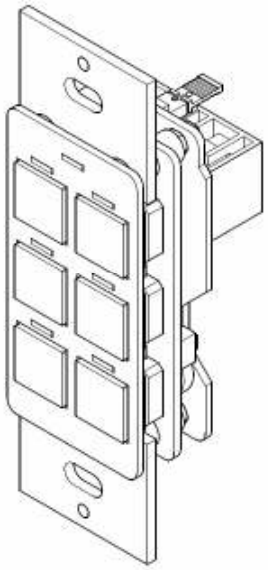
CHELSEA DIGITAL SWITCH



ADVANCED PROGRAMMING GUIDE

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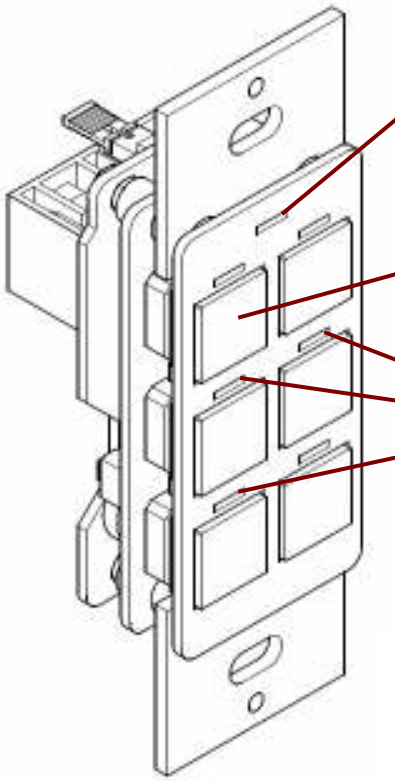
Overview

The Chelsea Digital Switch has been updated with several new programmable features. In summary, they are:



- Programmable Locator LED. Now the LED at the top of the switch can be programmed to flash during a blink warning. It can also be activated by Tech Support, for use in helping the user identify a particular switch.

- The feature allowing button 1 of the switch to function as the Address button can now be enabled or disabled in the programming menu.

- Status LED logic is now programmable. The Status LED above each button can now have one of 4 types of logic used to determine whether it should be lit or not. For example, if a button control 6 relays, and 4 of them are ON, the user can set whether the LED will be ON or OFF. This logic can be assigned button-by-button or for all the Status LEDs on the switch.

- Adjustable debounce time. Debounce is how long a switch button must be held down before it is recognized as a button press. Debounce can be set for the whole switch, or button by button.

- Audible beep alert which can be used to notify users during a blink warning period before the lights shut off. The beep pattern is programmable and can also be used by Tech Support to help the customer locate a specific switch on the bus.

- Alternate button programming. Chelsea Digital Switches can now have two sets of programming for six buttons, or three sets of programming for three buttons. Each set of programming can be activated by a time schedule, override switch, etc. This feature is useful for setting buttons to function differently at different times of day, or in partitionable rooms where a switch functions differently depending on whether a partition is open or closed.

- Programmable Toggle logic. If a button controls multiple relays, it is important to synchronize them when toggling them all at once. If some of the relays are ON and some are OFF, it is now possible to specify whether the switch syncs them all ON or all OFF when toggling.

- Enabling and disabling individual switch buttons is still an available feature carried over from the previous version of the Chelsea. Enabling and disabling buttons can now be allowed or not allowed for a switch in the programming menu. Additionally, disabled buttons can be set to trigger a rapid series of beeps when pressed, so the user knows that the button has specifically been disabled by programming.

! Important Programming Notes !

To use the advanced features of the new Chelsea Digital Switch, please ensure the following:

- Always set a Chelsea Digital Switch as a "14 Button Switch" in the Panel/Switch Types screen. This is true even if the switch only has 1, 2 or 3 physical buttons. The reason for this is because advanced programming requires setting parameters for buttons 7-14, even though they are "virtual" buttons and not physically present on the switch.

- To access advanced programming functions of the Chelsea Switch, you must have DTC clock version 4.48 or later.

- To use advanced programming functions of the Chelsea Switch, you must be using switch firmware 1.12 or later. The version of firmware a switch has is displayed in the lower left corner of the SETUP screen for that switch.

The Switch Setup Screen
(First Screen)

To access the screen, navigate to the switch you want to program, highlight the word SETUP and press ENTER.

