AN001 – Switching Mains using WebBrick Triacs

WebBrick Application Notes

Introduction

There are many different ways in which mains circuits can be controlled through a WebBrick. This document focuses only on switching mains circuits using the triacs of the WebBrick. For alternative ways of controlling mains please refer to *AN 002 – Dimming Mains Lighting* or *AN 003 – Controlling Curtain Motors.*

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
- A single pushbutton
- Fused mains supply
- 240V lamp fitting (including light bulb)
- LED with matching bias resistor (optional)

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

In this example a low voltage pushbutton is used to control a single mains lighting circuit via one of the four triacs of the WebBrick. Optionally an LED can be included in the circuit, which will reflect the state of the triac controlling the mains circuit. Such LEDs are very common in home automation environments and due to their state reflecting functionality, are referred to as mimics.

Please follow the next 7 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 “Gnd In” terminal on the WebBrick.

3. Connect one side of a pushbutton to “Digital Input 0” and the other side to one of the ground terminals (marked “G”) on the WebBrick.

4. Optionally, connect the positive pin of an LED in series with a bias resistor to “Mimic Output 0” and its negative pin to one of the ground terminals (marked “G”) on the WebBrick.

Mains Voltage Connections:

<u>Note:</u> Please read the safety notices prior to making mains connections to the WebBrick!

Each of the four triac channels in the WebBrick has a maximum power rating of 500W, with a combined maximum rating of 1500W across all channels. Prior to carrying out the following

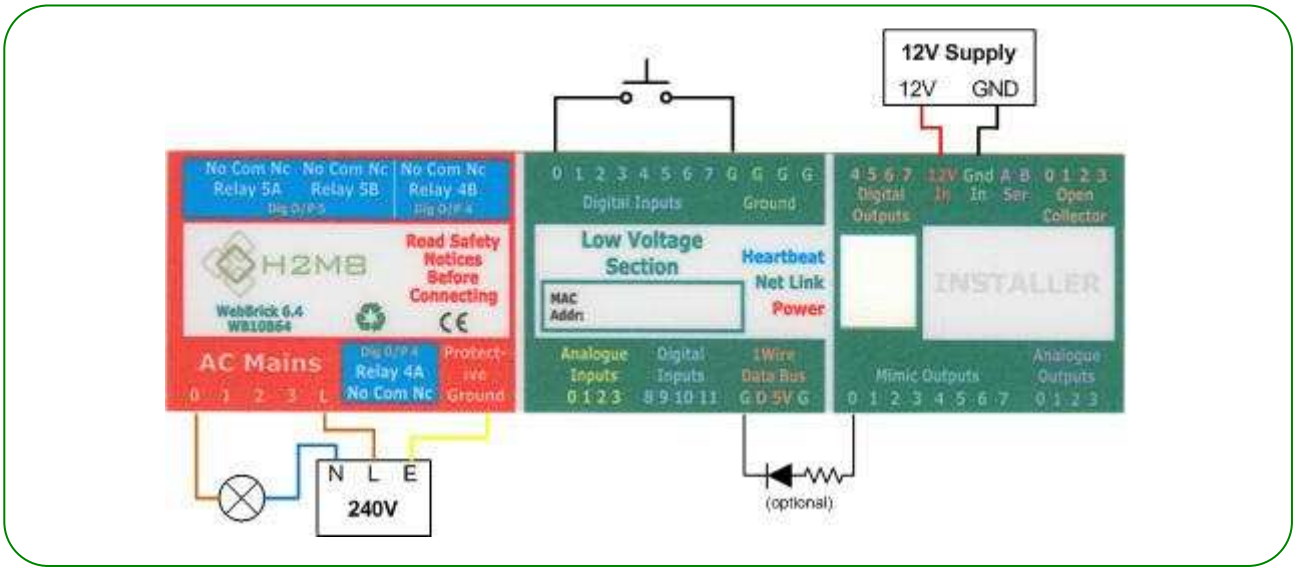

Figure 1: Circuit Diagram

instructions please make sure that your lighting circuit does not exceed this maximum rating.

