WebBrick Switch Interface

Requirements Specification

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Introduction

With the current WebBrick architecture to maintain the complete openness for switches and buttons the number of connections brought back to the WebBrick can be high.

For example, a 5 button 5 mimic plate would require 20 connections and therefore three CAT5 cables.

It is suggested that a module be developed that can be located at the switch plate to multiplex the connections back to the WebBrick using a simple 'open' protocol that would require a maximum of 4 connections.

Protocol Choices

The WebBrick has a number of protocols that might be used for this module:

Ethernet

IR

Dallas 1 Wire

RS232

RS485

Ethernet : this could be expensive and had the disadvantage that a switch or network failure could not be survived (i.e. Breaks 'Missing is not Broken')

IR: This could be used in a 'wired' format, i.e. The messages are sent down the wire rather than in IR. Has the disadvantage that two simultaneous button pressed might collide.

Dallas 1 Wire: This has the disadvantage that software needs to be written into WebBrick. A module based on this interface would be difficult to make 'open'.

RS232 and RS485: These interfaces could be made open but suffer the major disadvantage that the RS485 interface is destined to implement DMX. There is only one spare serial interface and this implements both the RS232 and RS485 standards depending on a software option.

Switches and Mimics

The interface should have inputs for four switches and outputs for four mimics.

Switch inputs are seen as either floating of grounded and may have the following characteristics:

1. Rising Edge – as seen in PIRs
2. Falling Edge – as seen in regular push buttons
3. Both Edges – as seen with toggle switches
4. Rotary Encoder – as seen with regular rotary encoders and switch inputs used as pairs

Note that the above numbers match with the 'option' numbers for the Digital Inputs of WebBricks.

Mimics are generally LEDs, although depending on the switch technologies may already have a series resistor in place. Mimics are PWM driven so that they have differing brightness for 'ON' and 'OFF' levels. The current WebBrick Mimic outputs have 64 steps and so it would seem sensible to take this through to this interface.

Addressing

WebBricks have 12 digital inputs, it is intended that this module overlays on these. Therefore addressing needs to look at two issues:

i. Starting Digital input address of this module
ii. How many inputs are in use for this module#

The mechanism for setting address and range needs to be simple and inexpensive.

Physicals

The interface is intended to be used within a standard European back box at 76mm x 76mm. There must be remaining space for four 19mm round switches.

Either rising clamp or IDC terminations may be specified. For IDC we must take into account the tools that an installer would already own.

Design Goals

Here we delve into company goals, ethos and values, so in general terms we have:

i. Affordable. This solution needs to be aimed at customers with a household income of £40K and above (i.e. Not millionaires!). A switch plate retail cost of around £40 for a two way plus mimics is a reasonable goal. This means a build cost of around £18 and therefore this interface needs to have a BOM of around £5

ii. Open. This solution should be usable with WebBricks and other products. For example a computer with suitable interfaces.

iii. Extensible. This solution could be developed into a whole back plate for a switch.