

WEBSwitch

Users Manual



Model: XRDI-WS1

Revision: 1.0 - November 22, 2006



a division of...
Xytronix Research & Design, Inc.
North Logan, Utah, USA

Contents

Trademark and Copyright Information

Warranty

Installation Guidelines (Read Before Installing)

Section 1: Introduction

1.1 Unit Description

Section 2: Installation and Setup

2.1 Connection

2.1.1 Network Connection

2.1.2 Power Connection

2.1.3 Output Connection

2.2 Establishing Communications for Setup

2.2.1 Option 1: Assign a Temporary IP Address to WebSwitch™

2.2.2 Option 2: Assign a Temporary IP Address to Configuration Computer

2.2.3 Open Configuration Web Page

2.3 Web-Based Setup

2.3.1 Main Setup Page

2.3.2 Network Setup Page

2.3.3 Password Setup Page

2.3.4 Out1 and Out2 Setup Pages

2.3.5 Control Page Setup

Section 3: Operation

3.1 Browser Operation

3.2 XML Operation

Appendix A: Restoring Factory Default Settings

Appendix B: Specifications

Appendix C: Open TCP Legal Notice

Trademark and Copyright Information

This document is Copyright ©2005-2006 by Xytronix Research & Design, Inc. All rights reserved. WebSwitch™ and ControlByWeb™ are Trademarks of Xytronix Research & Design, Inc. 2005-2006.

Portions of the software used in WebSwitch™ are open source and appropriate copyright and legal notices are listed at the end of this manual. All other parts of the software are property of Xytronix Research & Design, Inc. ©2005-2006. The hardware design, schematics, PCB layout, concept, graphics, users manual, etc., are property of Xytronix Research & Design, Inc. ©2005-2006. WebSwitch™ may not be opened, dis-assembled, copied or reverse engineered.

No part of this manual may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying or scanning, for any purpose other than the personal use by the purchaser of this product. Xytronix Research & Design, Inc., assumes no responsibility for any errors that may appear in this document.

Whereas effort has been made to make the information in this document as useful and accurate as possible, Xytronix Research & Design, Inc. assumes no responsibility for the application, usefulness, or completeness of the information contained herein. Under no circumstance will Xytronix Research & Design, Inc. be responsible or liable for any damages or losses including direct, indirect, special, incidental, or consequential damages or losses arising from either the use of any information contained within this manual or the use of any products or services referenced in this manual.

Xytronix Research & Design, Inc. reserves the right to change any product's features, specifications, documentation, warranties, fee schedules, and conditions at any time and without notice.

Warranty

This Xytronix Research & Design, Inc. product has a warranty against defects in material and workmanship for a period of one year from the date of shipment. During the warranty period, Xytronix Research & Design, Inc. will, at its option, either repair or replace products that prove to be defective. This warranty is extended to the original purchaser of the equipment only.

For warranty service or repair, the product must be properly packaged, and returned to Xytronix Research & Design, Inc. The purchaser shall prepay all charges for shipping to Xytronix Research & Design, Inc., and Xytronix Research & Design, Inc. will pay the shipping charges to return the product to the purchaser as long as the product is shipped within the United States. If the product is shipped outside of the United States, the purchaser shall pay all shipping charges, duties, and taxes.

Limitation

The foregoing warranty shall not apply to defects or damage resulting from improper use or misuse, unauthorized repair, tampering, modification, improper connection, or operation outside the electrical/environmental specifications for the product. Further, the warranty does not cover Acts of God, such as fire, flood, hurricanes, and tornadoes. This warranty does not cover damage to property, equipment, direct, indirect, consequential, or incidental damage (including damage for loss of business profit, business interruption, loss of data, and the like) arising out of the use or misuse of this product. **UNDER NO CIRCUMSTANCES WILL THE LIABILITY OF XYTRONIX RESEARCH & DESIGN, INC. TO THE PURCHASER OR ANY OTHER PARTY EXCEED THE ORIGINAL PURCHASE PRICE OF THE PRODUCT, REGARDLESS OF THE FORM OF THE CLAIM.** No other warranty is expressed or implied. Xytronix Research & Design, Inc. specifically disclaims the implied warranties or merchantability and fitness for a particular purpose. Some jurisdictions may not allow the exclusion of limitation of liability for consequential or incidental damage.

Installation Guidelines (Read Before Installing)

- Do not open the WebSwitch™ enclosure. This will void the warranty.
- This unit must not be installed directly outdoors.
- This unit must not be used for medical, life saving purposes, or for any purpose where its failure could cause the loss of life.
- Proper security precautions should be made before installing WebSwitch™ on the Internet.

Notes about security:

By design, WebSwitch™ is very secure. It does not support terminal connections or file transfer programs such as telnet, ftp, ssh, etc. This means that it is not possible for someone to 'break in' to WebSwitch™ and access other devices on your local network. WebSwitch™ does not support remote firmware updates which means that it is not possible for someone to remotely install malicious software. The simplicity of WebSwitch™ makes it a very secure device. As with any device to be installed on a network, there are some security precautions that should be observed. If WebSwitch™ is installed on the Internet, it may be possible for someone to gain access to the WebSwitch™ control web page and turn the output on and off. For Internet installations, it is recommended that passwords be enabled for the control page. Make sure secure passwords are used. Passwords should be at least 8 characters in length and should be a combination of upper case letters, lower case letters, and numbers. Don't use passwords that would be easy to guess. For additional security, a firewall may be used to limit access only to selected IP addresses. Another option may be to set up a Virtual Private Network (VPN) between the network where WebSwitch™ resides and the client machine (web browser, second WebSwitch™, etc.).

Section 1: Introduction

WebSwitch™ is a self contained, two-port electrical outlet with a built-in web server. Each port is internally wired to heavy-duty relays and can be separately controlled over any IP network including private networks or the Internet. Users can operate WebSwitch™ using a web browser or a custom application running on a computer.

WebSwitch™ can be used to control devices remotely or it can be used as an automatic reboot controller. When configured as an automatic reboot controller, WebSwitch™ will automatically reboot devices when they fail to respond to pings that WebSwitch™ sends out at periodic intervals.



1.1 Unit Description

All connections and indicators are located on the front panel. Connections to WebSwitch™ include Network, AC power in, and AC power out (Out 1 and Out 2). Each are described below.

Network: This RJ-45 connector is used to connect WebSwitch™ to a 10-Base T or 100-Base T network.

Power In: AC power is connected here and is used to power the internal web server, and the devices connected to Out 1 and Out 2.

Power Out 1: Devices which are to be controlled by WebSwitch™ are connected to the two outlets labeled Out 1 and Out 2. WebSwitch™ controls devices by switching power to the outlets, which in turn switches the devices.

Power Out 2: See description for Power Out 1.

WebSwitch™ has four LED indicators which include Link, Act, Out 1, and Out 2. Each are described below.

Link: This green LED located on the Ethernet connector indicates that WebSwitch™ is properly connected to the network and is ready to communicate. Network communications will not occur if this LED is not illuminated.

