Introduction

There are a variety of ways in which scenes can be selected by a user. This document focuses only on controlling scenes by using a rotary encoder to step through them. For the initial setting up of scenes and alternative ways of controlling scenes please refer to *AN 005 – Configuring Scenes* and *AN 006 – Scene Control with Push-Buttons*.

Background Information

Rotary Encoders are the most similar to traditional dimmers and can be used in this way to dim a single light circuit, see *AN002 – Dimming Mains Lights*. This document explains how scene control can be achieved using rotary encoders, though we do urge our customers to consider the use of rotary encoders for this task carefully as this solution comes with some limitations and implications. There are two approaches each with some limitations:

Approach 1 – Control via Analogue Channels:

- A maximum of five scenes can be used.
- Only one set of scenes can be used per WebBrick
- All analogue inputs are required for this solution

Approach 2 – Direct Scene Control:

- Whilst technically working, the interface may feel uncomfortable, since encoder 'clicks' do not necessarily match the number of scenes traversed.
- Traversal of scenes may only take half a turn of the encoder (if 24 cycle encoder is used).
- It can be unclear what scene is selected until fades are completed (avoid long fade times)

If approach 2 is used we strongly advice to use a 6 cycle rotary encoder with no detent. For approach 1 the type of rotary encoder is not as important though an encoder with a high number of cycles can make scene control very fiddly.

The following sections cover the implementation of approach 1 to control scenes. For information on how the setup can be changed if approach 2 is

to be used please refer to the Advanced Operation Section

Hardware Setup

The following components are required for the hardware setup of this application:
- 1 x WebBrick Controller
- 1 x 12.6V to 18V power supply delivering a minimum of 250mA
- 1 x Rotary Encoder
- 4 x 47kΩ resistor
- Light circuits to be controlled by scenes (optional)

In this example the rotary encoder is used to scroll through 5 scenes using one analogue output and the 4 analogue inputs of the WebBrick.

In the advanced section of this document it is described how multiple rotary encoders can be used to control the same set of scenes and also how it is possible to control scenes directly from a rotary encoder without having to use the analogue output and inputs (approach 2).

Please follow the next 4 steps to configure the circuit correctly.

Mandatory Connections:

1. Connect the positive output of a suitable power supply to the "12V In" terminal on the WebBrick.

2. Connect the negative/ground output of the power supply to the "Gnd In" terminal on the WebBrick.

3. Connect the ground of the rotary encoder to one of the signal ground terminals, marked "G" on the WebBrick.

4. Connect the 2 remaining pins of the rotary encoder, commonly referred to as A and B, to an even-odd adjacent pair of digital inputs on the WebBrick, i.e.:
   o   0 - 1
   o   2 - 3
   o   4 - 5
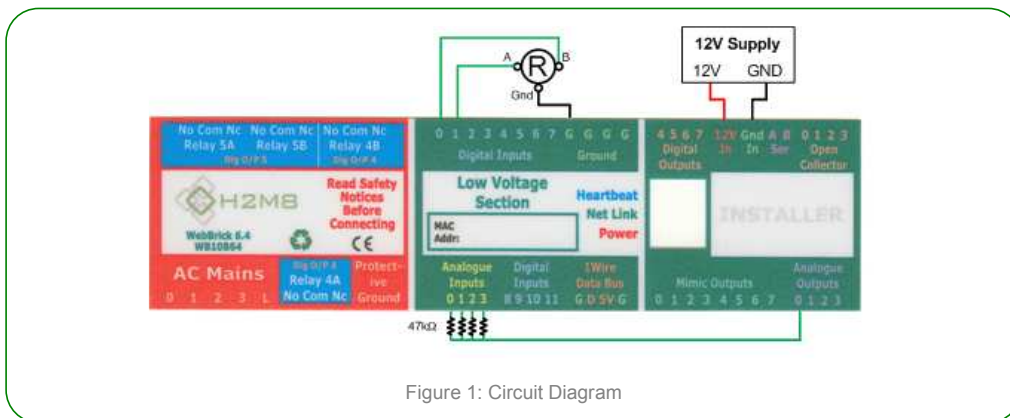   o   6 - 7
   o   8 - 9
   o   10 - 11

Figure 1: Circuit Diagram

If there are light circuits in place which you want to control as part of the scene setup, then please connect these to the WebBrick and test them individually prior to proceeding. In case this is just a test setup and no actual light circuits exist, then following the "Software Configuration" section of *AN 005 – Configuring Scenes* is sufficient to continue with the next steps of this application note.

Please compare your circuit with the diagram shown in figure 1 to ensure that your circuit is configured correctly prior to switching on the 12V power-supply.

Software Configuration

To configure the rotary encoder to scroll through the scenes it is necessary to access the WebBrick via its webpage and alter the configurations associated with the inputs the rotary encoder is connected to. If you are not familiar with the procedures required to access the WebBrick from a PC then please refer to *AN 004 – Networking and Accessing WebBricks* for more detail.

Part 1:

Use your preferred browser to go to the WebBrick homepage (by default: http://10.100.100.100/) and complete the following steps.

