

# Retail Store – Using the SC Media Engine

SC 32 / SC 64

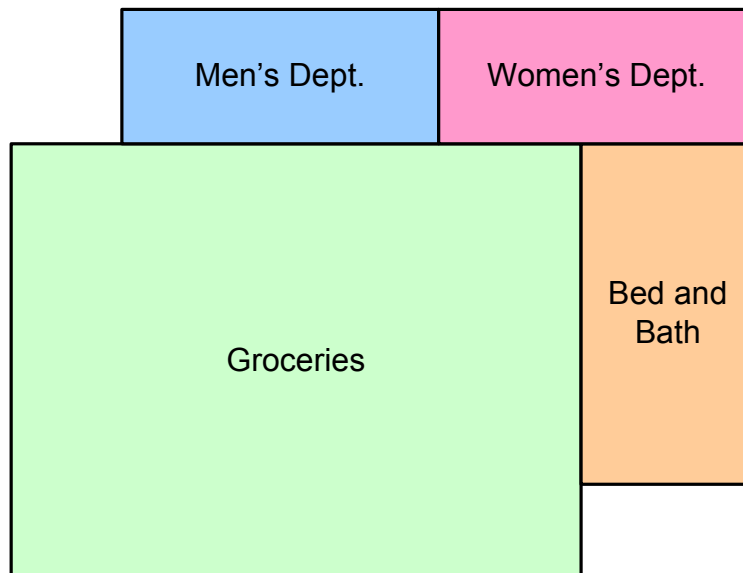
Routing audible advertisements to their appropriate departments is a commonly-used, powerful technique for driving business within a retail store. Also, using audio equipment to automatically play functional “store-opening” and “store-closing” announcements eliminates the need for employees to manually perform these duties. This ultimately saves precious labor-hours; a benefit particularly appealing to the store’s management. Finally, during times of emergency, it is often desirable to play pre-recorded, spoken instructions throughout the store to provide guidance to employees and customers. And by utilizing the main audio system’s infrastructure to deliver alarm tones, the cost and complexity of installing a parallel alarm system with its own speakers can be avoided.

In the other Retail Store application guide, these ads and announcements were stored as audio files on the control PC’s hard drive, and they were sent through its audio card over a stereo analog cable to the SC when requested. While this configuration is sufficient, it relies on the control PC’s operating system and hardware for ads and announcements to reach zones. For “mission critical” messages, this level of complexity can be undesirable and even unacceptable. However, adding the Media Engine option to the SC allows ads and announcements to be stored locally on the SC, thereby simplifying the system, increasing reliability, allowing direct control of media from within the HiQnet control network, and freeing up the inputs previously allocated to the external media-streaming devices.

In this guide, an SC 32 will make use of the Media Engine to fulfill the following requirements:

- Automatically delivering tailored, audible ads to each zone throughout the day
- Automatically playing functional “store hours” messages in the morning and evening
- Automatically or manually playing emergency announcements

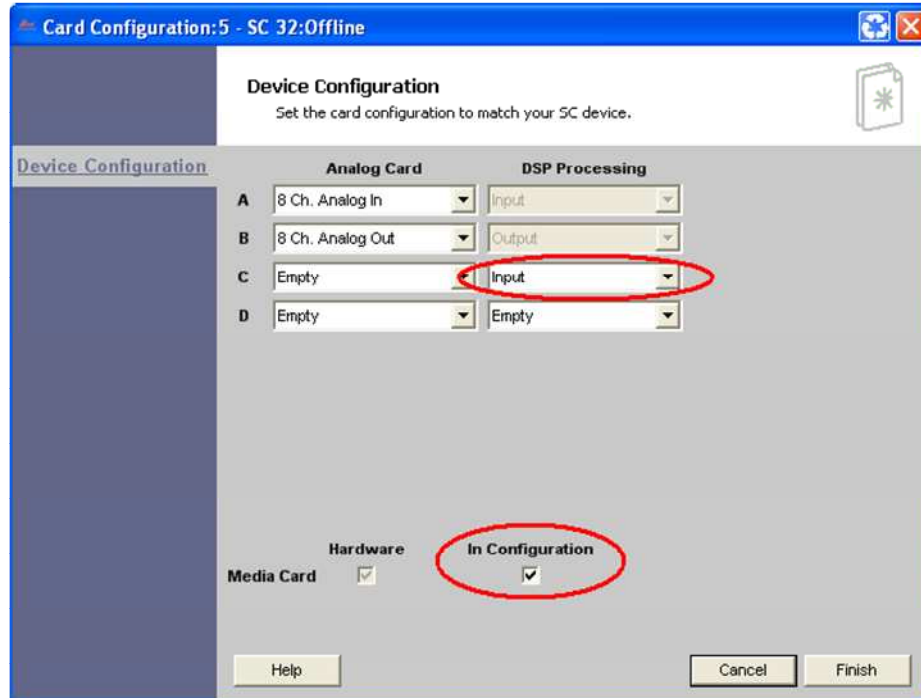
The objective of this guide is to discuss the Media Engine. Therefore we will keep the I/O to a minimum for the sake of simplicity. We will use an SC 32 with an 8 x 8 input/output configuration and the Media Engine option installed. There are two analog inputs being used: the left and right channel from a satellite music receiver (for BGM). There are four outputs being used: a single channel feeding each of the four zones. A contact closure on the alarm system is connected between Control Input 1 and Common. A single ZC-7 is connected to the “ZC Inputs 1-6” port.