Act: This amber LED located on the Ethernet connector indicates network activity on the Ethernet network.

Out 1: This green LED indicates that the outlet labeled Out 1 is powered. When this LED is off Out 1 is not powered.

Out 2: This green LED indicates that the outlet labeled Out 2 is powered. When this LED is off Out 2 is not powered. Out1 and Out2 can be controlled seperately.

Section 2: Installation and Setup

Installation consists of connecting WebSwitch™ to an IP network, power, configuring via a web browser, and finally connecting to the device(s) to be controlled.

2.1 Connection

2.1.1 Network Connection

Connect the Ethernet port to a 10 Base T or 10/100 Base T Ethernet connection. Note that by default, WebSwitch™ is configured for a 10 Base T network but can be changed to 100 Base T during setup. This typically connects to an Ethernet hub, switch, or router. For configuration, WebSwitch™ may be connected directly to the Ethernet port on a computer using a “crossover” cable. Otherwise for connection through a hub or router, a standard “straight-thru” cable should be used. Once connected to the network and power is applied, the green Link LED on the Ethernet connector illuminates which indicated proper connection. If the Link LED does not illuminate, communications with WebSwitch™ cannot occur. Verify that the proper cable is being used (straight-thru or crossover), try a different cable or connect to different hub/switch devices.

2.1.2 Power Connection

Connect the power input of WebSwitch™ to a 120VAC power source.

2.1.3 Output Connection

Connect one or both of the outlets on WebSwitch™ (Out1 and/or Out2) to device(s) to be controlled.

2.2 Establishing Communications for Setup

WebSwitch™ is set up using a web browser. The first step is to establish communications between a computer and WebSwitch™ so that the browser-based configuration can begin. To do this, the computer and WebSwitch™ must be physically connected to the same network and both must have IP addresses on the same network. There are two ways to set up the computer and WebSwitch™ so that they are on the same network. The first way (Option 1) is to change the IP address of WebSwitch™ to an address that is on the same network as the computer. The second way (Option 2) is to change the IP address of the computer to an address that is on the same network that WebSwitch™ is set to by default.

2.2.1 Option 1: Assign a Temporary IP Address to WebSwitch™

This option is used to TEMPORARILY assign an IP address to WebSwitch™ without the need to change the IP address of the configuration computer. It is the recommended method for establishing initial communications. Note that WebSwitch™ will only use this IP address as long as power is maintained. Once power is lost and restored, WebSwitch™ will use the IP address specified in the setup page and not the temporary address assigned here. This means that once communications are established, the desired IP address should be entered into the network setup page using the browser.

To assign the temporary IP address...

1. Make sure WebSwitch™ and the configuration computer are connected to the same physical network. This will not work through routers or gateways.
2. Assign the address as follows...

Windows:

Open a Command Prompt (on Windows XP, select START, then RUN, then type “cmd”).

Type...

```
arp -s {new IP address} {serial number of WebSwitch™ }
```

Note: IP address format is: xxx.xxx.xxx.xxx
Serial number format is: ss-ss-ss-ss-ss-ss

For example, to set a WebSwitch™ device (with serial number 00-0C-C8-01-00-01) to 10.10.10.40 the following command would be used.

```
arp -s 10.10.10.40 00-0c-c8-01-00-01
```

Next, type...

```
ping -l 102 {new IP address}
```

For example, if the new IP address is 10.10.10.40, the following command would be used.

```
ping -l 102 10.10.10.40
```

Linux/Unix:

Open a terminal, change to root user (su -, then enter root password).

Type...

```
arp -s {new IP address} {serial number of WebSwitch™ }
```

Note: IP address format is: xxx.xxx.xxx.xxx
Serial number format is: ss:ss:ss:ss:ss:ss

For example, to set a WebSwitch™ device (with serial number 00-0C-C8-01-00-01) to 10.10.10.40 the following command would be used.

```
arp -s 10.10.10.40 00:0c:c8:01:00:01
```

Next, type...

```
ping -s 102 {new IP address}
```

For example, if the new IP address is 10.10.10.40, the following command would be used.

```
ping -s 102 10.10.10.40
```

Mac OS X

Open a terminal,

Note that the terminal is in the “Utilities” directory which is in “Applications” directory.

type

```
sudo arp -s {new IP address} {serial number of WebSwitch™ }
```

Note: Administrator password is required.
IP address format is: xxx.xxx.xxx.xxx
Serial number format is: ss:ss:ss:ss:ss:ss

For example, to set a WebSwitch™ device (with serial number 00-0C-C8-01-00-01) to 10.10.10.40 the following command would be used.

```
sudo arp -s 10.10.10.40 00:0c:c8:01:00:01
```

Next, type...

```
ping -s 102 {new IP address}
```

For example, if the new IP address is 10.10.10.40, the following command would be used.

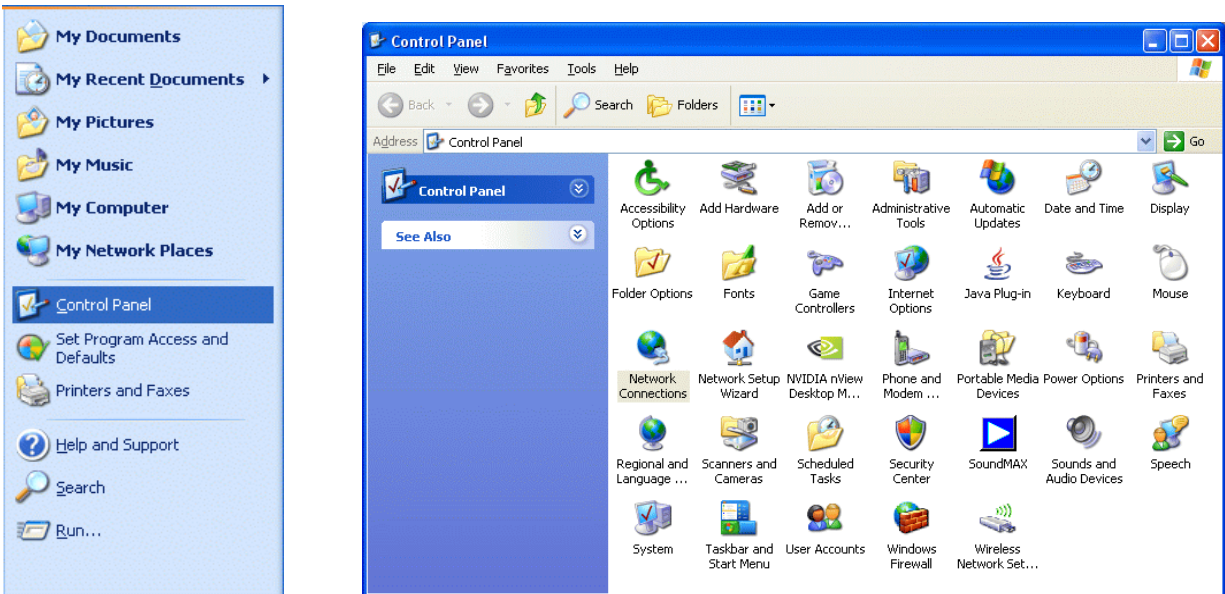
```
ping -s 102 10.10.10.40
```

2.2.2 Option 2: Assign a Temporary IP Address to Configuration Computer

If the first option above is not used, you can use this option to communicate with WebSwitch™. By default, WebSwitch™ comes from the factory with an IP address of 192.168.1.2. Communications with WebSwitch™ may be established by assigning an IP address to the configuration computer that is on the same network as WebSwitch™ (for example the configuration computer could be assigned to 192.168.1.5).

