User Guide Addendum

MD755

Programmable Motion Sensor for **Bright**Sign® Solid State Digital Sign Controllers

Overview

The MD755 is a motion sensor designed to trigger BrightSign playlist content. The detector responds to subtle temperature changes given off by people (and animals) moving about a room. Because of this, the sensor will not work if placed behind materials such as glass or Plexiglas, which would insulate the sensor from its surroundings.

For most digital signage applications, the MD755's default settings work very well. Lately however, the MD755 has become a key component in many exhibit type applications where there is frequent and often non-stop movement such as airports, museums, and shopping malls. A limitation of the original design was its inability to re-arm in such busy environments. This and other trigger related issues are addressed in the current shipping version.

There are no visible differences between versions of the MD755 except for model and serial numbers located on the connector plug. This sticker only appears on sensors bought after September 1, 2014. If you're not sure which version you have, just give us a call.

New MD755 Features

The overall functionality of the sensor has been greatly expanded with the addition of two new features. For example, you can now turn the MD755 ON/OFF within your BrightAuthor presentation. This feature resolves a number of issues, primarily trigger-related problems caused by frequent movement. In addition, a separate motion trigger has been added that allow events to trigger on Button 5. The sensor also takes advantage of the many new features and enhancements found in BrightAuthor 3.8* all of which, make the sensor significantly more versatile. The following GPIO and their corresponding buttons are reserved for use with the MD755:

- **GPIO 0 – Sensor Primary Trigger** controlled by Button 0 in BrightAuthor

- **GPIO 2 – Sensor Enable/Disable** (controlled by setting GPIO commands)

- **GPIO 5 – Sensor End-of-hold Trigger** controlled by Button 5 in BrightAuthor

GPIO 0 - Primary Trigger

The MD755 uses GPIO 0 to trigger the BrightSign controller via a Button 0 event in BrightAuthor. The most common trigger application is to transition from one media clip to another.

When triggered, the MD755 will enter a hold state, which keeps it from re-triggering while motion continues. The sensor will then rearm ten seconds after the last detection signature. A graphical explanation of the various trigger signals sent to the BrightSign controller is shown in Figure 1-A.

FIGURE 1-A
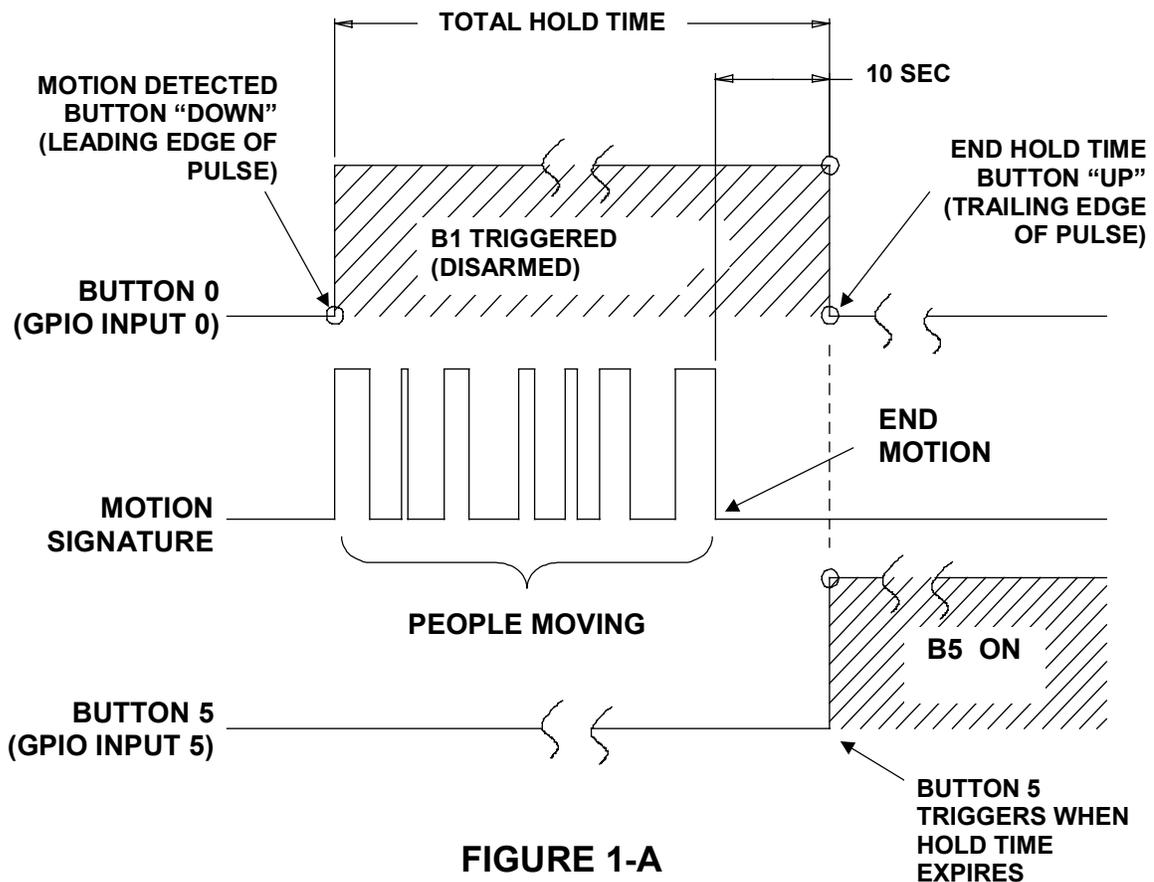
The **motion signature** pulses shown represent the frequency of motion within the detection zone. If there is a lot of movement, this signal will appear as a continuous detection pulse. The sensor will rearm when the frequency of these detection pulses exceeds ten seconds.