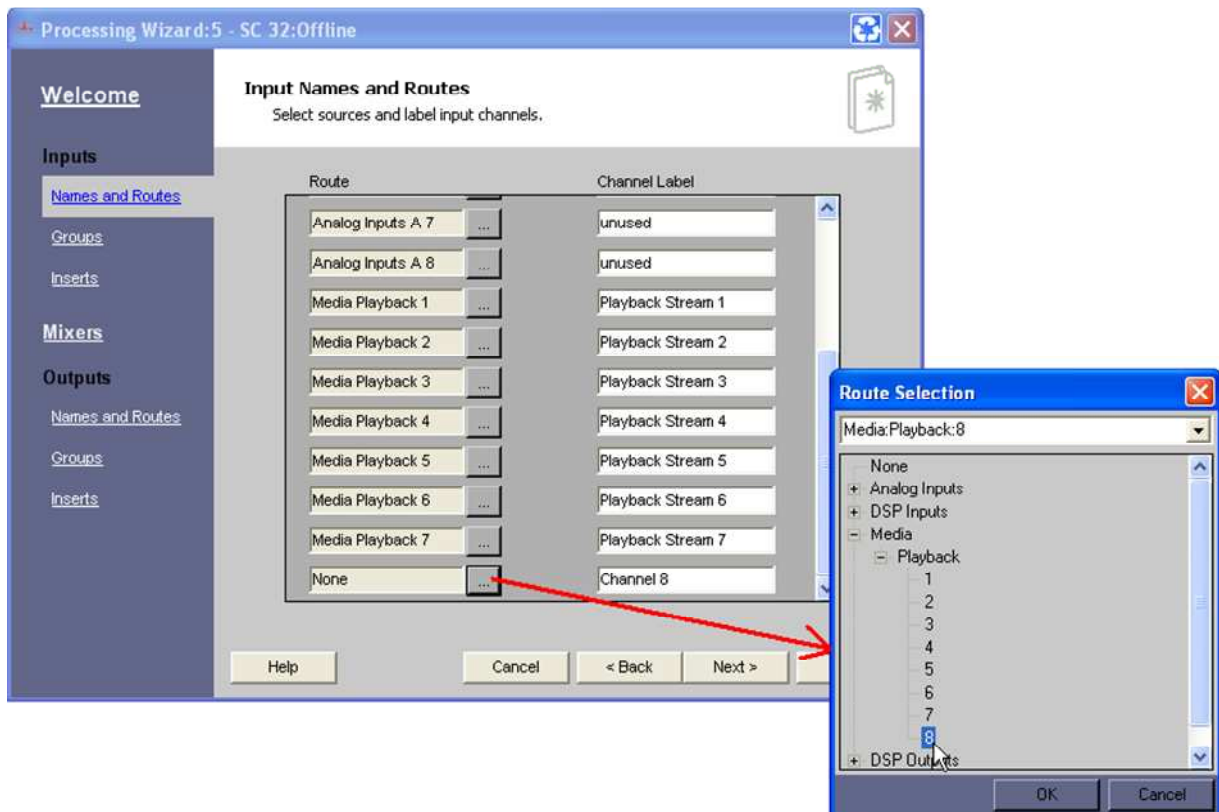
Media Engine Playback can be triggered from five separate mechanisms: the System Architect “Scheduler” (for automated playback), the dbx ZC controllers, any of the eight Control Inputs, custom control panels, and third-party control systems. In this guide, we will configure the SC 32 for media playback using all mechanisms except for third-party control.

## Setup

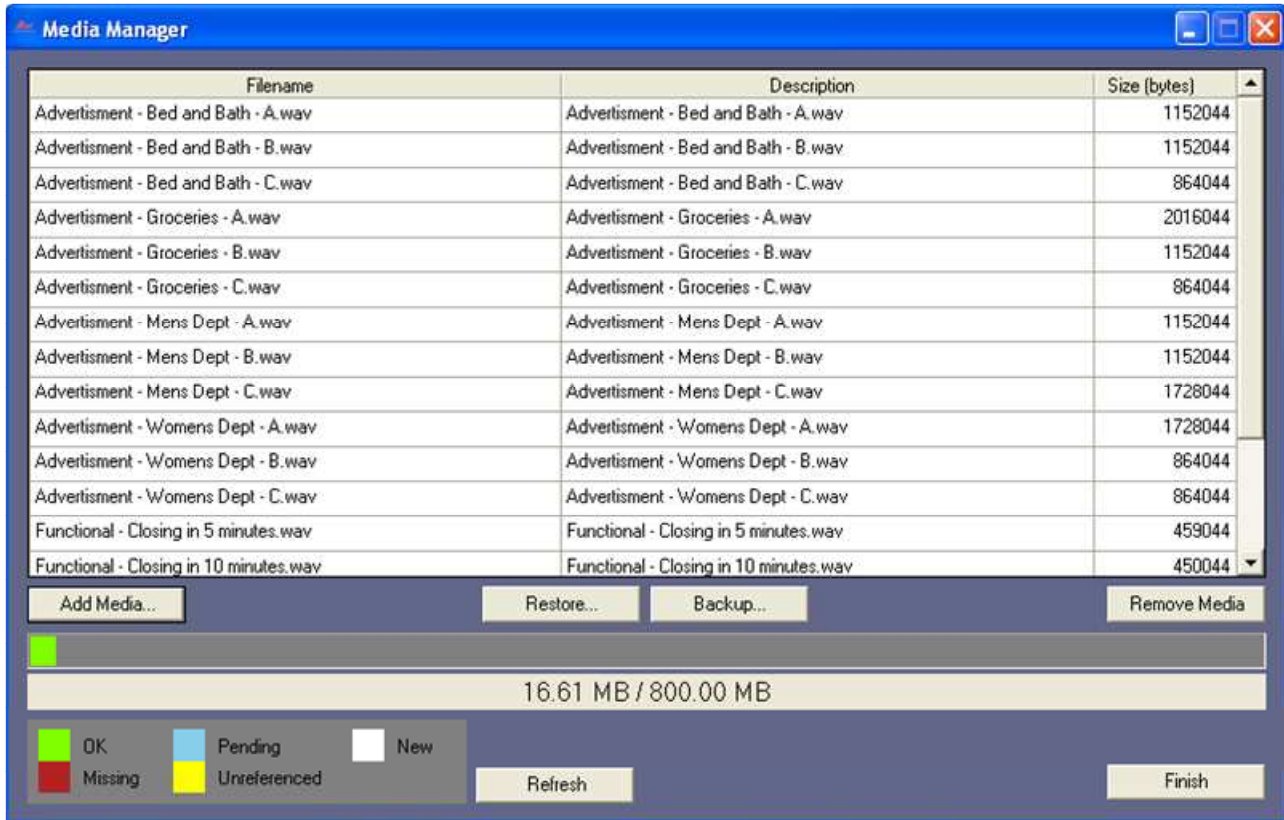
The first step is enabling the Media Engine option within the software. This is done by checking the "In Configuration" box within the Device Configuration window (Tools / Hardware Configuration / Device Configuration). In this same window we will also take advantage of one of the empty I/O slots ("C") by adding an extra eight channels of input DSP, which we will apply to the Media Engine audio.