Instructions for changing the IP address of the computer that will be used for WebSwitch™ configuration are given here. Note that these instructions are specifically for computers with the Windows XP operating system. For setup using other operating systems, refer to the appropriate users manual.

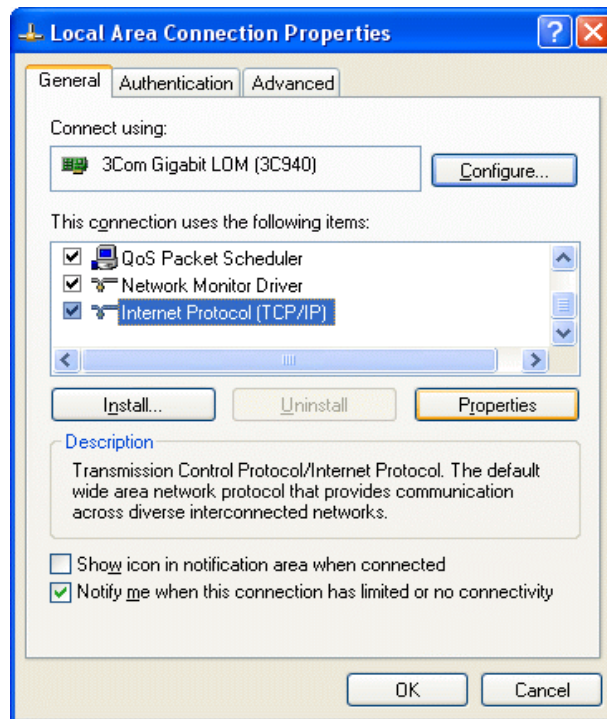
Step 1: Open the control panel by clicking on the start menu and then clicking on Control Panel. (Note that control panel shown is in “Classic View”. If control panel is in “Category View” select the “Classic View” option before proceeding.)



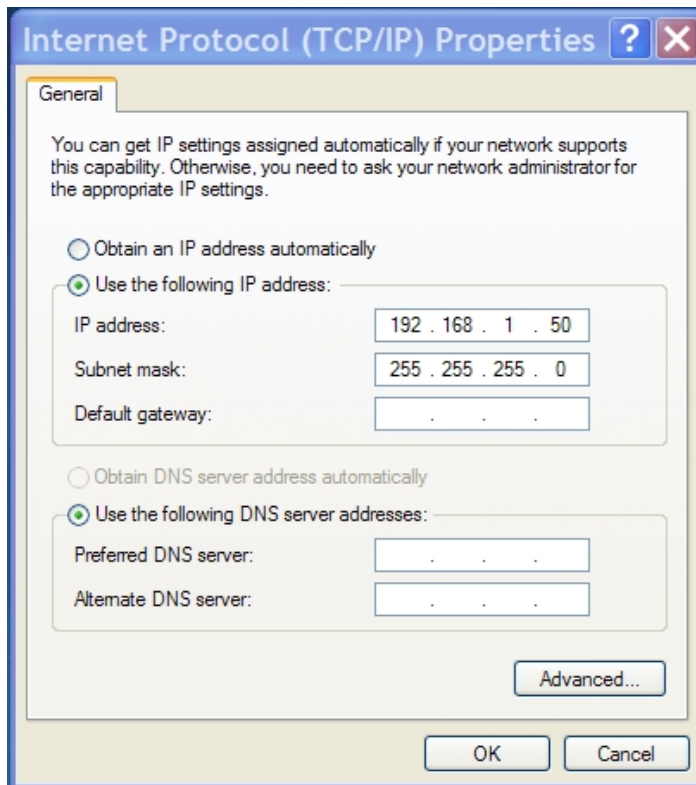
Step 2: Double click on the icon labeled Network Connections. The following menu will pop up.



Step 3: Right click on the icon labeled Local Area Connection. Another menu will appear. Select the option at the bottom of the menu labeled Properties. The Local Area Connection Properties window will appear.



Step 4: On the Local Area Connection Properties page scroll down to Internet Protocol (TCP/IP), select it, and then click the button labeled properties.



Step 5: Before making any changes to the network settings, write down the current settings so that they can be restored once WebSwitch™ is configured. Next, select the radio button labeled “Use the following IP address,” and type in the IP address 192.168.1.50. Type in a subnet mask of 255.255.255.0. Leave the default gateway field blank.

2.2.3 Open Configuration Web Page

Once the network is set up, open the configuration setup page by typing the following URL into the browser: `http://192.168.1.2/setup.html` (note that if option 1 above was used for initial configuration, replace the IP address given here with the newly assigned IP address). A password is required to change any parameters. The default password is 'webswitch' (do not include quotes, password is case sensitive).

2.3 Web-Based Setup

WebSwitch™ is fully configurable through HTML 4.0 compliant web browsers such as Internet Explorer and Mozilla Firefox. It's easy to use tab based menu system has been designed to allow the unit to be configured easily. Note that in this chapter, the default IP address of 192.168.1.2 is used in all examples. If the IP address has been changed, substitute the new IP address for the address shown in the examples.

Before proceeding, make sure a network connection has been established between the computer and WebSwitch™. This is done by typing the following URL into the web browser: `http://192.168.1.2/setup.html`. Another way to check communications is to ping WebSwitch™ (from the command prompt type `ping 192.168.1.2`). Each setup page is described below.

2.3.1 Main Setup Page

This is the initial page that appears when the URL `http://192.168.1.2/setup.html` is entered into the web browser. It provides basic information about the WebSwitch™ unit.



Navigating between setup pages is done by clicking on the tabs at the top of the page. All setup pages require a password. The default password is 'webswitch' (no quotes, all lower case) and no username is required. Once the password is entered, it will not be required again unless the password is changed or the browser is closed.



Each setup page has a “Submit” button and a “Reset” button at the bottom of the page. After entering the desired parameters into each page, the “Submit” button must be pressed before any parameters will be saved. If a mistake is made in entering the parameters, the “Reset” button may be used to restore all parameters on the page to their current settings. The “Reset” button is only effective before the “Submit” button is pressed.