If the sensor is within visible range, the red LED indicator will turn on when triggered. This can help when creating and testing your interactive presentations.

GPIO 5 - End-of-Hold Trigger

Button 5 events can also be used to trigger BrightAuthor events. Unlike Button 0 which triggers the moment motion is detected, Button 5 will trigger events at the *end* of the sensor's hold time cycle, which is also the moment the sensor re-arms. In other words, Button 5 is "pushed" just as Button 0 is "released".

Buttons 0 and 5 can also be applied to the same clip or event to achieve a variety of motion-driven results. Example 3 – "Controlling Audio" uses both triggers in a presentation that adjusts audio playback levels based on viewer presence.

GPIO 2 – Sensor Enable/Disable Control

BrightAuthor uses GPIO 2 to send ON/OFF commands to the MD755. To use this feature, GPIO 2 must first be configured as output within your presentation settings as shown in Figure 1-E. When configured as output, Button 2 can not be used as an event trigger and the toolbar icon will be disabled.
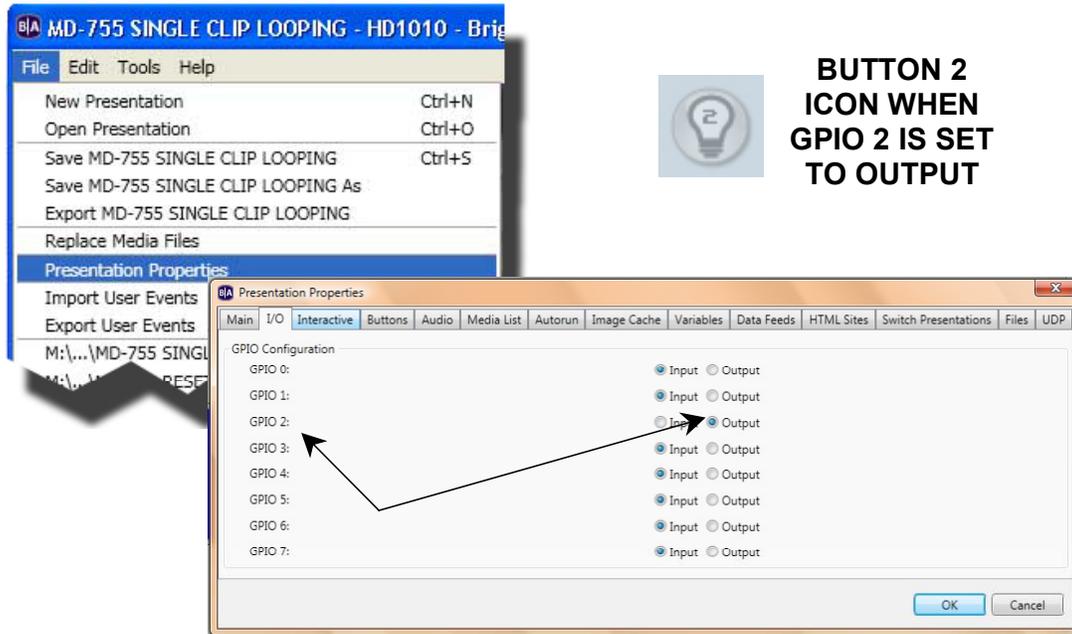
BUTTON 2 ICON WHEN GPIO 2 IS SET TO OUTPUT

FIGURE 1-E

Once GPIO 2 has been configured for output, the sensor can then be turned ON/OFF using GPIO commands. To add and set this and other command parameters, edit either a media clip or an event. Within the Properties dialog, click the "Advanced Tab" as shown in Figure 1-F.
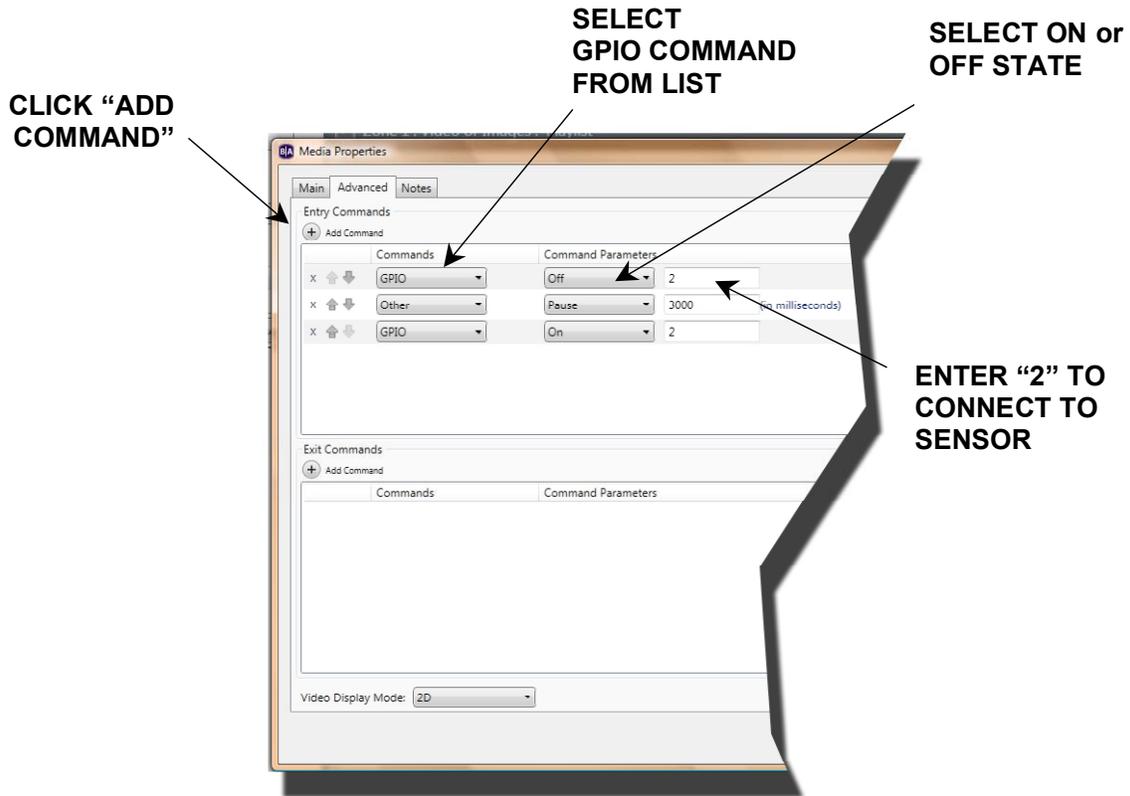