Next, we open the Processing Wizard (Tools / Processing Wizard) to permanently route each of the eight "Playback Streams" to the eight newly added input DSP channels. The eight Playback Streams represent the eight discrete channels of audio that the Media Engine is capable of outputting simultaneously. The Processing Wizard is also used to append descriptive labels to inputs and outputs, group similar channels, add mixers to the design, and route those mixers to their dedicated zone.



Next, the audio files must be transferred from the control PC to the Media Engine. To do this, open the Media Manager window (Tools / Media Manager). To be added to the Media Engine, audio files must be formatted as follows: 24-bit, 48kHz, Mono, PCM, WAV. In this case, there are 12 audible ads, 6 functional opening/closing announcements, and 2 emergency tones.



(NOTE: all audio files referenced here are included in the download bundle for this guide)

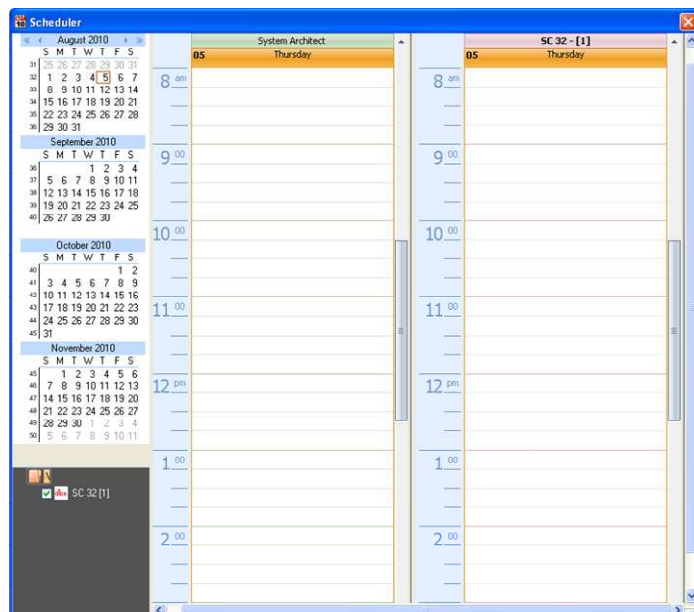
## Audible Ads

Routing audible ads to their appropriate departments is a powerful tool for driving business within a retail store and generating additional revenue from advertising.

Since audible ads are ideally delivered on an automatic basis, the Scheduler will be used to trigger their playback. Opening the Scheduler tool within HiQnet™ System Architect reveals a calendar in which actions are scheduled to occur within System Architect (which is running on a control PC, of course).

Since the SC devices contain internal calendars of their own, there is also a window representing the SC calendar. Actions scheduled on an SC calendar will occur with or without a control PC being present on the network.

(NOTE: For the SC calendar to appear, the box on the lower-left portion of the window must be checked)



In this application the four zones will receive audible ads at the top of every hour throughout the workday. Each zone has three different versions of ads for different products. The following schedule shows which ads will broadcast, when they'll broadcast, and the Playback Stream through which they'll broadcast:

| Time     | Playback Streams   |                      |                   |                       |          |          |          |          |
|----------|--------------------|----------------------|-------------------|-----------------------|----------|----------|----------|----------|
|          | 1                  | 2                    | 3                 | 4                     | 5        | 6        | 7        | 8        |
| 9:00 AM  | Men's Dept; ad "A" | Women's Dept; ad "A" | Groceries; ad "A" | Bed and Bath - ad "A" | (unused) | (unused) | (unused) | (unused) |
| 10:00 AM | Men's Dept; ad "B" | Women's Dept; ad "B" | Groceries; ad "B" | Bed and Bath - ad "B" | (unused) | (unused) | (unused) | (unused) |
| 11:00 AM | Men's Dept; ad "C" | Women's Dept; ad "C" | Groceries; ad "C" | Bed and Bath - ad "C" | (unused) | (unused) | (unused) | (unused) |
| 12:00 PM | Men's Dept; ad "A" | Women's Dept; ad "A" | Groceries; ad "A" | Bed and Bath - ad "A" | (unused) | (unused) | (unused) | (unused) |
| 1:00 PM  | Men's Dept; ad "B" | Women's Dept; ad "B" | Groceries; ad "B" | Bed and Bath - ad "B" | (unused) | (unused) | (unused) | (unused) |
| 2:00 PM  | Men's Dept; ad "C" | Women's Dept; ad "C" | Groceries; ad "C" | Bed and Bath - ad "C" | (unused) | (unused) | (unused) | (unused) |
| 3:00 PM  | Men's Dept; ad "A" | Women's Dept; ad "A" | Groceries; ad "A" | Bed and Bath - ad "A" | (unused) | (unused) | (unused) | (unused) |
| 4:00 PM  | Men's Dept; ad "B" | Women's Dept; ad "B" | Groceries; ad "B" | Bed and Bath - ad "B" | (unused) | (unused) | (unused) | (unused) |
| 5:00 PM  | Men's Dept; ad "C" | Women's Dept; ad "C" | Groceries; ad "C" | Bed and Bath - ad "C" | (unused) | (unused) | (unused) | (unused) |