`USER MENU → PROGRAM SWITCH → SWITCH# → SETUP`

The Switch Setup Screen has a number of parameters which can be set as shown below.

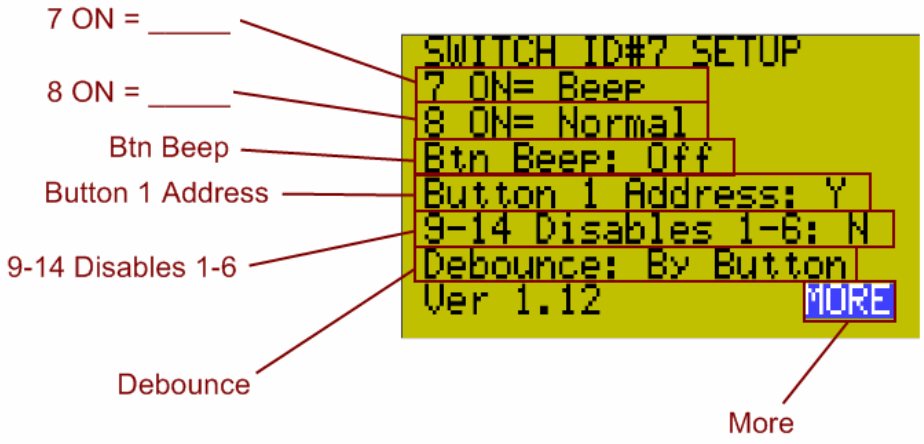


Table 1.1

7 ON = _____	
This field determines what happens when the LED status light associated with Button 7 is turned ON. Generally if the button is set to ON MODE and the relay it controls is ON, the LED will turn ON as well. This also applies to the opposite mode: if the button is set to OFF MODE and the relay it controls is OFF, the LED will also generally turn ON (the only exceptions are if the logic of the Status LEDs are changed as described later in this guide). Note that there is no physical Button 7 or physical Status LED for Button 7 on a Chelsea Digital Switch. So Buttons 7-14 are virtual buttons used for programming purposes only, and the associated Status LEDs are also just virtual placeholders that are turned on and off. Usually, virtual Buttons 7 and 8 will be set to operate a spare relay or an empty relay position rather than a relay with a connected load.	
Possible Values	Result
Normal (default value)	None. Setting this value to "Normal" in a Chelsea Digital Switch means that nothing will happen when the virtual LED associated with Button 7 is turned ON.
BTS 1-6 < 9 - 14	When the virtual LED associated with Button 7 is ON, the programming for buttons 1-6 will be replaced with the programming for buttons 9-14. When the LED is OFF, buttons 1-6 will revert to their original programming.
BTS 1-3 < 9 - 11	When the virtual LED associated with Button 7 is ON, the programming for buttons 1-3 will be replaced with the programming for buttons 9-11. When the relay is OFF, buttons 1-3 will revert to their original programming.
BEEP	When the virtual LED associated with Button 7 is ON, the switch will make a beeping sound. Highlighting the word BEEP and pressing ENTER will allow you to set the beep pattern.
Locator	When the virtual LED associated with Button 7 is ON, the switch's Locator LED will flash. Highlighting the word Locator and pressing ENTER will allow you to set the flash pattern.
Disable 1-6	When the virtual LED associated with Button 7 is ON, buttons 1-6 will be disabled.
Disable 1-14	For a Chelsea Switch, this has the same effect as "Disable 1-6". However, when programming a Digilink, it allows all Digilink inputs (1-14) to be disabled.
Beep + Locator	When the virtual LED associated with Button 7 is ON, the switch will make a beeping sound and the Locator LED will flash. Highlighting the words Beep + Locator and pressing ENTER will allow you to set the beep and flash pattern.