1. Ensure that the mains are turned off!

2. Connect earth (Yellow/Green) to the terminal marked “Protective Ground” on the WebBrick.

3. Connect the live wire (brown) to the terminal marked “L” on the WebBrick.

4. Connect one side of a light fitting to triac channel 0 (marked “AC Mains 0”) on the WebBrick and the other side to neutral (blue) of the mains supply.

Please compare your circuit with the drawing in figure 1 to ensure that your circuit is configured correctly prior to switching on mains or the 12V power supply.

Operation

Once all the connections to the WebBrick have been made as described in the previous section, the mains and the WebBrick power supply can be switched on. The order in which this is done is of no importance.

If all WebBrick settings are set to default, then no changes have to be made in order to achieve the correct operation of this circuit.

One will be able to observe that when the pushbutton is pressed the light connected to triac 0 lights up and the Mimic (if implemented) becomes bright. When pressed again the light is switched off and the mimic becomes dimly lit.

If you can observe the operation described above you may want to proceed to the section titled Advanced Operation to learn how you can change the action triggered by the pushbutton.

Software Configuration

If the functionality of the circuit is not as expected, then please confirm the connections to the WebBrick. If these are correct, then it may be that the WebBrick has previously been configured to provide other functionality.

Since this application requires all WebBrick settings for the relevant ports to be set to default, the easiest way to change the settings is to perform a factory reset. If the settings for other ports of the WebBrick are to be retained the relevant settings for this application can be returned to default manually.

Performing a Factory Reset:

To carry out a factory reset first ensure that the WebBrick power supply is switched off. Next use a credit card or another flat, non-conducting object to depress the button located in the crack between the green top cover and the row of connectors just below the cat5 connector. Whist depressing the button switch the 12V power supply back on. One will be able to observe that the blue heartbeat LED on the WebBrick will light up solid for 2 seconds prior to its normal start-up behaviour (The normal start-up behaviour consists of a series of rapid flashes).
Once the heartbeat LED is flashing slowly, indicating normal operation, one can let go of the reset button and the factory reset is complete.

Manual Port Configuration:

If the WebBrick has been configured for other functionality, which is to be retained, it is necessary to change relevant settings back to default manually. For this process it is necessary to access the WebBricks web pages from a PC. 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 open 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***.

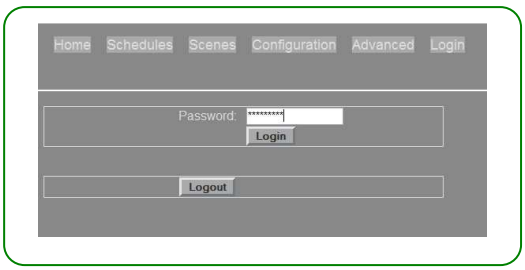

Figure 2: Login Page

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 overleaf).

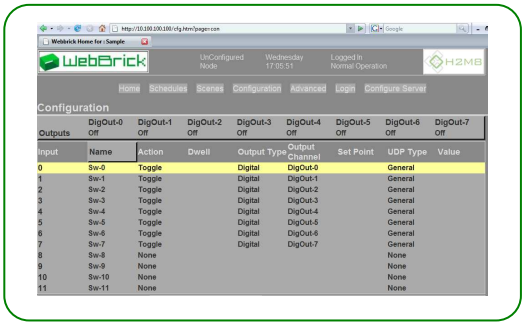

Figure 3: Configuration Page

4. This will open the configuration page for Digital Input 0. Please ensure that the settings are as displayed in figure below. Once your settings are matching click save.

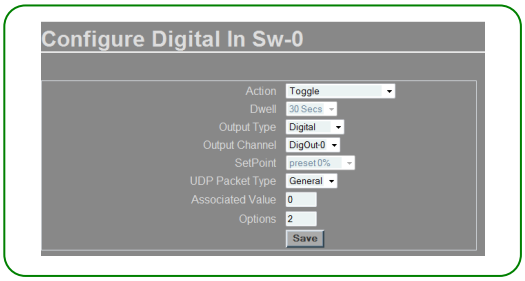

Figure 4: Toggle Configuration

After completion of the above steps, your WebBrick is configured to work as specified in the Operation section. If you are still having problems please follow the steps in the trouble shooting section.