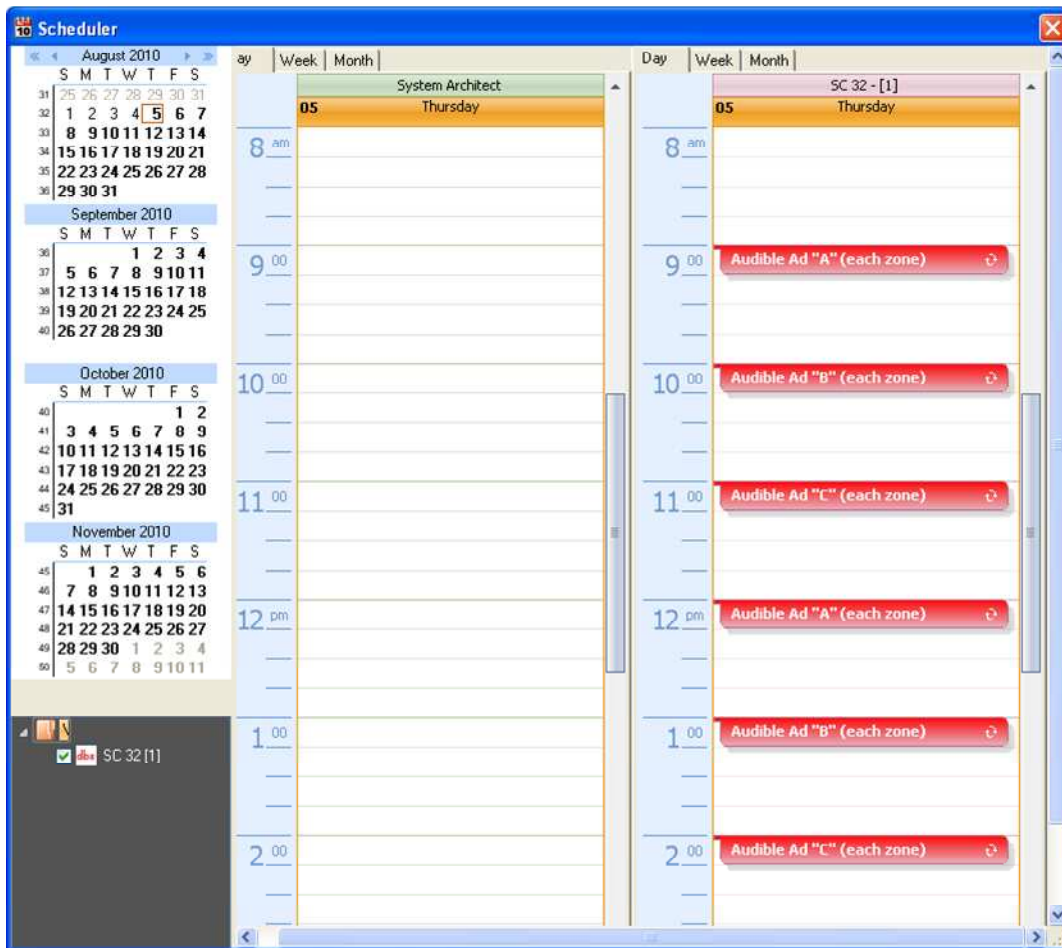
There is virtually no limit to the number of events one can schedule within a calendar. If desired, 8 simultaneous playback events could occur every minute! But, for the sake of clarity in this guide, the total number of playback events is kept relatively low.

Double-clicking on a blank slot within the SC calendar opens the event-scheduler window:

In this window, one of four types of actions (Device Presets, Panel Presets, Venue Recalls, Panel Presets, and Media Engine Audio Playback) can be triggered. The start time and recurrence pattern are also specified in this window. In this case, we work within the "Play Audio" tab to schedule media playback. Clicking "Add" under the "Play Audio" tab opens the Playback Audio window:

In this window, we select the Media Engine audio file, the Playback Stream, and the number of times the file will loop.

Once configured, scheduled events are represented graphically in the main Scheduler window:



## Functional Announcements

Using audio equipment to automatically play “store-opening” and “store-closing” announcements eliminates the need for employees to manually perform these duties. This ultimately saves precious labor-hours; a benefit which can be particularly appealing to the store’s management.