2.3.2 Network Setup Page

The network parameters are changed on this page. Note that if multiple WebSwitch™ units are used on the same network, install one unit at a time and set the IP address of each unit before connecting the next unit to the network. This avoids having multiple WebSwitch™ units installed on the network with the same factory default IP address at the same time. Also note that the unit must be power-cycled (power disconnected, then reconnected) before network settings take effect. No other setup page requires power-cycling for the settings take effect.

1. IP Address:

WebSwitch™ requires a static IP address. This is a unique address that identifies WebSwitch™ on the network. Dynamic IP address assignment is not supported. The lack of dynamic IP addressing support is intentional because a dynamically changing the IP address would make it difficult for a client to access the web server built into WebSwitch™. The IP address is specific to the network where WebSwitch™ will be installed, and must be obtained from the network administrator.

This guide is not meant to be a tutorial on IP addressing, however a few comments about IP addressing are given here.

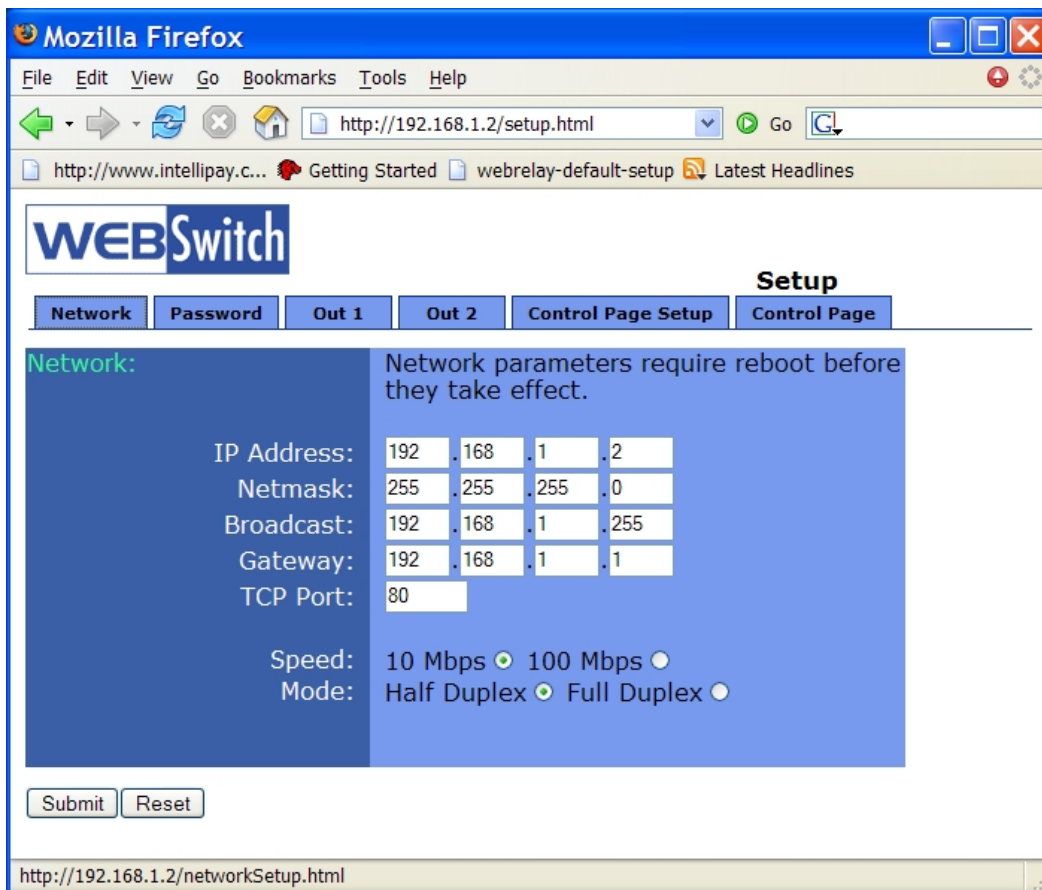
If WebSwitch™ will be used over the Internet, the IP address must be a routable address assigned by the upstream Internet Service Provider (ISP).

In cases where the ISP only provides a single routable IP address for the entire network (this is typical with ISPs such as cable providers), a proxy server (or gateway router) may be used. A proxy server allows multiple devices to connect to the Internet using a single routable IP address. Many small routers from LinkSys, Dlink, and Netgear perform proxy server functions. If a proxy server is used, WebSwitch™ will not be accessible from the Internet until the proxy server is

properly configured (forward proper port to WebSwitch™). This information is mentioned for convenience but details of setting up a configuration such as this is beyond the scope of this manual.

If WebSwitch™ is used on a private network only and is NOT used over the Internet, a routable IP address is not necessary. This may be the case when WebSwitch™ is used to control (or monitor) a device in another room or a nearby building.

If WebSwitch™ will be installed on a simple, private network that does not connect to the Internet, the default IP address may be used as long as no other device on the network uses the same address. If multiple WebSwitch™ units are installed on the same network, each unit must have its own unique IP address. For example, WebSwitch™ comes from the factory with a default IP address of 192.168.1.2. If multiple units are used, change the IP address for each unit (192.168.1.3, 192.168.1.4, 192.168.1.5 etc.).



2. Netmask:

This specifies the size of the local network. This must be obtained from the network administrator. By default, the netmask is set to 255.255.255.0.

3. Broadcast:

This specifies the broadcast address. This must be obtained from the network administrator. By default, this is set to 192.168.1.255.

4. Gateway:

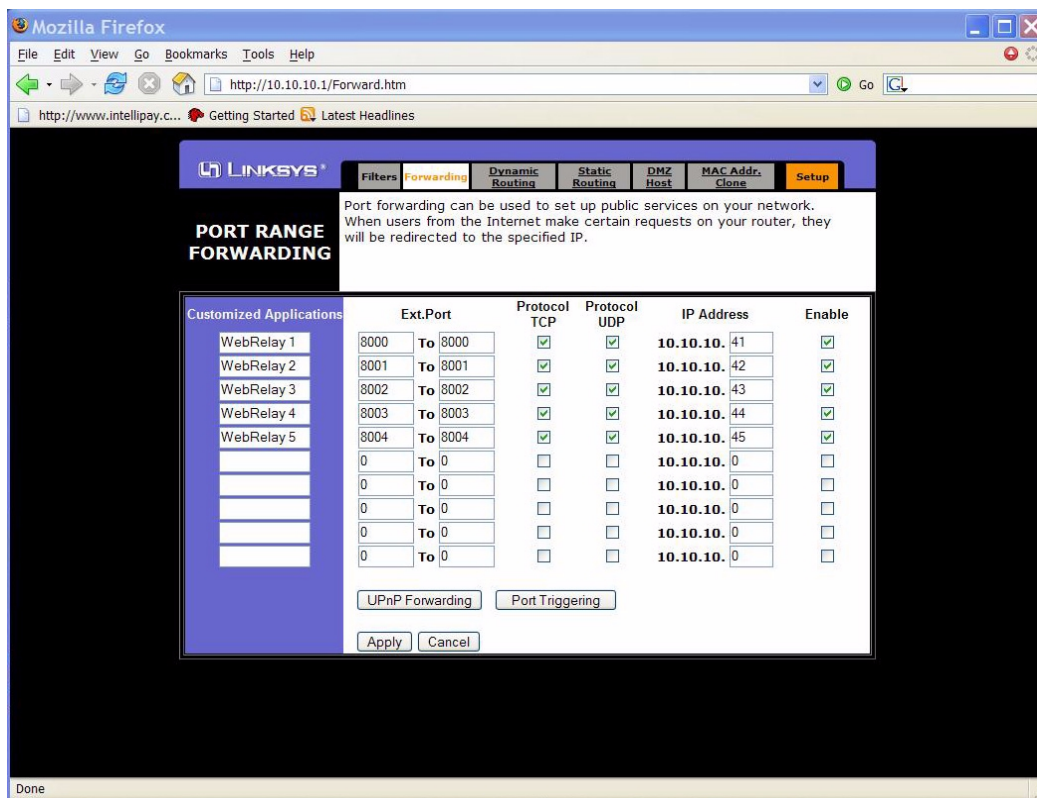
This specifies the IP address of the gateway router. This must be obtained from the network administrator. By default, this is set to 192.168.1.1. If no gateway is used, this can be set to 0.0.0.0 which will prevent WebSwitch™ from looking for a gateway.