Table 1.2

8 ON = _____	
This field determines what happens when the LED status light associated with Button 8 is turned ON. The operation of this field is almost identical in operation to the "7 ON = __". The parameters are the same as those given in Table 1.1 above with a few exceptions noted below. In general, the BTS 1-6 < 9 – 14, BEEP, Locator, and Disable 1-6 functions assigned to "7 ON = __" take priority over their "8 ON = __" counterparts. For example: If a switch is set to "7 ON = BEEP" and "8 ON = BEEP" and both virtual LEDs are ON, the switch will have the BEEP pattern of "7 ON = BEEP" not the pattern of "8ON = BEEP". If a switch is set to "7 ON = LOCATOR" and "8 ON = BEEP" and both virtual LEDs are ON, the switch will blink the Locator LED and also beep.	
Possible Values	Result
Normal (default value)	None. Setting this value to "Normal" in a Chelsea Digital Switch means that nothing will happen when the virtual LED associated with Button 8 is turned ON.
BTS 1-6 < 9 – 14 BEEP Locator Disable 1-6	These settings operate in the same way as they are described in table 1.1
BTS 1-3 < 12-14	When the virtual LED associated with Button 8 is ON, the programming for buttons 1-3 will be replaced with the programming for buttons 12-14. When the relay is OFF, buttons 1-3 will revert to their original programming.
Disable 9-14	Used only in Digilinks to disable higher numbered inputs.

** "8 ON = __" Does not have a "Beep + Locator" option.

Important Note On Using "7 ON = 1-3 ← 9-11" and "8 ON = 1-3 ← 12-14" in tandem:

If the switch has the settings " `7 ON = 1-3 ← 9-11` *" **and** "* `8 ON= 1-3 ← 12-14` *", and the relays operated by Button 7 and Button 8 are BOTH ON, then buttons 1-3 will execute both sets of programming (9-11 and 12-14) at the same time. Please ensure that there is no conflicting programming as the behavior of the loads controlled will become unpredictable. An example of conflicting programming is Button 9 turning ON a relay and Button 12 turning OFF a relay.*

Table 1.3

BTN Beep	
This field determines when the switch's buttons will cause a beeping sound.	
Possible Values	Result
OFF	There will never be a beeping sound when a button is pressed. Note that any beep alerts set to take place using the "7 On = _____" or "8 On = _____" fields will still be executed. Setting "BTN Beep" to OFF only effects normal button presses, not special alerts.
PUSH only	The buttons on the switch will beep when pressed. (Note that operating the same load(s) from another location will not cause the beep) There will be no rapid series of beeps when a disabled button is pressed, it will simply cause the standard single beep.
Disable	Buttons will not normally beep when pressed; however, if the user presses a disabled button, the switch will give a rapid series of beeps to alert them that the button will not operate as expected because it has been disabled.
Push + Disa.	Buttons on the switch will give a standard single beep when pressed. If the user presses a button that has been disabled, the switch will alert them with a rapid series of beeps.

Table 1.4

Button 1 Address	
This field determines whether Button 1 on the switch will act as the Address Button (meaning that the user can set and read the address by pushing Button 1 instead of having to press the Address Button on the back of the switch). This is generally set to "Y" (Yes) except on Digilinks, which are always set to "N".	
Possible Values	Result
Y	Yes, Button 1 will function as the Address Button
N	No, Button 1 will not function as the Address Button

Table 1.5

9-14 disable 1-6	
Determines whether "virtual" buttons 9-14 can be used to disable buttons 1-6 on the physical switch. For example, if virtual Button 9 is set to turn on relay X, then any time relay X is ON, the physical Button 1 will be disabled. If relay X is OFF, then Button 1 will function normally. The same correspondence exists between virtual Button 10 and physical Button 2, virtual Button 11 and physical Button 3, etc.	
Possible Values	Result
Y	Yes, virtual Buttons 9-14 will enable and disable physical Buttons 1-6. This is the normal, default setting. However, there are times when you should not use this functionality as described below.
N	No, virtual Buttons 9-14 will NOT enable and disable physical Buttons 1-6. You should use this option in the following circumstances: • If you have set up alternate button programming sets (e.g. you have set "7 ON = BTS 1-6 < 9 – 14" as described earlier in this section). • If you are already using other button disable settings, such as "7 On = Disable 1-14" described earlier in this section. • If you are programming a Digilink, which uses any of the inputs between 9 and 14.

Table 1.6

Debounce	
This field sets how long the user must hold down a switch button before the system recognizes the button press. If the button is released before the full duration of the debounce time, the press is ignored and no programming is executed.	
Possible Values	Result
By Button	This value means that the Debounce will be set individually for each individual Button in the Button's "Edit" menu. There will be no overall setting for all the buttons on the switch.

Selectable value between 0.05 sec and 5.00 sec.	These are global values that apply to all of the switch's buttons. Whatever value is selected will be how long the user must hold down the button before its programming is activated. For example, setting the value to 2.00 sec means that when the user first presses a button on the switch, nothing will happen. However, if the user continues holding down the button for at least 2 full seconds, the button will then operate the relays it was set to control. The default setting is 0.05 sec. Debounce affects button beeping the same way it affects programming.