In this case, the store requires the following announcements to play daily in all zones:

| Time    | Message                                         | Playback Stream |
|---------|-------------------------------------------------|-----------------|
| 7:50 AM | "Attention: the store is opening in 10 minutes" | Stream 5        |
| 8:00 AM | "Attention: the store is now open"              | Stream 5        |
| 5:45 PM | "Attention: the store is closing in 15 minutes" | Stream 5        |
| 5:50 PM | "Attention: the store is closing in 10 minutes" | Stream 5        |
| 5:55 PM | "Attention: the store is closing in 5 minutes"  | Stream 5        |
| 6:00 PM | "Attention: the store is now closed"            | Stream 5        |

Since these announcements must occur automatically, the Scheduler tool is used once again. Since none of these announcements overlap each other, they can all be assigned to the same Playback Stream. Playback Stream 5 is arbitrarily chosen.

## Emergency Announcements – Automatic Playback

During emergencies, it is often desirable to play pre-recorded, spoken instructions throughout the store to provide guidance to employees and customers. Also, by leveraging the main audio system's infrastructure to deliver alarm tones, the cost of installing a parallel alarm system with its own speakers can be avoided.

In the other Retail Store application guide, an SC 64 was configured to mute all outputs whenever the fire alarm opened its contact closure. But with the Media Engine, the SC can now deliver pre-recorded, spoken instructions and alarm tones across the store. To accomplish this, the GPIO Wizard (Tools / Wizards / GPIO Wizard) must be configured in a slightly different way.

First, we change the name of Control Input 1 to the more meaningful "Alarm System". Checking boxes in the "Subscriptions" section would mute the corresponding gain point when the contact opens. However, since simple muting during emergencies is not the objective in this instance, we can ignore the Subscriptions (leaving them all unchecked).

Each of the eight Control Inputs have two States: "open" and "closed". For the open State, we select the audio file "Emergency - Horn" to loop infinitely on Playback Stream 6, which is arbitrarily chosen as the "emergency" Playback Stream.

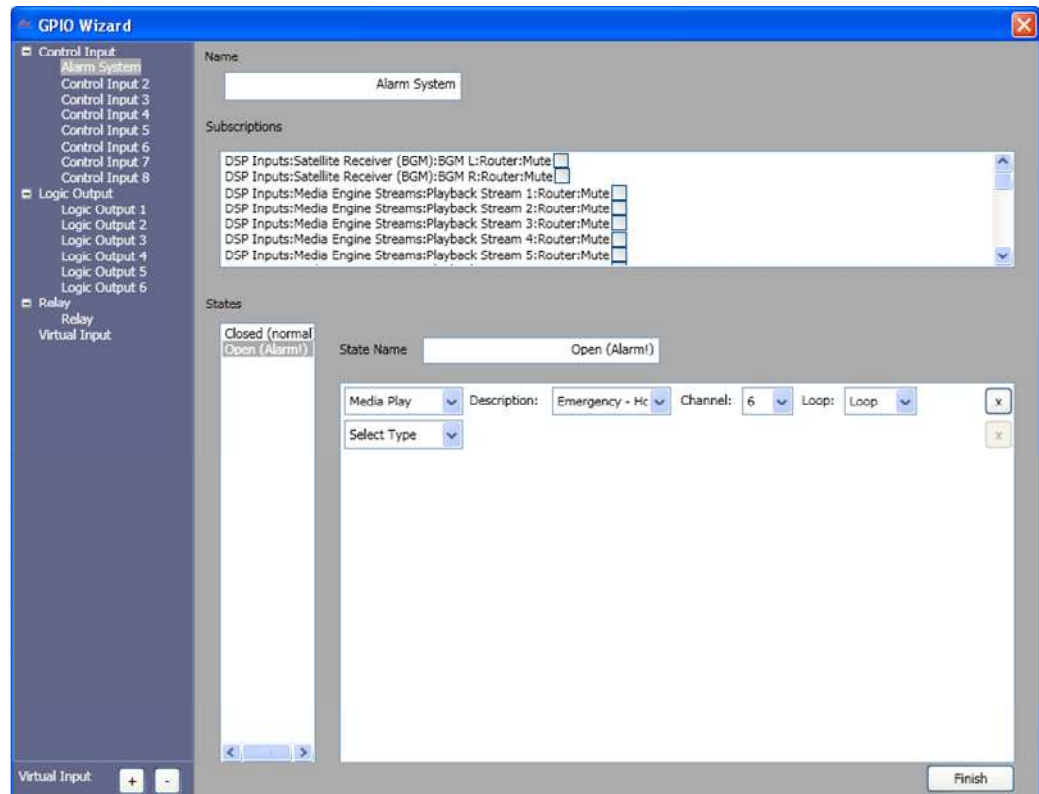
(NOTE: for infinite loops, select "loop" at the very top of the "loop" dropdown box)

For the closed State, we choose a Media Stop action to occur on Playback Stream 6.

This way, when the alarm system detects an emergency and opens its contact, the SC 32 will trigger playback of the "Emergency - Horn" file. And when somebody manually resets the alarm (closes the contact), the file will stop playing.

Although, in this case, only one action is selected to occur per State, there is still an important concept to