5. TCP Port:

This specifies the TCP port used for communications with WebSwitch™. By default, the port is set to 80 which is the standard http port. It is recommended that the port not be changed without an understanding of TCP/IP and ports.

Changing the port can be useful for accessing multiple WebSwitch™ devices which are installed behind a gateway router on a private network that uses non-routable IP addresses (192.168.x.x, 10.x.x.x, and 172.16.x.x through 172.31.x.x are non-routable or private IP addresses). In this case, each WebSwitch™ unit would be assigned a different port (for example 8000, 8001, 8002, etc). The gateway router would be set up to forward all traffic for each of the assigned ports to the IP address of the WebSwitch™ unit which uses that port. The WebSwitch™ units could then be accessed from outside the private network by entering the IP address of the gateway and the port for the desired WebSwitch™ unit. Note that whenever any port is assigned other than port 80, all communications with that WebSwitch™ device must include the port. For example, if WebSwitch™ is assigned port 8000, access to the setup page would require the following URL to be entered; <http://192.168.1.2:8000/setup.html>.

An example screenshot of a gateway router configuration is given below. Note that this screenshot is simply an example of a typical router setup page. Routers will vary.



In the example, the five WebSwitch™ devices are assigned IP addresses of 10.10.10.41 to 10.10.10.45. The WebSwitch™ device with IP address 10.10.10.41 is assigned port 8000.

The second WebSwitch™ device with IP address of 10.10.10.42 is assigned port 8001. This pattern continues through 10.10.10.45 which is assigned the port 8004. To access the WebSwitch™ units from the Internet, enter the IP address of the gateway plus the port number of the desired WebSwitch™ unit.

6. Speed:

This specifies the communication speed of the network. Select 10Mbps for 10 base T networks and 100Mbps for 100 base T networks. By default, this is set to 10Mbps.

7. Mode:

This specifies the duplex mode for the network. By default, this is set to Half Duplex.

2.3.3 Password Setup Page

The password setup page is used to change and enable passwords. A password is required for the setup pages but is optional for the control page. The password is enabled or disabled for the control page by using the *Yes* or *No* radio buttons. Enabling the control page password also enables the requirement for a password when reading/writing XML pages. Note that when the password is changed, the password may be displayed in the browser's history in clear text. It is advisable to clear the browser's history after setting the password.

The screenshot shows a Mozilla Firefox browser window displaying the WebSwitch Password Setup page. The browser's address bar shows the URL `http://192.168.1.2/setup.html`. The page features a navigation menu with tabs for **Network**, **Password**, **Out 1**, **Out 2**, **Control Page Setup**, and **Control Page**. The **Password** tab is selected. The main content area is titled "Password:" and contains the following fields and options:

- Setup Password: [password field]
- Re-enter Setup Password: [password field]
- Enable Control Password: Yes No
- Control Password: [password field]
- Re-enter Control Password: [password field]

At the bottom of the form are **Submit** and **Reset** buttons. The browser's status bar at the bottom shows the URL `http://192.168.1.2/passwordSetup.html`.

2.3.4 Out1 and Out2 Setup Pages

These pages are used to set up the function of the two outputs. The Out1 page is used to configure the output

labeled Out1, and the Out2 page is used to configure the output labeled Out2. Both pages look and operate the same.

1. Auto Reboot:



When this option is set to 'ON', WebSwitch™ will operate in **Automatic Reboot** mode. In **Automatic Reboot** mode, WebSwitch™ is configured to periodically confirm that another device (such as a server, computer, router, etc.) is working by sending ping requests to the device. WebSwitch™ expects a response after each ping. If a pre-set number of ping requests fail, it is assumed that the device is not functioning properly. WebSwitch™ will attempt to restore the device to normal operation by rebooting the device. In **Automatic Reboot** mode, users still have the ability to manually reboot the device from a remote location over the network.

When this option is set to 'OFF', WebSwitch™ will operate in **Normal** mode. In Normal mode, WebSwitch™ will only change the state of the outputs when commanded by a user.

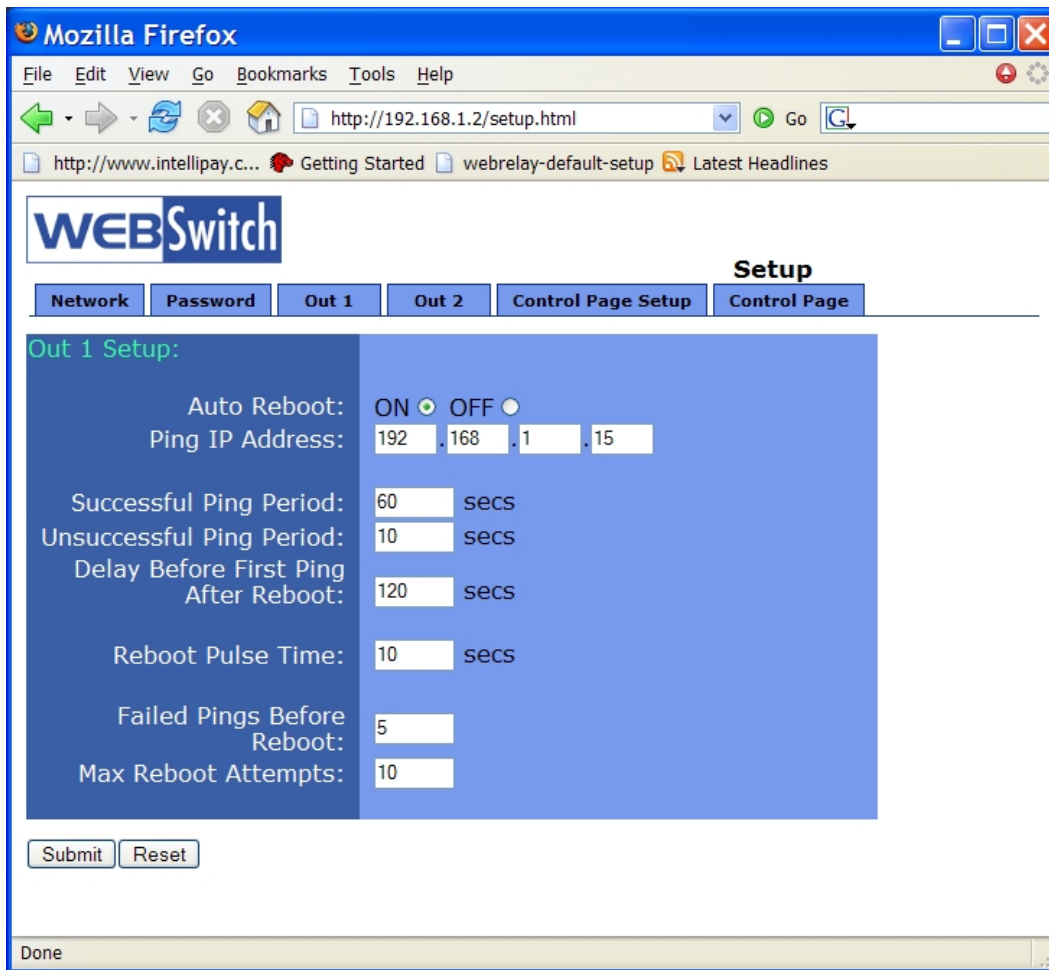
The following parameters (2-3) are available only when Auto Reboot is set to **OFF**.