Trouble Shooting

If, despite having carried out a factory reset or having manually configured the WebBrick, the desired operation was not achieved, then the following instructions may assist you to find the fault.

1. Use your preferred browser to navigate the WebBrick's 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 state of digital output 0 changing from 'Off' to 'On' (or 'On' to 'Off' respectively).

2. If the state of output 0 is changing, but the light in the mains circuit is not illuminating, then the problem is likely to be due to a wiring fault in the mains section of the circuit.

3. If the state of output 0 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 a change of state of the 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 state in the output 0, then please check the settings of digital input 0 on the configuration page (see figure 4) as this is likely to be the source of failure.

Advanced Operation

Having used a WebBrick to act as a simple light switch for a single light circuit, this section will illustrate how it is possible to change the behaviour of the circuit without the need for rewiring. In this example the mains light is to come on for a dwell period every time the pushbutton is pressed and turn off automatically once the dwell period is over. This functionality resembles the one of security lighting.

For this purpose it is necessary to access the WebBrick via its Webpage and alter the configuration associated with the input the push-button 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.

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***.

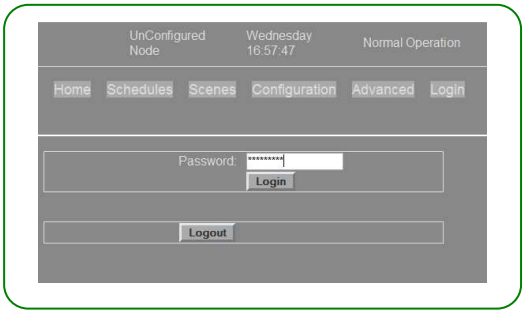

Figure 5: Login Page

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 below).

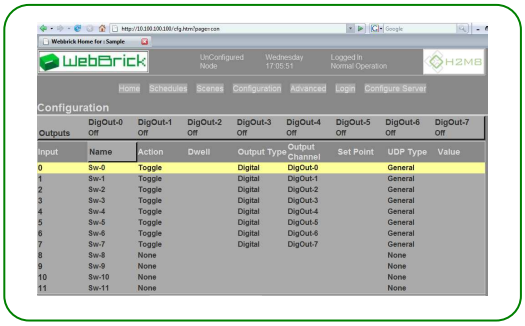

Figure 6: Configuration Page

4. This will open the configuration page for Digital Input 0. On this page you can alter the action provoked when input 0 is triggered. The fields of interest to achieve the functionality desired are the first and second field. In the first field the action has to be changed from 'Toggle' to 'Dwell' and in the second filed the duration of the dwell has to be set to one of 4 presets. The most sensible dwell period for this test application is 30 seconds. See also figure 7 for these settings.

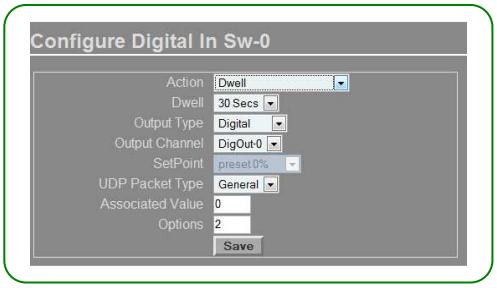

Figure 7: Dwell Configuration

Once digital input 0 has been configured to provoke a dwell rather than a toggle, one can observe that the mains light will turn on and, after the dwell duration, turn off automatically.

Related Documents

AN002 – Dimming Mains Lights

AN003 – Controlling Curtain Motors

AN004 – Networking and Accessing WebBricks

WebBrick Mains Voltage Safety Notices

Liability Disclaimer

These notes are intended for individuals who 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 by 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		