Important Note on Debounce:
Use debounce carefully since a long debounce time can make it seem like a switch is not working. If a switch does not appear to function, always check for a debounce setting before assuming that the switch is bad.

MORE
To go to the second page of switch setup options, highlight the field "MORE" and press ENTER.

The Switch Setup Screen
(Second Screen)

The Switch Setup Screen has additional parameters shown on a second page in the DTC screen. Along with the Debounce option on the first screen, these parameters are global in that they override any local LED logic set in the EDIT menu and apply to all buttons on a switch. These parameters can be set as shown below:

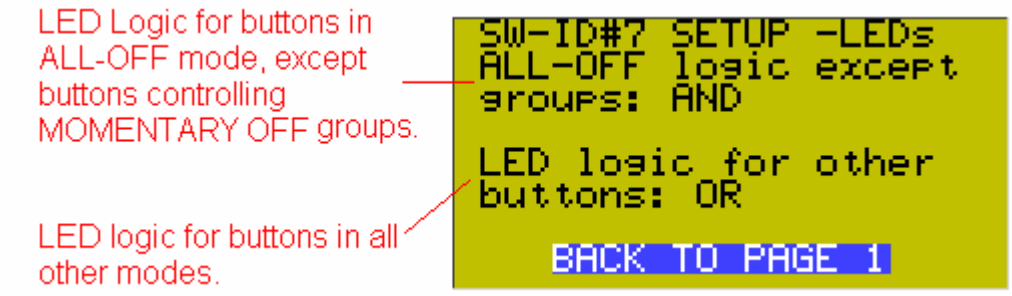


Table 2.1

ALL-OFF logic except groups	
Sets the logic which determines if the Status LED over each of the switch's buttons should be on or off. This field applies only to buttons programmed in OFF MODE. If a button only turns lights OFF, then it is customary to have the Status LED be lit when all of the controlled relays are in the OFF position. However, there are some applications when different logic is needed.	
Possible Values	Result
AND	The Status LED on a button set to OFF MODE will light up only if ALL the controlled relays are OFF. (This is also called "True" switch logic and is usually used for buttons in OFF MODE or MIX MODE).
OR	The Status LED on a button set to OFF MODE will light up if one OR more of the controlled relays are OFF.
OR-INVERT	The Status LED on a button set to OFF MODE will light up only if NONE the controlled relays are OFF (i.e. they are all ON)
AND-INVERT	The Status LED on a button set to OFF MODE will light up if ONE OR MORE of the controlled relays are ON. Therefore, if they are all OFF, the LED light will not be lit, but if at least one relay is ON, the LED will be lit.

Table 2.2

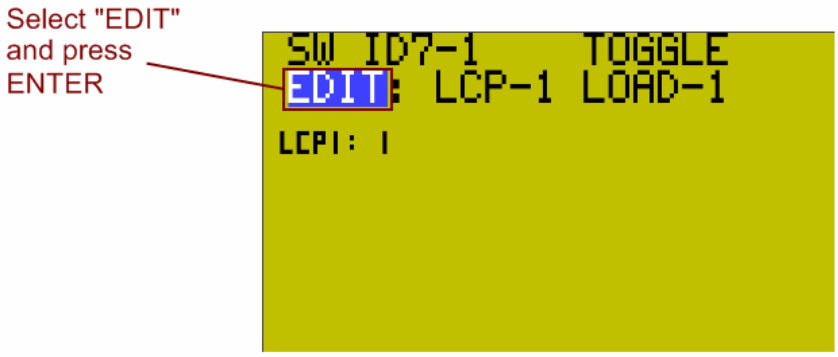
LED logic for other buttons	
Sets the logic which determines if the Status LED over each of the switch's buttons should be on or off. This field applies to buttons in TOGGLE MODE, ON MODE, MAINTAIN, MIX MODE (all other settings except OFF MODE).	
Possible Values	Result
AND	The Status LED on a button will light up only if ALL the controlled relays are ON. In MIX MODE the LED will be lit only if ALL the controlled relays are in the state (ON or OFF) the button was programmed to set them to. (This is also called "True" switch logic. It is usually used for MIX MODE or OFF MODE buttons.)
OR	The Status LED on a button will light up if ONE OR MORE of the controlled relays are ON. In MIX MODE the LED will be lit if ONE OR MORE of the controlled relays are in the state (ON or OFF) the button was programmed to set them to. (Usually this logic in used for buttons that are set to something other than MIX MODE or OFF MODE).
OR-INVERT	The Status LED on a button will light up only if NONE of the controlled relays are ON (i.e., they are all OFF). In MIX MODE the LED will be lit only if NONE of the controlled relays are in the state (ON or OFF) the button was programmed to set them to (they must all be in the opposite state from what the button was assigned to set them to).
AND-INVERT	The Status LED on a button will light up only if ONE OR MORE of the controlled relays are OFF. In MIX MODE the LED will be lit only if ONE OR MORE of the controlled relays are in the opposite state from what the button was programmed to set them to.