FIGURE 1-F

An "OFF" command will disable the sensor. Turning GPIO 2 back ON effectively reinitializes the sensor. This simple action acts as a **reset** and can be applied a number of ways.

The Button 0 event shown In Figure 1-G triggers the transition to Video 2. But if people are still moving when the presentation reinitializes, the sensor will not rearm properly. In this case, the playback of Video 1 will loop.

Briefly turning the sensor OFF-ON prior to returning to the home state guarantees that it will be rearmed.

In Figure 1-H, you can specify both "Entry" and "Exit" commands. The command editor is located under the Advanced tab in the Media Properties. Here, we see the sensor is turned OFF immediately upon entering the clip, and is turned back ON just before exiting. This method will keep the sensor disabled for the entire duration of the clip.
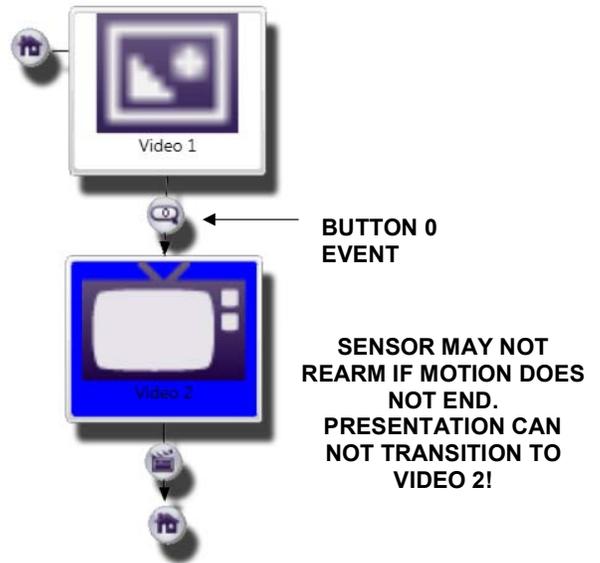

BUTTON 0 EVENT

SENSOR MAY NOT REARM IF MOTION DOES NOT END. PRESENTATION CAN NOT TRANSITION TO VIDEO 2!

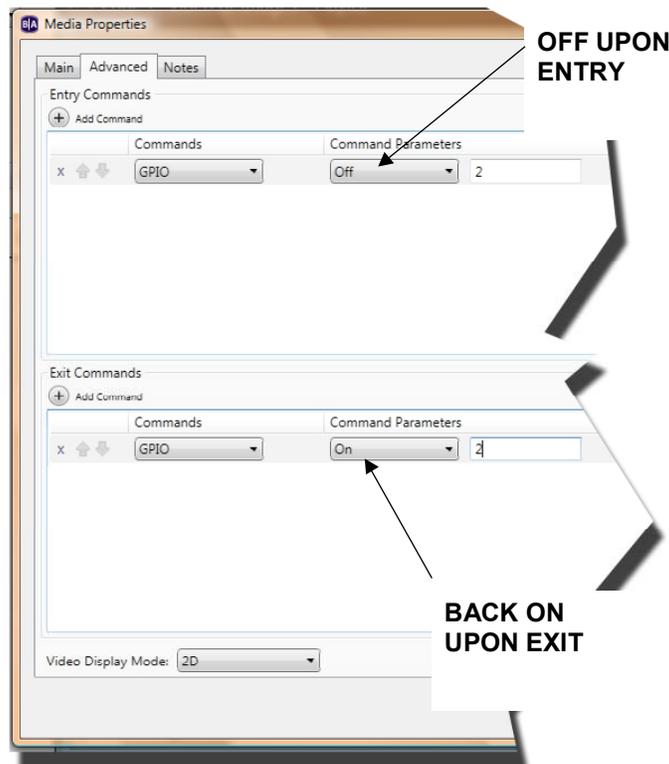**FIGURE 1-G**

OFF UPON ENTRY

BACK ON UPON EXIT

FIGURE 1-H

Another way to "reset" the sensor is to momentarily disable the sensor thus forcing a new trigger-ready cycle to start as shown graphically in Figure 1-J.