2. State at Powerup:

When this option is set to **ON**, Out 1 will immediately be powered when power is applied to WebSwitch™. When this option is set to **OFF**, Out 1 will not be powered when power is applied to WebSwitch™. By default, this option is set to **OFF**.

3. Reboot Pulse Time:

This is the time (in seconds) that WebSwitch™ pulses the output 'off' and then back 'on' to reboot the device connected to the outlet. WebSwitch™ executes the reboot sequence when the user presses the reboot button. This time can be set from 1 second to 60000 seconds (1000 minutes). The factory default setting for this is 10 seconds.



The following parameters (4-10) are available only when Auto Reboot is set to **ON**.

4. Ping IP Address:

This is the IP address that WebSwitch™ will ping. This is typically the IP address of the device that will be re-booted upon failure (such as a server, router, computer, etc.). It could however, be the address of a device on the opposite side of a communications link when WebSwitch™ is used to reboot a communication device that does not have an IP address such as a CSU/DSU, satellite modem, router, etc.

5. Successful Ping Period:

This is the time interval (in seconds) between successful ping requests. This time can be set from 1 to 60000 seconds (1000 minutes or 16.666 hours). The factory default for this setting is 60 seconds.

6. Unsuccessful Ping Period:

When ping requests fail (no response from device), it may be desirable to begin pinging at a shorter time interval. This allows WebSwitch™ to determine in less time that the device is not functioning. After each unsuccessful ping, WebSwitch™ will wait this time interval (in seconds) before the next ping attempt. This time can be set from 1 to 60000 seconds (1000 minutes or 16.666 hours). The factory default for this setting is 10 seconds.

7. Delay Before First Ping After Reboot:
When WebSwitch™ is first powered, it will wait this time interval (in seconds) before beginning to ping the device. This time delay allows the device to boot before being pinged. This time can be set from 0 to 60000 seconds (1000 minutes or 16.666 hours). The factory default for this setting is 120 seconds.
8. Reboot Pulse Time:
This is the time (in seconds) that WebSwitch™ pulses the output ‘off’ and then back ‘on’ to reboot the device connected to the outlet. WebSwitch™ executes the reboot sequence when commanded by the user or when the automatic reboot controller determines that it is time to reboot. This time can be set from 1 seconds to 60000 seconds (1000 minutes). The factory default for this setting is 10 seconds.
9. Failed Pings Before Reboot:
The device will be re-booted after this number of ping failures. This number can be set between 1 and 255. The factory default for this setting is 5.
10. Max Reboot Attempts:
After the device has been re-booted this number of times without any successful pings, it is assumed that there are problems with the device and WebSwitch™ will no longer attempt to re-boot the device. At this point, WebSwitch™ will leave the device on but will disable the auto re-boot feature. The auto re-boot feature will remain disabled until a user enables it through the control page or WebSwitch™ is powered down and powered up once again. This number can be set between 1 and 255. The factory default for this setting is 10.

2.3.5 Control Page Setup

Once WebSwitch™ is set up, it can be controlled and monitored using a web browser by accessing its control page. Titles and basic contents of the control page can be customized by setting the appropriate options on the ‘Control Page Setup’ page. Note that this setup page only affects the control web page and does not affect the function of WebSwitch™ in any way.

*Note that the option labeled Auto Reboot ON/OFF is available only when outputs are configured for Auto Reboot mode as described in section 2.3.4. In the screen-shot shown below, Out 1 has Auto Reboot set to **No** and Out 2 has Auto Reboot set to **Yes**. This makes the Auto Reboot ON/OFF option available for Out 2 only.*

1. Main Header Text:
This text will be displayed in the main header area of the control page. This field can be up to 25 characters in length.
2. Auto Refresh Page:
Web pages traditionally display static information. The WebSwitch™ control page, however, displays information that is dynamic. Each time the control page is loaded to the browser, it displays a snapshot of the current status of the unit. If the state of the unit changes, the information on the control page will be outdated unless the page is re-loaded. Whenever a user changes the state of the output via the web browser, the web page will automatically reload the control page to display current information. If, however, the output state changes due to the automatic reboot controller or due to a command sent from another machine, the output state will not be updated and the control page information will be obsolete. The ‘Auto Refresh Page’ option will cause the control page to continually update its contents by setting a timer in the web page that causes it to be reloaded at a specified time interval.
3. Duration: If the ‘Auto Refresh Page’ option is set to **Yes**, this field specifies the time in seconds that the page will be refreshed. It can be set from 1 to 32 seconds.

4. Description:

The screenshot shows a Mozilla Firefox browser window displaying the WebSwitch Setup page. The address bar shows the URL <http://192.168.1.2/setup.html>. The page has a blue header with the WebSwitch logo and a navigation menu with tabs: Network, Password, Out 1, Out 2, Control Page Setup, and Control Page. The 'Control Page Setup' tab is active, showing a form with the following fields and options:

- Control Page Setup:**
 - Main Header Text:
 - Auto Refresh Page: Yes No
 - Duration: sec
- Out 1:**
 - Description:
 - ON/OFF Buttons: Yes No
 - Reboot Button: Yes No
- Out 2:**
 - Description:
 - ON/OFF Buttons: Yes No
 - Reboot Button: Yes No
 - Auto Reboot ON/OFF Button: Yes No

At the bottom of the form are 'Submit' and 'Reset' buttons. The status bar at the bottom of the browser shows the URL <http://192.168.1.2/indexSetup.html>.