BACK TO PAGE 1
To go back to the first page of switch setup options, highlight the field "BACK TO PAGE 1" and press ENTER.

The Button Edit Screen

To access the Button EDIT screen, navigate to the switch button you want to program, highlight the word EDIT and press ENTER. These parameters are local, meaning that they apply to each individual button only, not the entire switch.

`USER MENU → PROGRAM SWITCH → SWITCH# → BUTTON# → EDIT`



The Button Edit Screen has the parameters which can be set as shown below.

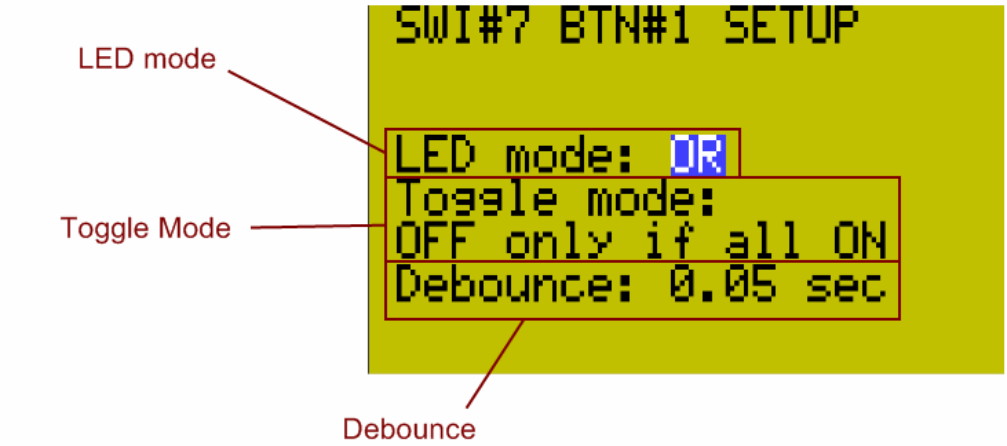


Table 3.1

LED mode
Sets the logic which determines if the Status LED over the button should be on or off. The operation of this field is identical in operation to the SETUP second screen LED logic except these settings apply only to a single button because they are local settings. The parameters are the same as those given in Table 2.1, if OFF MODE is used, or Table 2.2 above for all other modes.

Table 3.2

Toggle mode	
Sets how the button synchronizes multiple relays when toggling. For example, if a switch button is toggling relay X, relay Y and relay Z, the user can decide what happens when relay Y is ON and relays X and Z are OFF. The least desirable behavior is to have the relays just flip states so that no matter how the TOGGLE button is pressed either, relay Y is OFF and relays X and Z are ON, or relay Y is ON and relays X and Z are OFF. This would make it impossible to get all the lights ON or OFF at the same time. Therefore, one of the two types of logic below is used to sync the relays that are being toggled by a switch button.	
Possible Values	Result
OFF if any load ON	If any ONE OR MORE of the relays controlled by the switch button are ON, then pressing the toggle button will turn ALL relays OFF.
OFF only if all ON	If the relays are out of sync, the toggle button will first bring them all ON. Then, once they are all ON, pressing the toggle button again will turn them all OFF.

Table 3.3

Debounce
Works in the same manner as SETUP menu Debounce except it applies to individual buttons, has no "By Button" option, and only appears on screen if SETUP menu Debounce is set as "By Button".

Important Note on Debounce:
Use debounce carefully since a long debounce time can make it seem like a switch is not working. If a switch does not appear to function, always check for a debounce setting before assuming that the switch is bad.

Common Applications

Question:

How do I disable a particular switch button (for example, button 3)?