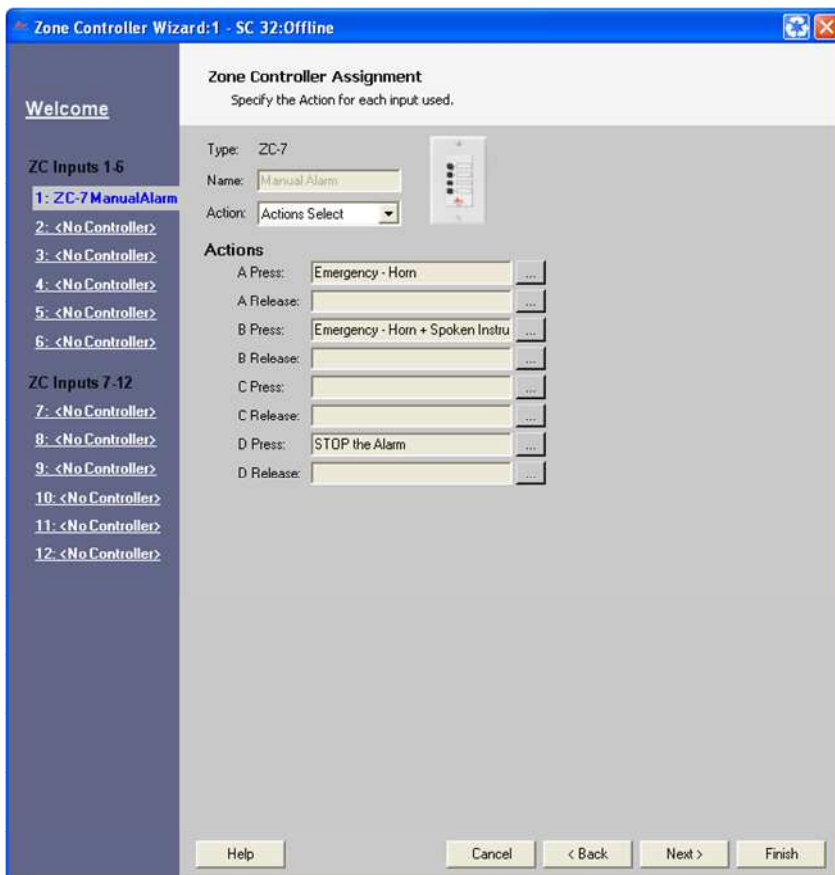
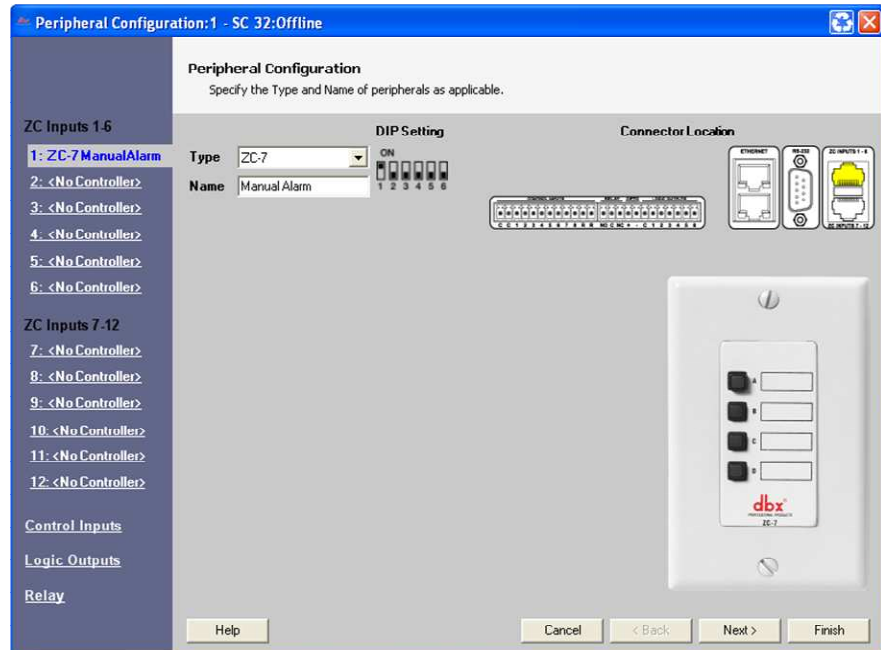
understand about "States". A State is simply a list of actions that will fire in sequence (starting with the event in the first row) and not simultaneously. Therefore, when multiple Media Play actions are added to a State, this has the effect of creating a playlist.



## Emergency Announcements – Manual Playback (via ZC Controllers)

Now that we've configured the emergency announcements to play/stop automatically (upon being triggered by the emergency alarm), let's give the store manager the ability to manually play and stop the emergency announcements. In this case, we'll configure a ZC-7 installed in the manager's office. Pressing button A will play the audio file "Emergency – Horn," and pressing button B will play "Emergency – Horn plus spoken Instructions". Pressing button D will immediately end playback of either file. Here's how we accomplish this:

First, a ZC-7 is added to the design via the Peripheral Configuration window (Tools / Hardware Configuration / Peripheral Configuration). In this window we also give it a meaningful name: "Manual Alarm".



Next, the Zone Controller Wizard (Tools / Wizards / Zone Controller Wizard) is used to configure the ZC-7 as needed. Previously in the GPIO Wizard, we built two States, (and a State is a list of actions that will occur sequentially). Here in the Zone Controller Wizard, we'll do the same thing, interchanging the word "State" with "button". For button A, we select the audio file "Emergency - Horn" to loop infinitely on Playback Stream 6.

Other than selecting the audio file "Emergency – Horn plus spoken instructions", the exact same process is repeated for button B.

For button D, we add a Media Stop action for Playback Stream 6.

(NOTE: separate "Press" and "Release" states can be configured for each of the four buttons on a ZC-7. When the user configures something to occur on the release of the button, it can effectively behave as a momentary button. But in this instance, the "Release" states are left alone.)