Adding a "Pause" command immediately following the GPIO OFF entry determines *how long* the sensor will remain disabled. Example 5 illustrates this using the "Pause" command with a set duration.
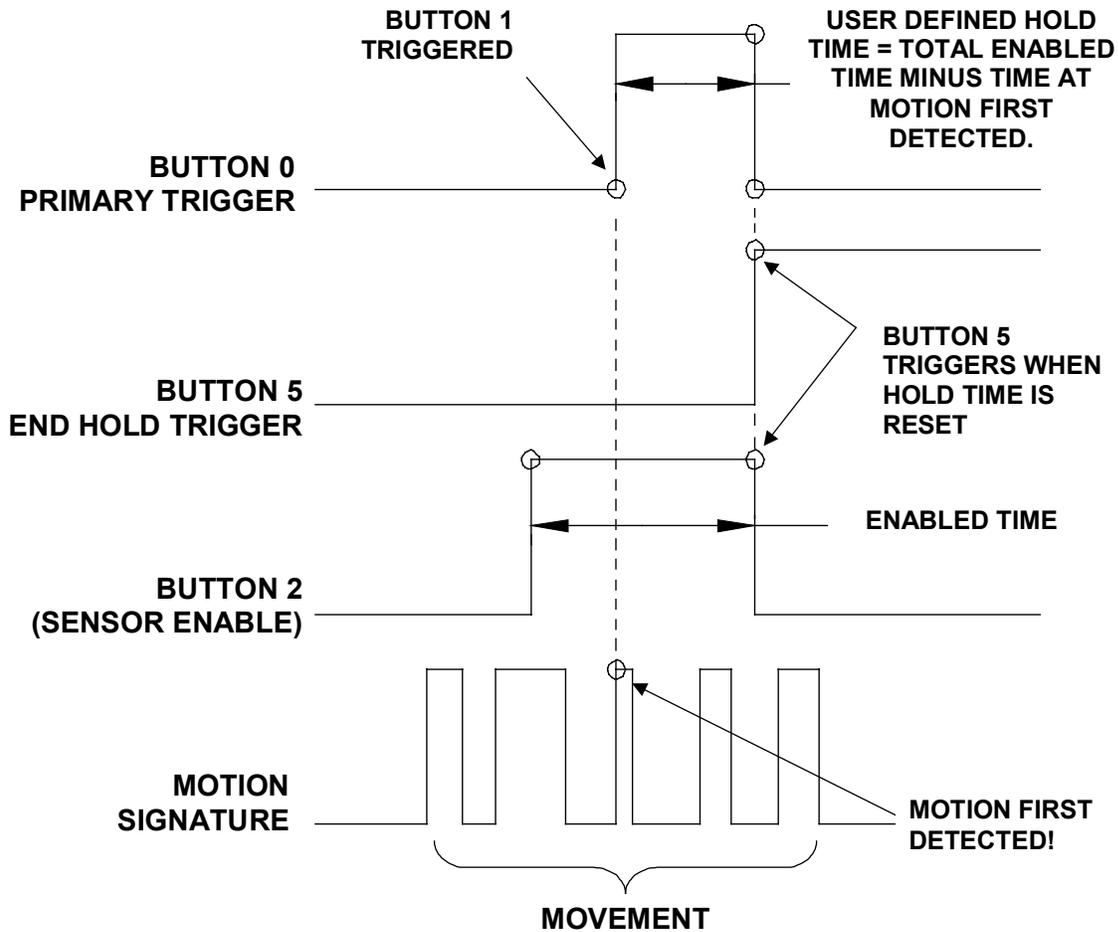
FIGURE 1- J

Updated BrightAuthor Examples for the MD755

The following are some straightforward programming examples for MD755 motion sensor. You can expand on these using a combination of other BrightSign interactive functions. For example, adding touch-screen events to an initial display can serve as a launch point for other interactive presentations.

Example 1 - Simple Reset

On startup, the presentation shown in Figure 2 opens with the "Welcome to Our Exhibit!" attract screen. This clip will loop continuously until motion triggers a transition to the "The Main Event" media clip via the Button #0 event. When triggered, the sensor's red LED indicator turns on, and remains lit until the sensor rearms.

If motion continues to be detected, the sensor can not rearm. Since there is no "Media End" event specified, the clip will loop indefinitely. However, when no further motion is detected, the sensor re-arms after ten seconds and the presentation is immediately returned to the initial state via Button #5.
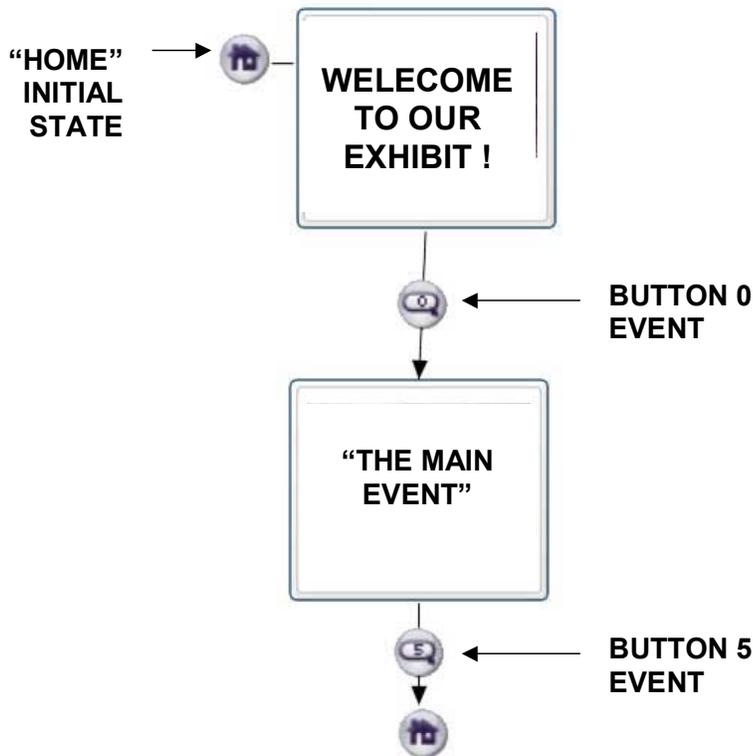