This text is used to describe the function of Out 1 (or Out 2) on the control page. This field can be up to 20 characters in length.

5. ON/OFF Buttons:

When this option is set to **Yes**, the control page will display buttons to turn the device *on* and *off*. If this option is set to **No**, the control page will not display buttons to turn the device *on* and *off*.

Note that disabling the on/off buttons is recommended when if turning the device off causes communications with WebSwitch™ to be lost (for example WebSwitch™ controls a router or modem which must be operating properly to remotely communicate with WebSwitch™). In this case the user may press the 'OFF' button and lose communications with WebSwitch™ so he/she cannot turn the device back on.

6. Reboot Button:

When this option is set to **Yes**, the control page will display a button to reboot the device.

When the user presses this button, WebSwitch™ will turn the output off for the time duration specified in the Reboot Timer field of the Out 1 or Out 2 configuration page and turn the output on.

7. Auto Reboot ON/OFF Button (*Only available for Outputs that have **Auto Reboot** enabled*):
When this option is set to **Yes**, the control page will display a button which allows the user to turn the Auto Reboot feature on or off. When this option is set to **No**, the button to turn the Auto Reboot feature on or off will not be displayed on the control page.

Section 3: Operation

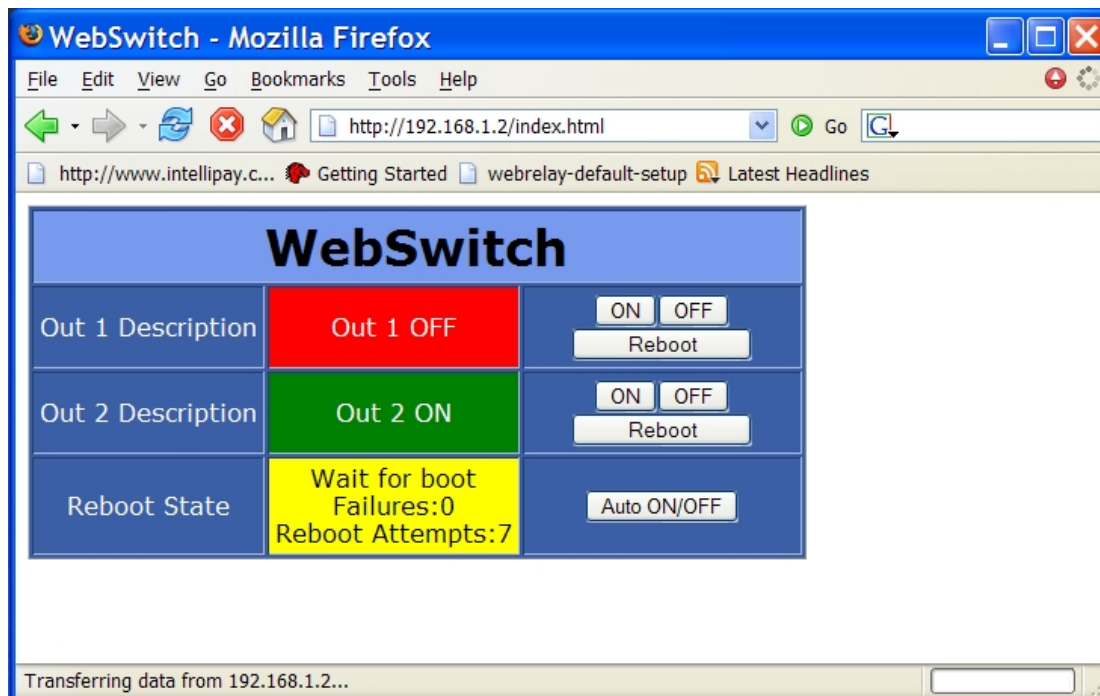
WebSwitch™ can be operated by using a web browser, or by sending text commands to an XML status/control page.

3.1 Browser Operation

Once the unit is set up, the control page may be accessed by typing the following URL into the web browser: <http://192.168.1.2> (Note that if the IP address was changed, replace the default IP address shown with the new address that was assigned. Note also that if any port is used other than port 80, the port must also be included in the request: <http://192.168.1.2:8000>) The new control page will appear. A control page is shown below. Note that in the example control page shown, Out 1 is configured for “manual” reboot mode and Out 2 is configured for “Automatic” reboot mode.

Out 1 & Out 2 Description:

A brief user description of the output (or device being controlled) and the output state may be displayed on the control page. It is recommended that in WebSwitch™ setup, appropriate labels be used that best represent the device being controlled.





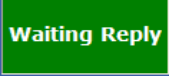
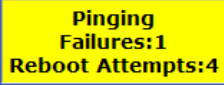



ON/OFF Buttons:

These buttons are available only when the ‘On/Off Buttons’ field in the ‘Control Page Setup’ is set to **Yes**. These buttons will turn the power to the device connected to the corresponding output on and off.

Reboot Button:

This button may be included on the control page (as specified in the setup). When the user presses this button, WebSwitch™ will power the device off which is connected to corresponding output for the time specified in Reboot Pulse Time and then turn the power to the device back on.

Reboot State - This field provides important information about the current status of the automatic reboot controller. Each state is described below.

Reboot State	Description
	After power-up, WebSwitch™ will wait for the device to boot before sending any ping requests. The “Waiting for boot” message is displayed during this wait time. The wait time is specified in the ‘Delay Before First Ping After Reboot’ parameter under the ‘Out 1’ or ‘Out2’ setup tabs.
	WebSwitch™ is periodically pinging device. This indicates normal operation.
	This indicates that a ping request has been sent out and WebSwitch™ is waiting for a reply from the device. Usually under normal circumstances the device will reply very quickly and there will be no time to display this message.
	The status field looks like this when one or more ping requests have failed. The top line indicates the current state. It may be ‘Pinging’, ‘Waiting Reply’, ‘Waiting for boot’, or in its ‘Reboot Sequence’. The next line (Failures) indicates the number of consecutive ping request have failed to respond. This counter is reset each time WebSwitch™ receives a successful ping response. The counter is also reset each time WebSwitch™ re-boots the device. The bottom line (Reboot Attempts) indicates the number of consecutive times that WebSwitch™ has re-booted the device. This counter is reset upon a successful ping response or when the user manually re-boots the device.
	This indicates that WebSwitch™ is currently performing a reboot.
	This indicates that WebSwitch™ has re-booted the device the maximum number of times specified in the ‘Max Reboot Attempts’ field under the ‘Out 1’ or ‘Out 2’ setup tabs. The device failed to respond to any ping requests, even after being re-booted (possibly numerous times). Once the maximum number of attempts have been reached, WebSwitch™ will leave the device powered on and quit trying to perform reboot attempts.
	This indicates that the user has turned the auto reboot feature off. Note that the auto reboot feature will automatically be re-enabled if power is lost and restored to WebSwitch™

Auto ON/OFF Button:

This allows the user to temporarily disable the automatic reboot feature. When automatic reboot is disabled,

WebSwitch™ will stop pinging the device. Automatic reboot will be disabled until a user re-enables it or WebSwitch™ is powered cycled. The user can re-enable this feature by pressing the ‘Auto ON/OFF’ button, or by changing any of the reboot parameters in the setup pages.