Answer:

1. Go to the Program Switch screen and select the switch you want to disable the button for. For physical Button 3, you would use the virtual Button 11 to enable and disable it. (See table 4.1 below)

Button Enable / Disable Relationships	
This virtual button:	**Disables this physical button:**
9	1
10	2
11	3
12	4
13	5
14	6

2. Select Button 11 on the Program Switch Screen. Assign a spare relay or empty relay position to this button and make sure it is set to ON MODE.

3. Back on the Program Switch screen, again select the switch you want to program and then go to the "SETUP" field and press ENTER.

4. Ensure that the option "**9-14 disable 1-6"** is set to **"Y"** (for Yes). See table 1.5 earlier in this guide for details.

5. Now, when you turn the relay you selected in step 2 above ON, Button 3 will be disabled and not function. When you turn the relay OFF, Button 3 will function again. Remember, you can turn this relay ON and OFF using schedules, groups, other switches, or even photocells that pass a certain light level!

Question:

How do I set a button to give an audible "error" beep when someone presses a disabled button?

Answer:

It can be very frustrating or confusing to a user when they press a button that usually turns certain lights on and off, only to find that nothing is happening. Sometimes, this happens when a switch button has been programmed to be disabled, but the user has no way of knowing. Therefore, it is helpful to set up the switch to make and "error" beep if the user presses a disabled button. To do this, follow the steps below:

1. Go the Program Switch screen and select the switch you want to set up the error beep for.

2. Highlight the "SETUP" field and press ENTER

3. Set the option labeled "**BTN Beep"** to "**Disable**". This causes the switch to emit a rapid series of beeps if a user presses a button that has been disabled. See Table 1.3 earlier in this guide for details.

4. If you want the switch to make a standard beep whenever an enabled button is pressed, and a rapid series of beeps when a disabled button is pressed, set the "**BTN Beep**" option to "**Push + Disa.**" See Table 1.3 earlier in this guide for more details.

Question:

How do I make a switch give an audible alert during a blink warning period?

Answer:

It is a fairly common request to have users notified a few minutes before the lights turn off, so they have an opportunity to override the offsweep. Instead of having the lights flash, or a separate horn installed, the new switch can be set to generate a beeping alert pattern as a warning that the lights will be shutting off shortly. To do this:

1. First, create a Maintain+Blink Group containing the relays that are going to be turned on and off with the schedule. You can use any Timer and Blink Warning settings you wish; typical values are a 2 hour Timer and a 5 minute Blink Warning. *Make sure that you include one spare relay or empty relay position in the group. This will be the "Horn Driver relay"*

2. Once you have created the Maintain + Blink Group above, go to the Relay Properties Screen for the individual relay you set as the "Horn Driver relay". Change the Horn Driver Mode parameter to "Y" (for Yes). Set the Horn One parameter to the length of time you want to audible alert to last. Then exit out of the screen.

3. (Optional) You will probably want to set the "No Blink" option to "Y" (for Yes) for all the relays in the Group to prevent them from flashing OFF and then ON again when the Blink Warning starts. Sometimes, the flash is desirable, but since there is going to be an audible alert, the lights blinking will most likely not be necessary.

4. Now create a new MOMENTARY ON Group that contains all the same relays as your group from step 1 above, including the Horn Driver Relay.

5. Assign the MOMENTARY ON Group to the switch and button that you want to behave as an override, to turn the lights on or keep them on at the end of the schedule / blink warning period.

6. For the same switch, go to the PROGRAM SWITCH screen, select the switch, highlight the "SETUP" field and press ENTER.

7. On the switch SETUP screen, set either the "7 ON =" or "8 ON =" field to the option "BEEP". (See Tables 1.1 and 1.2 earlier in this guide for full details).

8. In the Program Switch Screen, set either Button 7 or Button 8 (depending on which you selecting in the previous step) to ON MODE, and have it associated with the relay you set earlier as the Horn Driver Relay.

9. That's it. Now, at the end of the schedule, the switch will start beeping to signal that the lights will be shutting off shortly. If the user presses the override button on the switch, the beep alert will stop, and the lights will stay on for an additional 2 hours (or whatever duration the Timer was set to in the Maintain+Blink Group). At the end of this 2 hour period, the switch will start beeping again to signify the lights will be shutting off, at which point the user can override the shutoff again and start the cycle over again, or simply let the lights go off.