FIGURE 2

Example 2 - Triggering Alternate Media

This example expands on Example 1 by adding clip #16 – "Bye Now!". This provides an alternate path for the presentation to follow if no motion is detected rather than returning to the initial state. When triggered, Clip #16 can serve as yet another branch point if needed. Here, the "Media End" event passes control to #13 (not shown).

On the other hand, if the sensor continues to detect motion during playback of "The Main Event" clip, it will continue playing without interruption before returning to the initial state ("Home").

Keep in mind that if there is a high amount of traffic present, the sensor may not re-arm upon returning to the initial state and the splash screen may loop indefinitely. Example 5 illustrates a way to set/reset the sensor using a Button #2 event.
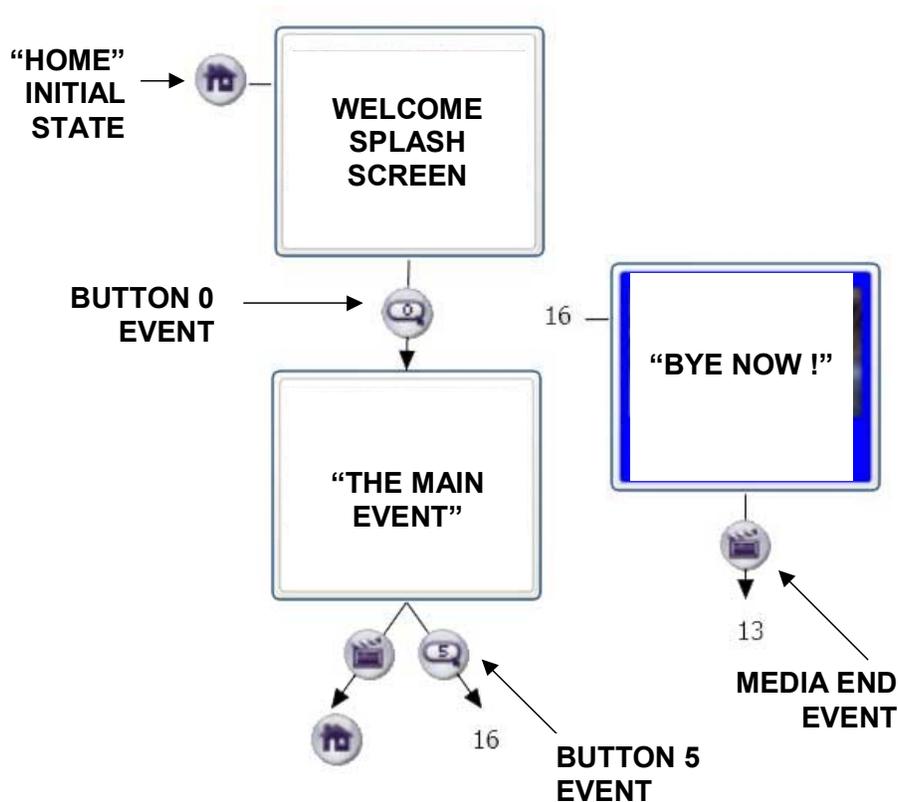
"HOME" INITIAL STATE

WELCOME SPLASH SCREEN

BUTTON 0 EVENT

16

"BYE NOW !"

"THE MAIN EVENT"

13

MEDIA END EVENT

16

BUTTON 5 EVENT

FIGURE 3

Example 3 - Controlling Audio

With the MD755, you can dynamically control the audio of you BrightSign. One of the more popular motion sensor applications is turning a display's volume off entirely when no one is around, and vice-versa.

BrightAuthor provides several commands that allow you to programmatically adjust audio playback, such as setting the volume level, muting, and control the source. The MD755 compliments these features by letting you interactively adjust the audio levels based on detected motion.