1. Navigate to the login page by clicking on the Login button at the top left of the main page.

2. On the login page enter the installer password which will give you installer rights and allow you to change the configuration settings. By default this password is *installer* (see figure 2).
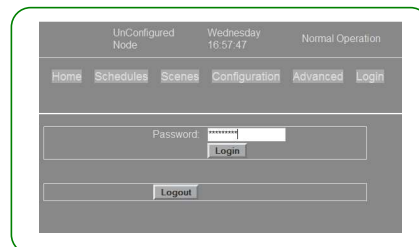

Figure 2: Login Page

3. Pressing the login button will automatically redirect you to the configurations page. On this page click on the line, which corresponds to the first of the digital inputs you connected the rotary encoder to. In this example we used digital input 0 (see figure 3).
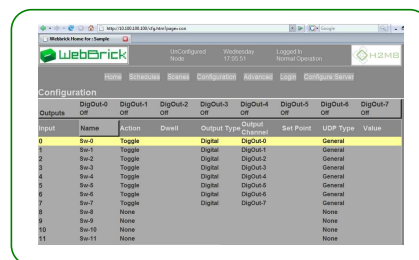

Figure 3: Configuration Page

4. This will open the configurations page for digital input 0. On this page you can alter the action provoked when digital input 0 is triggered. To increase the voltage level of analogue output 0 and hence the voltage level on the analogue inputs the following changes have to be made. The Action has to be changed to "Up", the output type has to be changed from "Digital" to "Analogue" and finally the output channel has to be set to "An Out-0". Before clicking save the Option field is to be set to 4 to indicate the

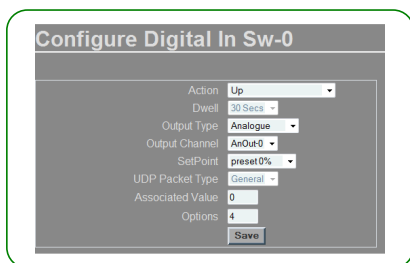use of a rotary encoder on a pair of adjacent digital inputs.

Configure Digital In Sw-0

Action	Up
Dwell	30 Secs
Output Type	Analogue
Output Channel	AnOut-0
SetPoint	preset 0%
UDP Packet Type	General
Associated Value	0
Options	4
	Save

Figure 4: Digital Input 0

5. Once back on the configuration page click on the second line, which corresponds to digital input 1.

6. To decrease the voltage level of analogue output 0 when the rotary encoder is turned counter clockwise, carry out the same changes as described in step 4, apart from setting the Action to "Down" instead of "Up".

At this point it is worthwhile to check that the rotary encoder functions correctly. We expect that when turning the rotary encoder clockwise the voltage of analogue ouput 0 as well as the input voltage on analogue inputs 0 - 3 increases. The easiest way to check if this works, is to go to the home page of the WebBrick note the current level of analogue output 0 and the analogue inputs, then turn the rotary encoder and refresh the webpage. The values should have either increased or decreased depending on the direction the rotary encoder was tured.
Note: If you are having problems at this stage please refer to the section titled "Trouble Shooting"

Part 2:

Having configured the rotary encoder to control analouge output 0 and hence the voltage on the analouge inputs. The next steps explain how to adjust the high and low thresholds of the analouge inputs to trigger the wanted scenes.

1. Navigate to the configuration page, by clicking "Configuration" in the menu at the top of the page.

2. Scroll down the page until you see the section for the analogue inputs and click on the first line, which corresponds to the low threshold of analogue input 0 (see figure 5).

Analog In	Name	Value	Threshold	Action	Dwell
0	AnIn-0	0%	0%	None	
	AnIn-0		100%	None	
1	AnIn-1	0%	0%	None	
	AnIn-1		100%	None	
2	AnIn-2	0%	0%	None	
	AnIn-2		100%	None	
3	AnIn-3	0%	0%	None	
	AnIn-3		100%	None	

Figure 5: Configuration Page

3. This opens the configuration page for the low threshold of analogue input 0. On this page you can alter the action provoked when the voltage on analogue input 0 falls below the threshold value. Since we are trying to create a list of scenes which we can step through depending on the voltage detected on the analogue inputs, the Threshold field should be set to "10" (values are given in percent), the Action to "On", Output type to "Scene" and output channel to the first scene, here "Scene 0". Finally click Save to save these settings.
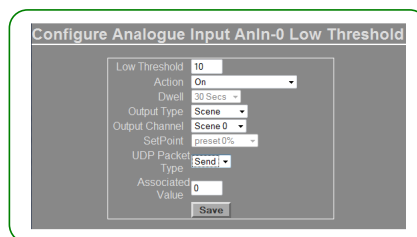

Configure Analogue Input AnIn-0 Low Threshold

Low Threshold	10
Action	On
Dwell	30 Secs
Output Type	Scene
Output Channel	Scene 0
SetPoint	preset 0%
UDP Packet Type	Send
Associated Value	0
	Save

Figure 6: Analogue Input 0

4. Once back on the configuration page click on the second line in the analogue inputs section, which corresponds to the high threshold of analogue input 0.

5. This time set the Threshold field to "30", the Output Type to "Scene" and the "Output Channel" to "Scene 1". As before Action should be set to "On" before clicking on Save.