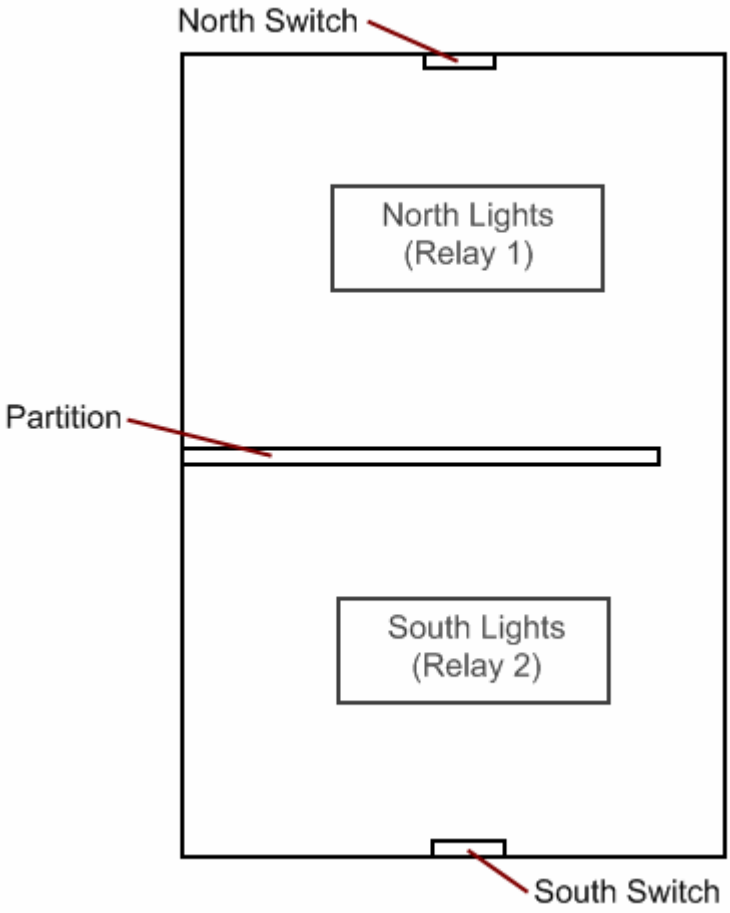
** The procedure just described can also be used to make the Locator LED blink. Just replace "BEEP" in step 7 with "Locator".

Question:

How do I set up a room with a partition, so that the switches change their function depending on whether the partition is open or closed?

Answer:

Let's take a scenario where a room has a switch on the north wall, a switch on the south wall, and a partition that can separate the room into a north half and a south half.



Each switch has an ON button and an OFF button. When the partition is open, the switches control both sets of lights in the room (North *and* South lights, i.e. Relay 1 *and* Relay 2). When the partition is closed, the South Switch turns on and off the South Lights (Relay 2) *only*, and the North Switch turns on and off the North Lights (Relay 1) *only*.

Here are the steps to accomplish this:

1. For the North Switch, program Button 1 to ON MODE for Relay 1 and Relay 2. Program Button 2 to OFF MODE for Relay 1 and Relay 2.

2. While still in the Program Switch screen for the North Switch, set Button 9 to ON MODE for Relay 1 *only*. Program Button 10 to OFF MODE for Relay 1 *only*.

3. Program Button 7 to ON MODE for a spare relay or empty relay position (Relay X).

4. Now go to the North Switch "SETUP" screen and set the parameter "7 ON =" to the option "BTS 1-6 < 9 – 14". (See Table 1.1 for full details).

5. Now, for the South Switch, program Button 1 to ON MODE for Relay 1 and Relay 2. Program Button 2 to OFF MODE for Relay 1 and Relay 2.

6. While still in the Program Switch screen for the South Switch, set Button 9 to ON MODE for Relay 2 *only*. Program Button 10 to OFF MODE for Relay 2 *only*.

7. Program Button 7 to ON MODE for the same spare or empty relay position you used in step 3 above (Relay X).

8. Now go to the South Switch "SETUP" screen and set the parameter "7 ON =" to the option "BTS 1-6 < 9 – 14". (See Table 1.1 for full details).

9. Set another switch button, or a Digilink with an input coming from a partition sensor, to turn ON Relay X when the partition is CLOSED and turn OFF Relay X when the partition is OPEN.

10. That's it. When the partition is closed or separate switch button is pressed, each switch will only control the lights in their half of the room. When the partition is open, each switch controls ALL of the lights in the room.