The presentation shown in Figure 6 will initialize using the default audio settings, which are usually "ON" and at a 100% volume level. On startup, the sensor will trigger "The Main Event" clip via the first Button 0 event. Note: The clip's duration must be at least 30 seconds to experience the audio transitions.
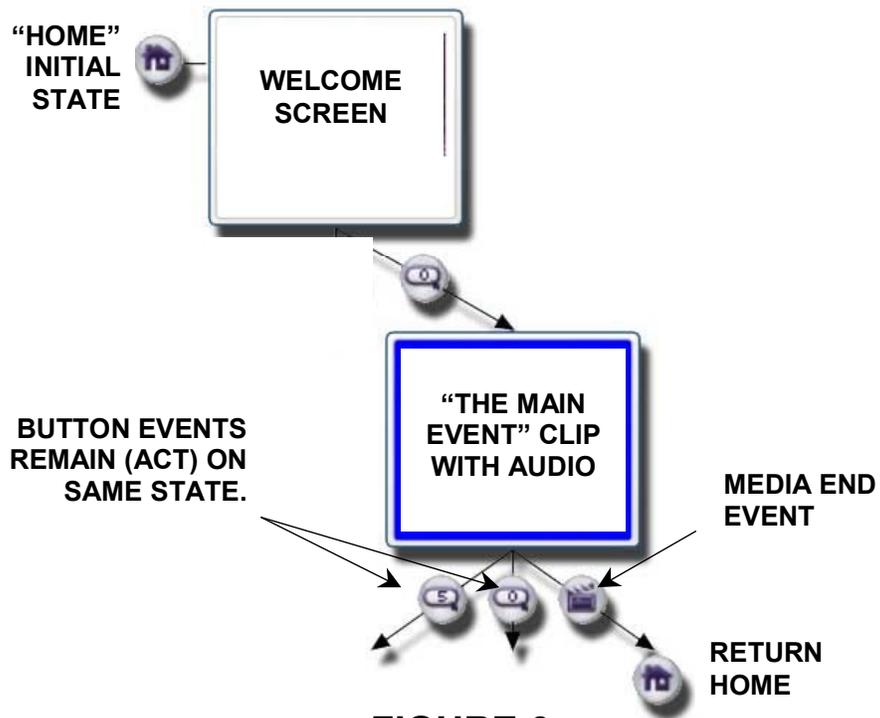
"HOME" INITIAL STATE

WELCOME SCREEN

BUTTON EVENTS REMAIN (ACT) ON SAME STATE.

"THE MAIN EVENT" CLIP WITH AUDIO

MEDIA END EVENT

RETURN HOME

FIGURE 6

The Button 0 event also specifies a command to Un-Mute the audio, should it not initialize in this state as shown in Figure 6-A.

UNMUTE AUDIO

FIGURE 6-A

Notice the "Main Event" clip has two button events - 0 and 5, both of which have no apparent transition clip. This representation is new in BrightAuthor 3.8 and indicates that the event will remain on, and act on the current state when triggered. In our example, the sensor will trigger Button 0 and 5 while performing their respective audio functions.

The GPIO event properties for the buttons are shown in Figure 6-B. The "Remain on current state" option will be automatically selected if the event was created in the authoring window using drag and drop. Otherwise, you can manually select the Start state option by editing. Under the "Advanced" tab is the command to MUTE the audio when Button 5 is triggered. Similarly, the Button 0 event specifies the commands to UnMUTE the audio.
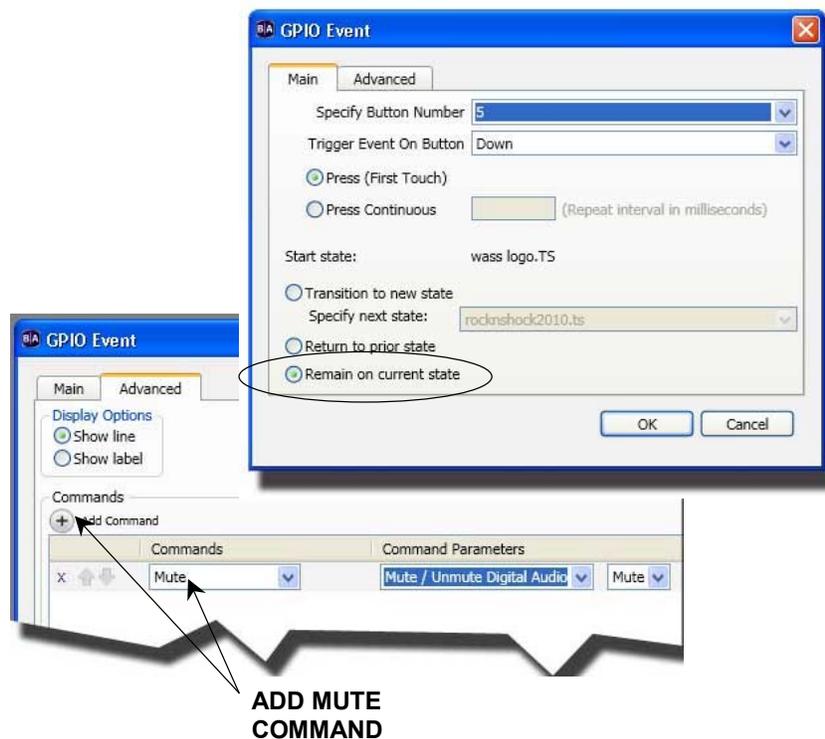

ADD MUTE COMMAND

FIGURE 6-B

Here's how it works; during the playback of "The Main Event", motion will trigger Button 0 and UNMUTE the audio, regardless of its previous state. Continued motion during the playback of the clip keeps the sensor in a hold state thus keeping the audio on. Button 5 will trigger the moment the sensor's hold time expires, which by default is 10 seconds after the last detection signature. Therefore, when display activity stops, the audio treack will again be muted shortly thereafter.

On a separate note, event commands that execute while remaining on the current state happen almost immediately with no perceivable interruption, since no clip needs to be loaded into memory.