6. The same has to be done for the remaining three analogue inputs; setting the Action to "On" the Output Type to "Scene" and the other values according to the following table.

Analogue Input	Threshold Value	Output Channel
0 - Low	15	Scene 0
0 - High	25	Scene 1
1 - Low	35	Scene 1
1 - High	45	Scene 2
2 - Low	55	Scene 2
2 - High	65	Scene 3
3 - Low	75	Scene 3
3 - High	85	Scene 4

Operation

Once the software setup is completed, the following functionality should be observed.

When turning the rotary encoder clockwise the WebBrick steps up through the scenes 0 to 4 and when turning it counter clockwise it steps down through the scenes.

If you can observe the operation described above you may want to proceed to the section titled 'Advanced Operation' to find out how multiple rotary encoders can be used to control the same set of scenes.

Trouble Shooting

If, despite having followed the previous instructions, the desired operation was not achieved, then the following steps may assist you to find the fault.

Fault 1: The function of the rotary encoder is inversed, i.e. the voltage rises when turned counter clockwise and falls when turned clockwise.

In this case you have two options to solve the problem. Either swap the A and B connections from the rotary encoder to the WebBrick or swap the "Up" with "Down" and vice versa in the Action field for the configuration of the digital inputs.

Fault 2: The voltage levels on the analogue inputs are changing, but there are no changes apparent changes when scenes should be switching.

1. Navigate to the Scenes page by clicking on "Scenes" in the menu at the top of the page.

2. Check that the scenes that are triggered by the thresholds are configured. If this is not the case, please refer to AN 005 – Configuring Scenes.

Advanced Operation

Having achieved the desired operation using a single rotary encoder one may want to know how multiple rotary encoders can be used to control the same set of scenes. This is particularly useful in large rooms with multiple switch locations.

Adding further rotary encoders:

Firstly a second rotary encoder has to be connected to the WebBrick, this requires an even-odd adjacent pair of digital inputs to be free. For details on how to connect the rotary encoder follow the steps in the Hardware Setup section of this application note.

Once the second encoder is connected the *Part 1* of the *Software Setup* section has to be repeated; only this time for the two digital inputs the second rotary encoder is connected to.

After finishing *Part 1* of the *Software Setup* both encoders are configured to control analogue output 0 and hence will control the scenes.

Approach 2 - Direct Scene Control:

Another way to control scenes using a rotary encoder is to have the rotary controller configured to directly trigger the next/previous scene, rather than targeting the analogue output. The advantage of this approach is that the analogue output and inputs can be used for other tasks.

Since the analogue output and inputs are not required anymore the wiring between them may be removed. This also means that *Part 2* of the *Software Setup* is now redundant and will not affect the scene control.

To configure the digital inputs connected to the A and B pin of the rotary encoder please follow steps 1 - 3 in Part 1 of the Software Setup section and then continue as followed.

1. Step 3 will have opened the configurations page for digital input 0. On this page you can alter the action provoked when digital input 0 is triggered. To trigger the next scene when the rotary encoder is turned clockwise the following changes have to be made. The Action has to be changed to "Next", the Output Type has to be changed to "Scene" and finally the Output Channel has to be set to the last scene in the set. We are using 8 scenes in this example (scene 0 - 7), hence in our case this is set to "Scene 7". Before clicking save remember to set the Option field to 4 to indicate the use of a rotary encoder on a pair of adjacent digital inputs.
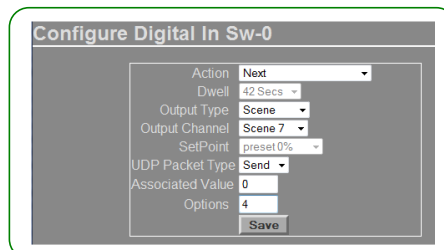
Figure 7: Digital Input 0

2. Once back on the configuration page click on the second line, which corresponds to digital input 1.

3. To trigger the previous scene when the rotary encoder is turned counter clockwise carry out the same changes as described in step 1, apart from setting the Action to "Prev" instead of "Next" and setting the Output Channel to the lowest scene used in your scene set, in this example that is "Scene 0".

Once you have completed the above steps the rotary encoder will scroll through the scenes without having to analogue output and inputs. You may notice though that selecting the desired scene is more fiddly than before and usability is limited. To achieve best possible usability we recommend using a 6 cycle rotary encoder with no detent.

Related Documents

AN004 – Networking and Accessing WebBricks

AN005 – Configuring Scenes

AN006 – Controlling Scenes with Push-Buttons

Liability Disclaimer

These notes are intended for individuals that are familiar with working on mains and are aware of taking the necessary precautions. All WebBrick Application Notes are to be seen as guidelines only. WebBrick Systems cannot take any responsibility for the wiring carried out by individuals, or damage caused as a result of incorrect wiring.

Appendix

Comment [PS1]: Missing information

Commonly used Components for Evaluation:		
	RS Order Code	**Farnell Order Code**
Suitable WebBrick Power Supply		
Rotary Encoder 24 Step		
Rotary Encoder 6 Step		

WebBrick® Systems