## Emergency Announcements – Manual playback (via Custom Control Panels)

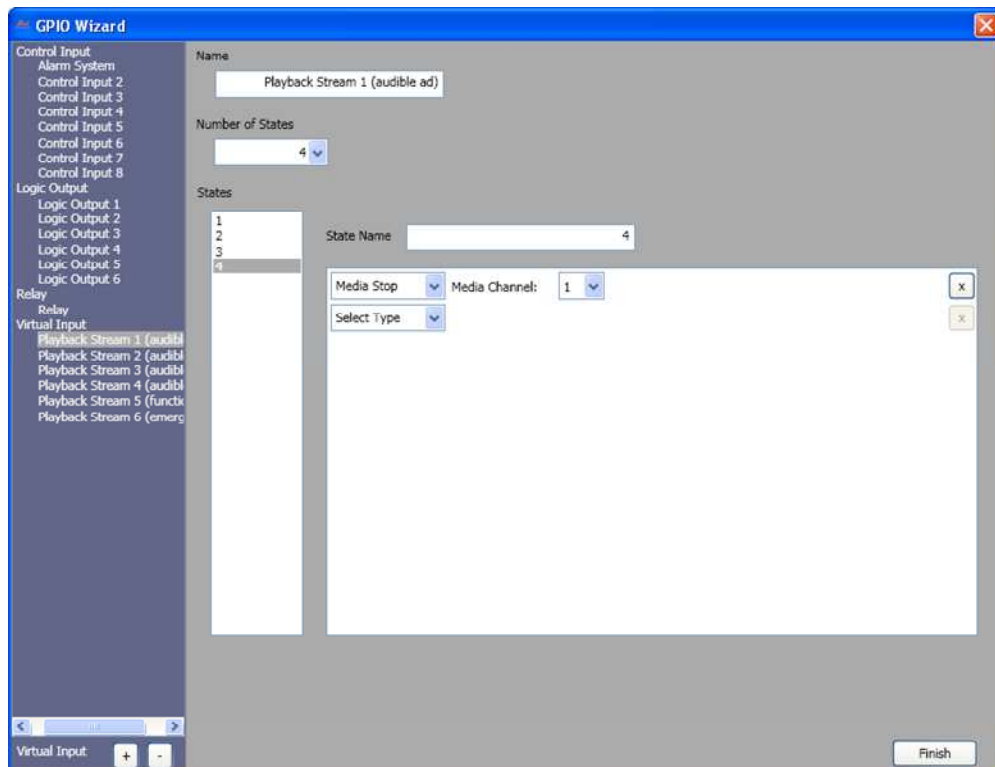
The store manager can also have manual control over the emergency alarm system via a custom designed computer interface. This is made possible by harnessing the power of custom control panels in HiQnet™ System Architect.

In this case, we will design a custom control panel that can trigger playback of not only the Emergency Announcements audio, but also every other audio file stored on the Media Engine (20 in all), plus a “stop” button for each Playback stream (six in all).

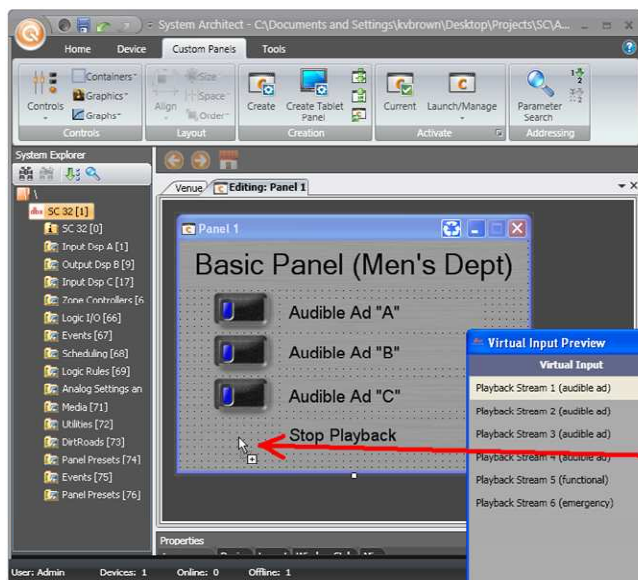
To create the 26 necessary “play” and “stop” buttons that can be dragged onto a custom control panel, we must visit the GPIO wizard again. This time we work within the “Virtual Inputs” category. For every each needed button, we must create one State. This is accomplished by clicking the “+” button at the lower left portion of the screen. The process of adding Virtual Inputs and their corresponding States should be continued until 26 States have been created within the Virtual Input category.

NOTE: a Virtual Input is a collection of States. Therefore, it's main function is to help organize large numbers of States into logical groups. In this instance, instead of creating one Virtual Input with 26 states, we create six Virtual Inputs—one for each Playback Stream being used in this design. Within each Virtual Input, we add the necessary number of related states. For example, Playback Stream 1 carries three audible ads, which we must create “play” buttons for. We also want a stop button for Playback Stream 1. Therefore the “Playback Stream 1” Virtual Input contains four States.

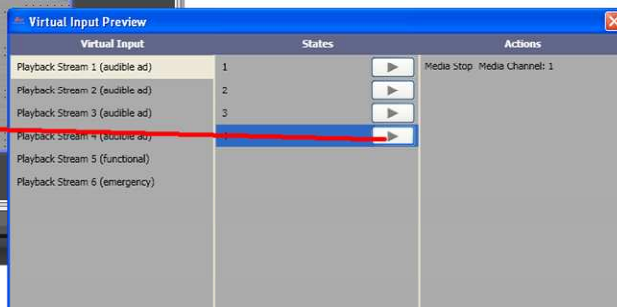
A Virtual Input can also be thought of as a ZC-7 with a scalable amount of buttons that can later be dragged onto a custom control panel.



Next, we must open the Virtual Input Preview window (Tools / Virtual Input Preview). In this window, the button in the middle column represents the Virtual Input States, which were just created. These buttons can be dragged onto custom control panels.



