **Off** as illustrated below.
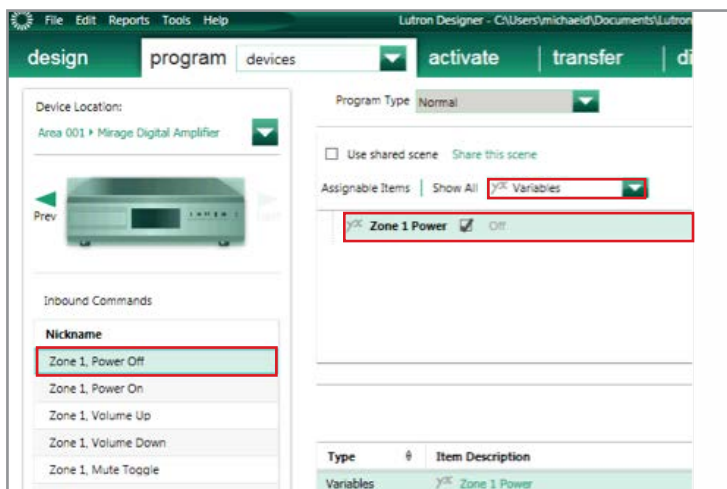
Once this is complete, you can perform the same steps to program the variable to be set on when Power On feedback is received from the amplifier.

4.3 Sample Home Scenario

This section assumes that you are familiar with basic programming practices in HomeWorks QS Programming Software such as Sequences, Variables, and LED Logic.

For the purposes of illustrating how the Mirage Audio System can be successfully integrated into a HomeWorks QS residence, consider a project with the following rooms, all with integrated lighting and music installed:

1. Kitchen
2. Living Room
3. Dining Room
4. Office
5. Patio
6. Master Bedroom
7. Kid's Playroom
8. Kid's Bedroom
9. Billiards Room
10. Gym

4.3.1 Establishing Room Groups for Coordinating Music Playback

Given the simple interface we're implementing using just a few keypad buttons, the goal is to create simple rules that intuitively operate the system the way the customer expects for most occasions. The Mirage mobile applications or other interfaces can be utilized when the customer wants to orchestrate a more complex scenario.

While the Mirage Audio System is capable of playing entirely different music sources and programs in every zone, in practice, customers often utilize common areas of the home to listen to the same content in groups of rooms. If the homeowner turned on the system and selected a music program in the kitchen, for example, then moved to the living room and turned on the music system in that room, in most cases they will want to listen to the same content playing in the kitchen.

We can accomplish this default behavior by automatically selecting the same source input on the amplifier within certain groups of rooms that tend to be used together by using sequences.

Our first step is to identify our room groups. For example, after interviewing our customer, we may determine that there should be three groups of rooms that generally operate together.

Group 1	Group 2	Group 3
Kitchen	Gym	Kid's Playroom
Living Room	Billiards Room	Kid's Bedroom
Dining Room	Office	
Patio		
Master Bedroom		

Note that the customer can still operate the rooms individually using the Mirage mobile applications and other interfaces, but programming the rooms to act in unison when controlled from HomeWorks QS keypads will provide a simple and readily accessible solution which most customers would expect and understand.

4.3.2 A Simple but Powerful Interface Design for 6-Button Keypads

For the sake of simplicity and consistency, we will design the interface using seeTouch 6-button keypads dedicated to the Mirage Audio System.

The buttons on the keypad will function as follows:

Power: Will toggle the power state with the LED lit when the zone is on (press) and will power off all zones in the house when held

Preset 1-4: Will recall (press) or store (press and hold) music presets

Party: Will cause all rooms in the group to power on and play the same music

4.3.3 Controlling Zone Power with Feedback

We will start by programming the power button on the Kitchen keypad, which is Zone 1 in the Mirage Audio System.

