AN002 – Dimming Mains Lights

WebBrick Application Notes

Introduction

There are many different ways in which mains circuits can be controlled through a WebBrick. This document focuses only on dimming mains lighting using the 0 to 10V analogue outputs of the WebBrick in conjunction with a dimming unit such as <Name of Dimmer Unit>. For alternative ways of controlling mains please refer to *AN 001 – Switching Mains using WebBrick Triacs* or *AN 003 – Controlling Curtain Motors (using double switchover relays).*

Hardware Setup

The following components are required for the hardware setup of this application:

- 12.6V to 18V power supply delivering a minimum of 250mA
- Two pushbuttons
- Fused mains supply
- <Name of Dimmer unit> or similar

Please refer to the table in the appendix for a list of commonly used components for each of the above.

In this example two low voltage pushbuttons are used to dim a single mains lighting circuit by controlling one channel of <Name of Dimmer unit> dimmer with one of the 0 to 10V analogue outputs of the WebBrick.

Please follow the next 6 steps to configure the circuit correctly.

Low Voltage Connections:

1. Connect the positive output of a suitable power supply to the terminal marked “12V In” on the WebBrick.
2. Connect the negative/ground output of the power supply to the terminal marked “Gnd In” on the WebBrick.
3. Connect one side of the first pushbutton to “Digital Input 0” and the other side to one of the ground terminals on the WebBrick.
4. Do the same for the second pushbutton, but this time using “Digital Input 1”.
5. “Connect Analogue Output 0” to the control input for channel XXX of the dimmer.
6. To assure correct operation it is also necessary to connect one of the ground terminals of the WebBrick (marked “G”) to the Signal Ground on the XXX dimmer.

Figure to be created once information on dimmer unit is available.

Figure 1: Circuit Diagram

Mains Voltage Connections:

Since the mains lighting circuit is controlled through the dimmer it is not necessary to make any connections to the mains section of the WebBrick.

For instructions of setting up the mains light circuit connected to the dimmer please refer to the information provided by the manufacturer. For the <Name of Dimmer unit> this information can be found on www. <Name of Dimmer unit>.com.

Please compare your circuit with the drawing in figure 1 to ensure that your circuit is configured correctly prior to applying power to the circuit.

Software Configuration

This application intends to use one pushbutton to increase the brightness level and the other to decrease it. For this purpose it is necessary to access the WebBrick via its webpage and alter the configurations associated with the inputs the pushbuttons are 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.

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 password which will give you installer rights and allow you to change configuration settings. By default this password is ***installer*** (see figure overleaf).

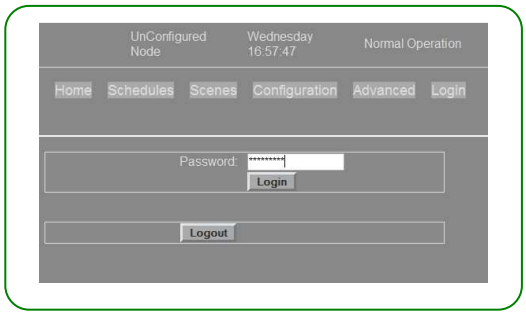

Figure 2: Login Page

3. Pressing the login button will automatically redirect you to the configurations page. On this page click on the first line, which corresponds to digital input 0 (see figure 3).

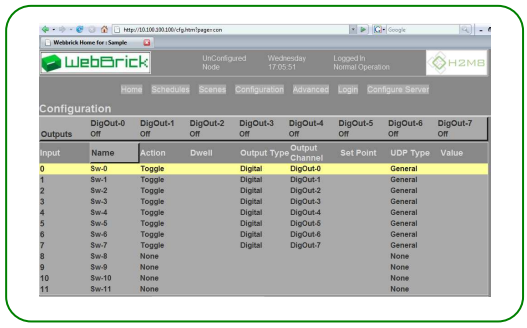

Figure 3: Configuration Page

4. This will open the configuration page for digital input 0. On this page you can alter the action provoked when the pushbutton connected to digital input 0 is pressed. To increase the voltage level of analogue output 0 and hence the brightness of the mains light connected to the dimmer the following changes have to be made. The action has to be changed from “Toggle” 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”. See alsonfigure 3 for these settings.

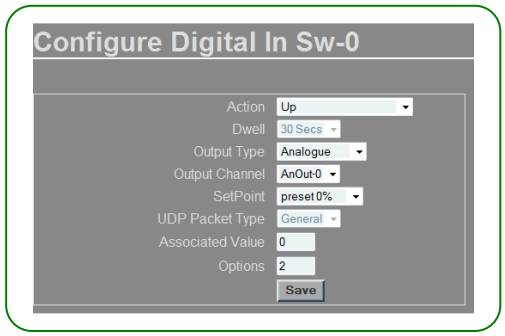

Figure 4: Digital Input 0

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 and hence the brightness of the mains light connected to the dimmer, carry out the same changes as described in step 4, apart from setting the action to “Down” instead of “Up”.