Finally, the Media End event completes the presentation and returns control to the initial state with the audio unmuted. Alternately, you can add an "Unmute" EXIT command directly to the "Main Event" within the "Media Properties" dialog as shown in Figure 6-C. If your "Welcome" screen has audio, this step ensures it is restored to its initial intended state.
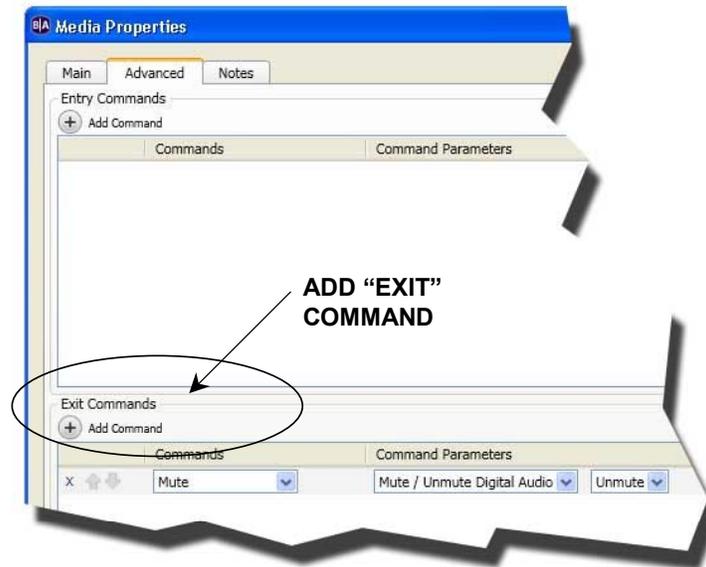

FIGURE 6-C

Example 4 - Button Trigger Response

BrightAuthor 3.8 now has settings for controlling button trigger characteristics. These options are set within the GPIO Event property dialog box as shown in Figure 7.

Although the MD755 is not a manual input device, the output as far as BrightSign is concerned, is similar to a pushbutton board. When using the MD755, these same buttn conventions are used for setting the trigger characteristics as shown in Figure 7. The "DOWN" setting relates to pressing the button momentarily, while "UP" corresponds to the button being released.
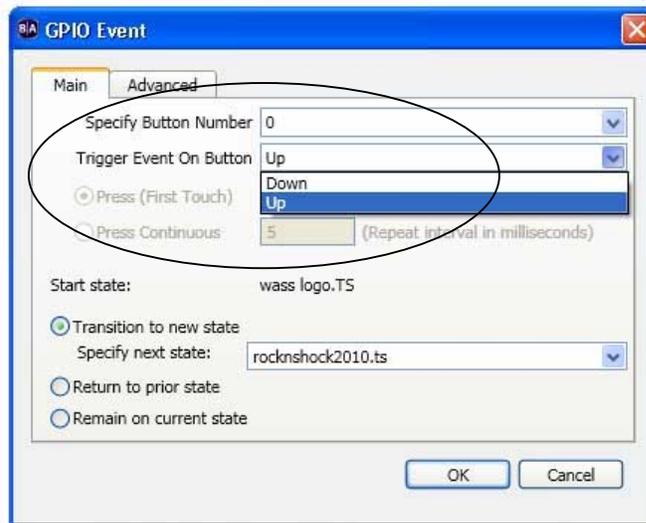

FIGURE 7

It's also possible to hold a Button Event "down" for a period of time before being released by selecting the "Press Continuous" option. The interval of time between the successive button pushes can also be set. This feature can be used as a quick way of prolonging (not shortening) the sensor's default hold time.

When used with the MD755, setting Button 0 to trigger on the "Up" press behaves exactly like a Button 5 event, and vice-versa.

Example 5 – Controlling Hold Time

When triggered, the MD755 remains unarmed until all motion stops and then rearms in about 10 seconds. This default hold time is suitable for most applications since it balances triggering priority and wait time.

The default hold time can also be overridden by specifying the duration in which the sensor remains unarmed. You can also force the sensor to reset at specific points during the presentation and add as many resets as needed.

Note: Whenever using the MD755, the playlist type must be set to "Interactive".

Start by configuring **GPIO 2** as "**Output**" within the "Presentation Properties". GPIO Configuration is located under the I/O tab as shown in Figure 8-1.

Once GPIO 2 has been set to "Output", GPIO ON/OFF Commands can then be sent to the MD755.
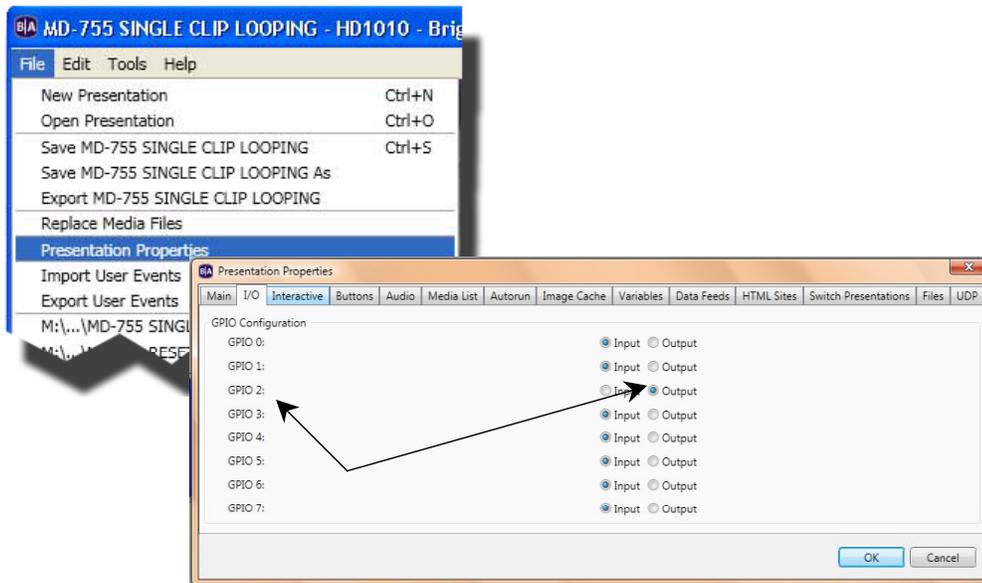

FIGURE 8-1

Momentarily turning GPIO 2 off and then back on again effectively resets the sensor. User defined hold times are achieved by specifying how long the sensor remains turned off. The sensor returns to a trigger-ready state (armed) the moment the specified hold duration expires and GPIO 2 is turned back ON.