- Set the button type to Toggle and the LED logic to Scene

- Create a variable action to set the Zone 1, Power variable created earlier to On

- Create a 3rd Party Control action and select the Zone 1 Source 1 command

Note that instead of selecting the **Zone 1 Power On** command, selecting **Zone 1 Source 1** is a better choice because it will insure that Zone 1 is always set to Source 1 on initial power up in this room group. When we program rooms in Group 2 (above), we would use **Zone 1 Source 2** to isolate this room group from Group 1 and play different content by default.

Now you can perform the same steps to program the **Press Off** tab to turn off the variable state and send the power off command to the Mirage Digital Amplifier. Programming the button in this manner will cause the LED to light and extinguish according the power feedback from the amplifier.
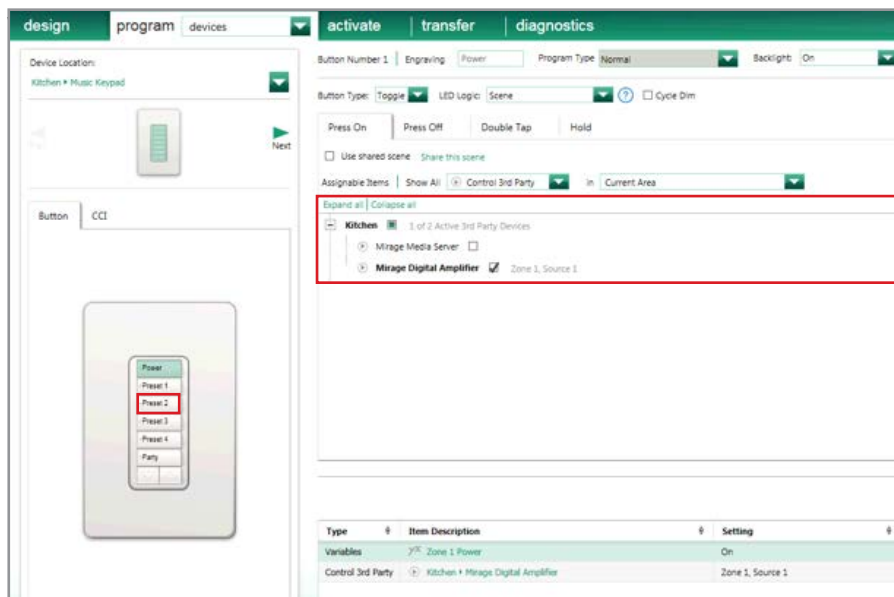
4.3.4 Creating User Programmable Music Presets

A powerful feature of the Mirage Audio System is its ability to take a **Snapshot** of any music playing and create a recallable preset. These presets can be recorded from any content that you can play on the Mirage Audio System, such as playlists, music queues, streaming music stations, or satellite radio programs.

We will create preset buttons on the seeTouch keypad that will allow your customer to turn on the amplifier and recall on of four presets with a single touch. Further, your customers will be able to reprogram these presets themselves as their tastes change.

Start by selecting the first preset button on your keypad in the Program view.

- Set the button type to Single Action, LED logic to Scene

- Select **Control 3rd Party** in the Show All drop down list

- Check the Mirage Media Server, and select the command **Recall Preset 1**

- Check the Mirage Digital Amplifier, and select the command **Zone 1, Source 1**

Again, note that we're forcing this zone to Source 1 in all cases to avoid user confusion if the amplifier happens to be set to a different source in other rooms in the group. Doing this for all rooms in Group 1 ensures that if any other rooms in the group are turned on the same music will be playing. If a different preset is selected in any of these grouped rooms, all the other rooms in the group will follow, as the user expects.