Operation

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

When pressing the pushbutton connected to digital input 0 the brightness level of the mains light will increase. When pressing the pushbutton connected to digital input 1 the brightness level of the mains light will decrease.

The change in brightness level can also be controlled from the main page of the WebBrick. One can use the buttons Sw-0 and Sw-1, which is equivalent to pressing the pushbuttons, or click on one of the presets for analogue output 0.

If you can observe the operation described above you may want to proceed to the section titled 'Advanced Operation' to find out how a rotary encoder can be used instead of two pushbuttons to dim the mains light.

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.

1. Use your preferred browser to navigate the WebBricks main page. Press the pushbutton connected to digital input 0 and refresh the webpage. If the push-button is configured correctly one should observe the output level of analogue output 0 is increasing.

2. If the output level is increasing, but the light in the mains circuit is not illuminating, then the problem is likely to be due to a wiring fault between the WebBrick and the dimmer, or in the mains section of the circuit.

3. If the output level is not changing, then you may try to simulate the pressing of the pushbutton by clicking on the button labelled Sw-0 located on the main webpage.

4. If pressing the button Sw-0 results in an increase of the analogue output 0 (and in illumination of the mains light), then the problem is likely to be due to the wiring of the pushbutton.

5. If pressing the button Sw-0 still does not result in a change of the analogue output 0, then please check the settings of digital input 0 on the configuration page (see figure 3) as this is likely to be the source of failure.

Advanced Operation

Having achieved the correct operation one may notice that repeatedly pressing a pushbutton to increase and decrease lighting levels is rather tedious. There are many ways to make the dimming process easier. This section will illustrate how a rotary encoder can be used to effectively control a single dimmer channel. If multiple dimmer channels are to be controlled at once you may want to refer to *AN 005 – Using Scenes*.

The two pushbuttons previously used have to be replaced by a rotary encoder in the following manner.

1. Switch off the WebBrick power supply.

2. Disconnect the two pushbuttons.

3. Connect the ground pin of the rotary encoder to one of the ground terminals (marked "G") on the WebBrick.

4. Connect pin A of the rotary encoder to "Digital Input 0" and pin B to "Digital Input 1".

Apart from replacing the pushbuttons with the rotary encoder the configuration of the digital inputs have to be slightly changed. For this purpose use your preferred browser and navigate to the WebBrick homepage (by default: http://10.100.100.100/) and complete the following steps:

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

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

3. Pressing the login button will automatically redirect you to the configurations page. On this page click on the first line, which corresponds to digital input 0 (see figure 3).

4. As before this will open the configuration page for digital input 0. To correctly operate with a rotary encoder the value in the options filed has to be changed to 4. Also see figure 5 for the correct settings.

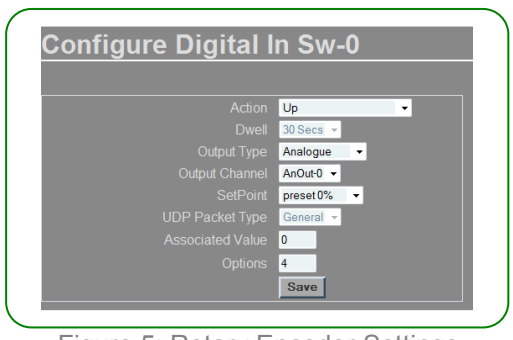

Figure 5: Rotary Encoder Settings

5. The same change has to be applied to the configuration of digital input 1.

Once these changes have been carried out, turning the rotary encoder will increase/decrease the brightness of the mains light.

Related Documents

AN 001 – Switching Mains using WebBrick Triacs

AN 003 – Controlling Curtain Motors

AN 004 – Networking and Accessing WebBricks

AN 005 – Configuring Scenes

Liability Disclaimer

These notes are intended for individuals that are familiar with working on mains and are aware of taking the necessary precautions. All H2M8 Application Notes are to be seen as guidelines only. H2M8 cannot take any responsibility for the wiring carried out by individuals, or damage caused as a result of incorrect wiring.

Appendix

Commonly used Components for Evaluation:

	RS Order Code	Farnell Order Code
Suitable WebBrick Power Supply		
Pushbuttons		
LEDs for Mimics		
Pushbuttons with Mimic LEDs		