1. To reset the MD755, edit the media clip where the reset should occur. Under the "Advanced" tab, add a GPIO "OFF" command to GPIO line #2 as shown in Figure 8-2.
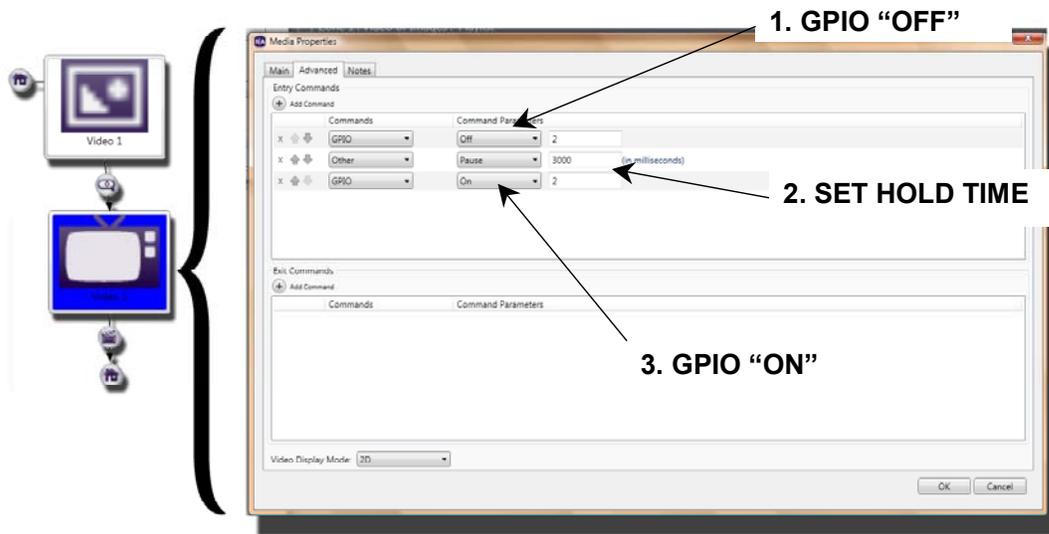

FIGURE 8-2

2. To keep the sensor from triggering for a specified length of time, you can add a "Pause" command. From the Commands drop down list box, chose "Other" and select the "Pause" Command Parameter. Specify the duration in the field provided. For 3 seconds, enter 3000.

Note: BrightAuthor commands are executed sequentially. So upon transitioning to "Video 2", the first Entry Command encountered is that which turns GPIO line 2 "OFF", followed by the Pause, etc.

3. The third command re-enables the sensor by turning GPIO 2 back "ON". Generally speaking, it's good practice to add a similar line to the initial media clip. This ensures that the sensor is prepared upon system boot, should the BrightSign controller encounter an unexpected error in programming or a power failure.

Tip: It's generally recommended to include a very short hold time between the ON/OFF command lines even if for simple resets. This will ensure reliable execution since the commands execute so rapidly.

On playback, our example presentation will trigger the transition to "Video 2" via the Button 0 event. The sensor will then immediately shut off for three seconds and then rearmed using the default hold time.

While this is a functional example, resetting the sensor has no practical purpose unless there is a subsequent trigger event to take advantage of the rearmed sensor. For example, by adding another Button 0 event to "Video 2" establishes a point from which the presentation can now branch to when the sensor is rearmed. Otherwise, the media clip will return to the initial clip when finished playin as shown in Figure 8-3.
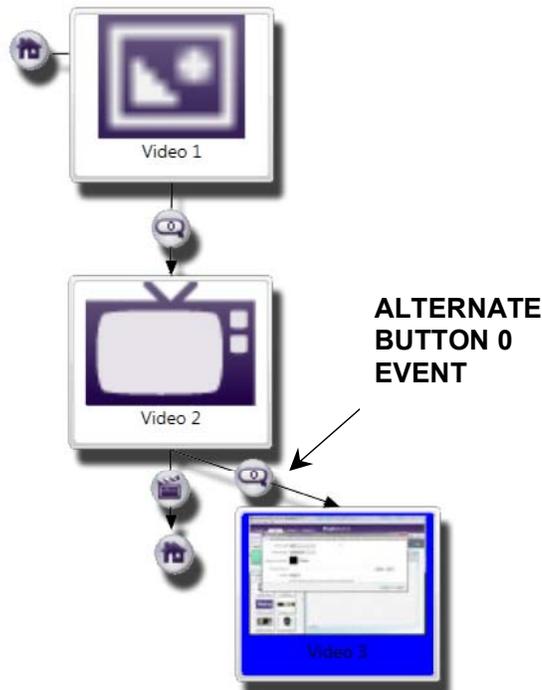

FIGURE 8-3

Additional Resources

For a detailed demonstration of this and other application examples, be sure to visit our tutorial page at:

intelli-sign.com/tutorials