Once you've completed these steps, your screen will look similar to the illustration below.
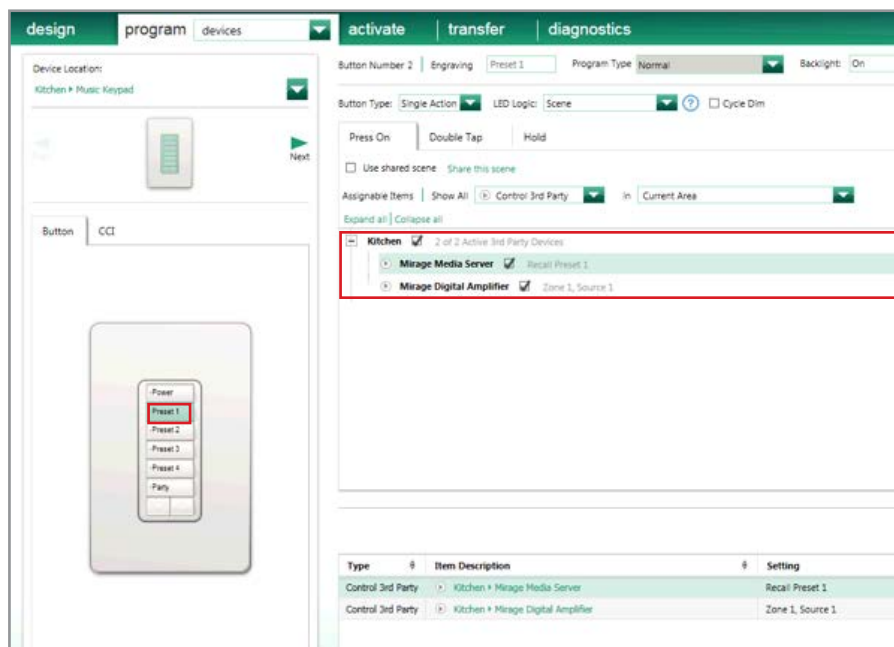
The last step is to allow the customer to change the music associated with these presets by pressing and holding the keypad button. To do this, select the **Hold** tab on programming pane and set the button action to **Recall Preset 1** on the Mirage Media Server device. There is no action necessary on the amplifier for this behavior. It is recommended to set a **Hold** time to 3 seconds or longer to avoid unintended alterations to **Presets**.
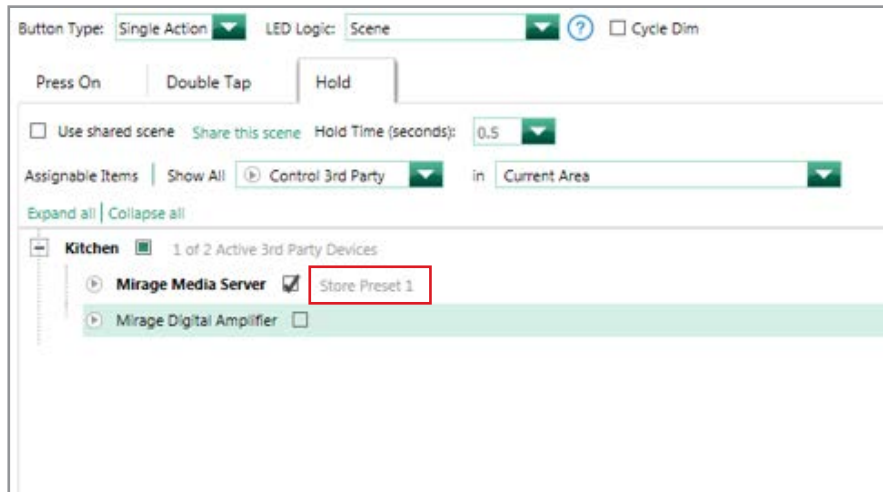
Now you can continue to program this keypad by programming the remaining three keypad buttons the same way, except that you will choose **Recall Preset 2** for the next button, and so on.

Programming the Remaining Rooms

Continue programming all the remaining rooms in the group in the same way, changing only the Zone number associated with each keypad to reflect the room it is in.

Once you're ready to program group two, you'll begin to use **Source 2** for each command to ensure these rooms always operate in unison when controlled with the Lutron system. Room Group 3 would used Source 3, and so on.

A system utilizing an MMS-5A digital media server can support up to five room groups, and an MMS-2A will support two independent zone groups. Both servers can operate in up to 96 zones simultaneously when using multiple MAS amplifiers in your system.

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