3.2 XML Operation

Custom computer applications may be created to monitor and control WebSwitch™ without using a web browser. Monitoring the state of the outputs is done by sending a request to port 80 (or port specified in setup) for the XML page. Control of the outputs is done by sending GET requests to the same page on port 80 (or port specified in setup). This can be demonstrated by entering commands into the URL line of a web browser.

Request the current state: `http://192.168.1.2/state.xml`

This will return the following XML page.:

```
<?xml version="1.0" encoding="utf-8" ?>
--<datavalues>
  <relay1state>1</relay1state>
  <relay2state>1</relay2state>
  <reboot1state>0</reboot1state>
  <reboot2state>0</reboot2state>
</datavalues>
```

The tags `<relayXstate>`, and `<rebootXstate>` indicate the current state of the WebSwitch™ unit. Note that `relay1state` and `reboot1state` represent Out1 and `relay2state` and `reboot2state` represent Out2. Values for each tag is described below. (Note that *X* in the tags should be replaced by a 1 or a 2)

`<relayXstate>` 0=output off
 1=output on

`<rebootXstate>` 0=Auto Reboot off
 1=Pinging
 2=Waiting for response
 3=Rebooting
 4=Waiting for boot

Commands can be sent to WebSwitch™ which control the output and change its state. Commands are sent using a variable called `relay1State` (or `relay2State`). Examples of using `relayXState` are given here. Note that these commands are case sensitive.

Turn out 1 ‘off’: `http://192.168.1.2/state.xml?relay1State=0`

Turn out 1 ‘on’: `http://192.168.1.2/state.xml?relay1State=1`

Turn out 2 ‘off’: `http://192.168.1.2/state.xml?relay2State=0`

Turn out 2 ‘on’: `http://192.168.1.2/state.xml?relay2State=1`

All `relayXState` options are contained in the following list.

`relayXState` 0=Turn output off (when in **Automatic Reboot** mode, output turns off but auto-reboot is still enabled)
 1=Turn output on (when in **Automatic Reboot** mode, output turns on but auto-reboot is still enabled)
 2=Pulse output (reboot)
 3=Disable automatic reboot (only when output is in **Automatic Reboot** mode)
 4=Enable automatic reboot (only when output is in **Automatic Reboot** mode)

Note that when the above commands are sent to WebSwitch™, its current state is returned in the form of an XML

page. The commands can also be sent without having WebSwitch™ return the XML page. This is accomplished by adding the noReply field as follows.

Turn the output 'on' without returning state: <http://192.168.1.2/state.xml?relay1State=1&noReply=1>

Turn the output 'off' without returning state: <http://192.168.1.2/state.xml?relay1State=0&noReply=1>

Password :

If the control password is enabled in the WebSwitch™ unit and the XML page is requested through a browser, the browser will prompt the user for the password. If the XML request is sent from another application and not a browser, the html request will need to contain the password encoded using the base 64 encoding scheme. The html request header without the password looks like this:

```
GET /state.xml?noReply=1 HTTP/1.1 (Ends with two \r\n)
```

The html request header with the password looks like this:

```
GET /state.xml?relay1State=1&noReply=1 HTTP/1.1
Authorization: Basic bm9uZTp3ZWJyZWxheQ== (Ends with two \r\n)
```

where `bm9uZTp3ZWJyZWxheQ==` is the base 64 encoded version of the username and password
none:WebSwitch

A utility is provided at <http://www.ControlByWeb.com/encoder> that can be used to encode the password. The utility is used by simply typing the string username:password into the website and pressing encode.

Appendix A: Restoring Factory Default Settings

In the event that the IP address or passwords are forgotten, WebSwitch™ may be restored to its original factory default settings. To do this, first remove the power from the unit. Next, insert a thin object (such as a toothpick) through the small hole in the side of the unit to press the small button that is located inside the unit. When the object is inserted, a tactile feel can be detected as the button is depressed. While holding the button down, apply power and wait for about 10 seconds. After about 10 seconds, release the button. Now all settings will be back to the original factory defaults. CAUTION: DO NOT USE METAL OBJECTS FOR THIS FUNCTION.

Appendix B: Specifications

Power Requirements:

Input Voltage: 85-125VAC

Input Frequency: 47-63Hz

Input Connector: IEC 320 Appliance Connector (C14 Male)

Max Input Current: 15A

Outputs:

Number of Outputs: 2

Output Connectors: NEMA 5-15R Outlets (United States)

Output Control Options: On/Off or Pulsed

Network:

10Base-T or 100Base-T Ethernet

Setup: static IP address assignment, TCP port selectable

Network Connector: 8-pin RJ-45 socket

LED Indicators:

- Out 1 on

- Out 2 on

- Network linked

- Network activity

Physical:

Operating Temperature: 32°-158°F (0°-70°C)

Size: 5.717in (145.20mm) wide (including mounting ears) X 4.724in (120.00mm) high X 2.525in (64.1mm) deep

Weight: 12.7oz (360 grams)

Enclosure Material: ABS, Flame Retardant UL94-V0

Pulse Timer:

Duration: 1 Second to 60000 Seconds (1000 minutes)

Accuracy: ±50ms

Password Settings:

Password protection on setup page: Yes

Password protection on control page: Optional

Password Encoding: Base 64

Max password length: 10 characters

Appendix C: Open TCP Legal Notice

Portions of the software used in WebSwitch™ are open source. The appropriate notices are listed below. All other parts of the software are property of Xytronix Research & Design, Inc. ©2005-2006.

Copyright (c) 2000-2002 Viola Systems Ltd.
All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
3. The end-user documentation included with the redistribution, if any, must include the following acknowledgment:
"This product includes software developed by Viola Systems (<http://www.violasystems.com/>)."

Alternately, this acknowledgment may appear in the software itself, if and wherever such third-party acknowledgments normally appear.

4. The names "OpenTCP" and "Viola Systems" must not be used to endorse or promote products derived from this software without prior written permission. For written permission, please contact opentcp@opentcp.org.

5. Products derived from this software may not be called "OpenTCP", nor may "OpenTCP" appear in their name, without prior written permission of the Viola Systems Ltd.

THIS SOFTWARE IS PROVIDED "AS IS" AND ANY EXPRESSED OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL VIOLA SYSTEMS LTD. OR ITS CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

=====

OpenTCP is the unified open source TCP/IP stack available on a series of 8/16-bit microcontrollers, please see <<http://www.opentcp.org>>.

For more information on how to network-enable your devices, or how to obtain commercial technical support for OpenTCP, please see <<http://www.violasystems.com/>>.