Shown here is a very basic custom control panel. For a look at a more intricate custom control panel, be sure to look at the “Master” custom control panel in the accompanying venue file. “Master” makes use of Media Play and Media Stop controls alongside other conventional controls such as graphs for room EQ and faders for zone volume.



## Routing/Triggering Schemes

Up to this point, we've focused on triggering playback certain audio files onto certain Playback Streams, but the streams have not yet been routed through to any outputs. Earlier in the Processing Wizard, we routed all eight of the Media Engine's Playback Streams to the DSP Input Routers, and we also created zone mixers and routed them to their intended zones. Therefore, all we need to do now is route the appropriate DSP Input channels (which are carrying the Playback Streams) to each zone mixer.

Within each mixer, we route BGM L and BGM R to the first two channels. Next, the appropriate audible ad Playback Stream is added to the third channel on each mixer. For example, Playback Stream 2 is routed to the third channel in the Women's Department mixer. Within each mixer, we give this channel a higher priority than the BGM, because we want the audible ads to duck the BGM.

Next, we route the Playback Streams carrying the functional announcements (Playback Stream 5) and emergency announcements (Playback Stream 6) to channels four and five on each mixer. We give these channel even higher priorities than the audible ad streams and BGM, with the emergency streams receiving the highest priority.

(NOTE: ensure that the priority enable button within all mixers is illuminated and that the gates for the routed channels are enabled)



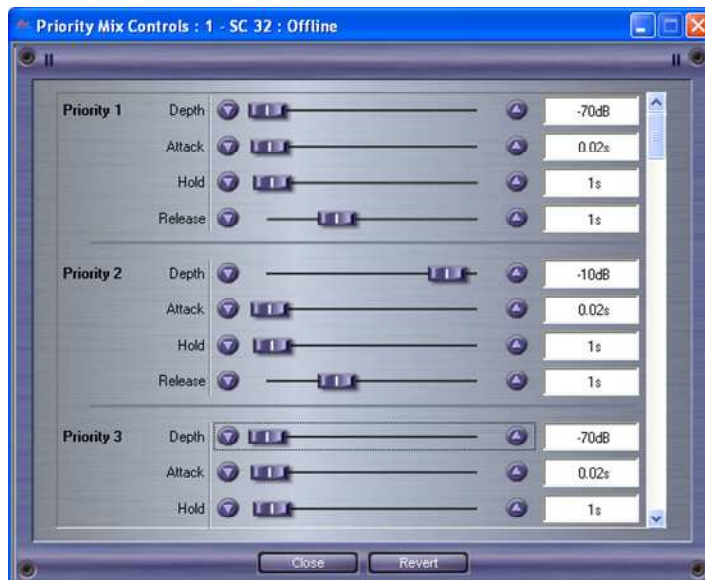
Using this routing structure, when an audio file is triggered and sent onto a Playback Stream, that stream is already routed to a DSP Input processing path, which is routed (with a high priority) to a mixer. Within the DSP Input processing path, the gate threshold is surpassed, which then causes the Playback Stream to duck other sources in the mixer. When the audio finishes playing, it will drop below the gate threshold and the mixer will therefore cease ducking the other channels—in effect returning the system back to its normal condition.

The amount by which a channel will duck channels of lower priority within the same mixer is specified in the Priority Mix Controls window (Tools / Priority Mix Controls).

In this case, we want the emergency announcements (Playback Stream 6, set at priority 1 across all mixers) to completely duck all other program material. Therefore the Priority 1 Depth is set to -70dB.

The functional announcements (Playback Stream 5, set at priority 2 across all mixers) should only partially duck the audible ads and BGM. Therefore the Priority 2 Depth is set to -10dB.

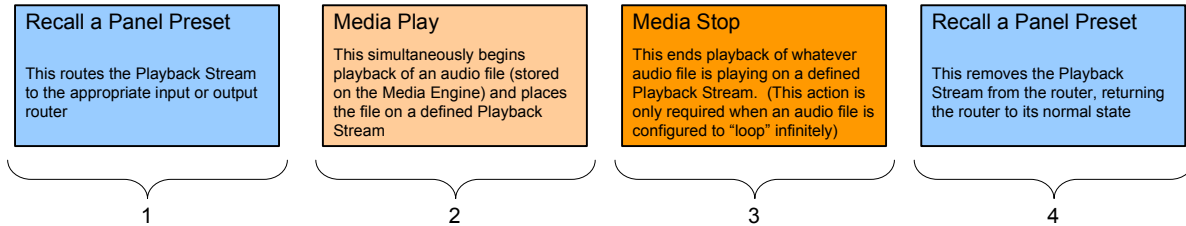
The audible ads (Playback Streams 1/2/3/4, set at priority 3 across all mixers) should completely duck the BGM, since the ads have their own built-in techno music. Therefore, the Priority 3 Depth is set to -70dB.



## An Alternate Routing/Triggering Scheme

(NOTE: the following section does not pertain to this particular Retail Store example and is therefore not reflected in the accompanying venue file. This is a self-contained tip.)

In this instance, an unused I/O slot on the SC 32 allowed us to allocate eight channels of input processing to the Playback Streams. In effect, the unused slot allows us the luxury of permanently routing the Playback Streams to a mixer, where priority ducking will dynamically add and remove a Playback Stream from the signal path. However, when an extra I/O slot is not available, a slightly different approach must be taken. Whenever Media Engine playback is triggered (through any of the five mechanisms mentioned on the first page), panel presets should be used to dynamically route and "de-route" the Playback Stream to and from the signal path. This sequence of events can be illustrated as follows:



NOTE: Playback Streams can be routed to two points in the signal path: the DSP input router and the DSP output router. These routing points are visually represented in the SC device window as follows:

