WebRelay-Quad™
User's Manual

CONTROL by **WEB**™
www.ControlByWeb.com

Contents

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Installation Guidelines (Read Before Installing)

- Do not exceed contact voltage and/or current ratings.
- This unit must be installed by qualified personnel.
- 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 WebRelay-Quad™ on the Internet.

Notes about security:
By design, WebRelay-Quad™ is very secure. It does not support terminal or file transfer programs such as telnet, ftp, ssh, etc. This means that it is not possible for someone to 'break in' to WebRelay-Quad™ and access other devices on your local network. WebRelay-Quad™ does not support remote firmware updates which means that it is not possible for someone to remotely install malicious software. The simplicity of WebRelay-Quad™ 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 WebRelay-Quad™ is installed on the Internet, it may be possible for someone to gain access to the WebRelay-Quad™ control web page and turn the relay 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 WebRelay-Quad™ resides and the client machine (web browser, second WebRelay-Quad™, etc.).

Section 1: Introduction

WebRelay-Quad™ is a small circuit board with four electro-mechanical relays and a built in web server. It can be controlled and/or monitored over any IP network including private networks, IP-based industrial control networks, and the Internet. Users can operate WebRelay-Quad™ using a web browser or a custom application. Computers or automation controllers may control and monitor WebRelay-Quad™ without user intervention. This works by sending text commands over the network and reading XML status pages from WebRelay-Quad™.

WebRelay-Quad™ has many applications and is only limited by imagination. It works very well as a stand-alone device that can be controlled using a web browser or as a convenient way to add I/O to a computer. It can be used in industrial applications to control motors, lights, coils, pumps, valves, etc. It can be used in data centers to control servers, routers, modems, wireless radios, etc.

1.1 WebRelay-Quad Models Available

WebRelay-Quad™ is currently available in two models. Both models function identically but are powered by different means. The two models are described below.

XRDI-WRQ-LS operates from a 5VDC power supply.
XRDI-WRQ-POE-LS can be powered over an Ethernet line (802.3af), or using a 5VDC power supply.

Both models have four low-signal relays that are designed for low power applications. The contacts are designed to maintain a low resistance and reliably conduct low signals for the life of the relay. If high power switching is required, the relay contacts can be used to control a high current relay, or the 10Amp WebRelay™ devices are a good option.
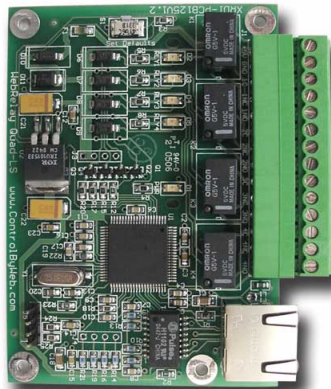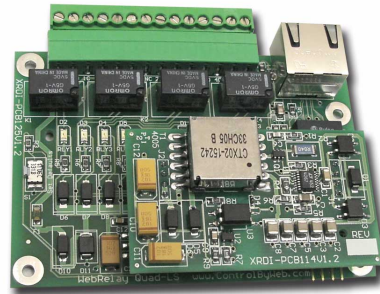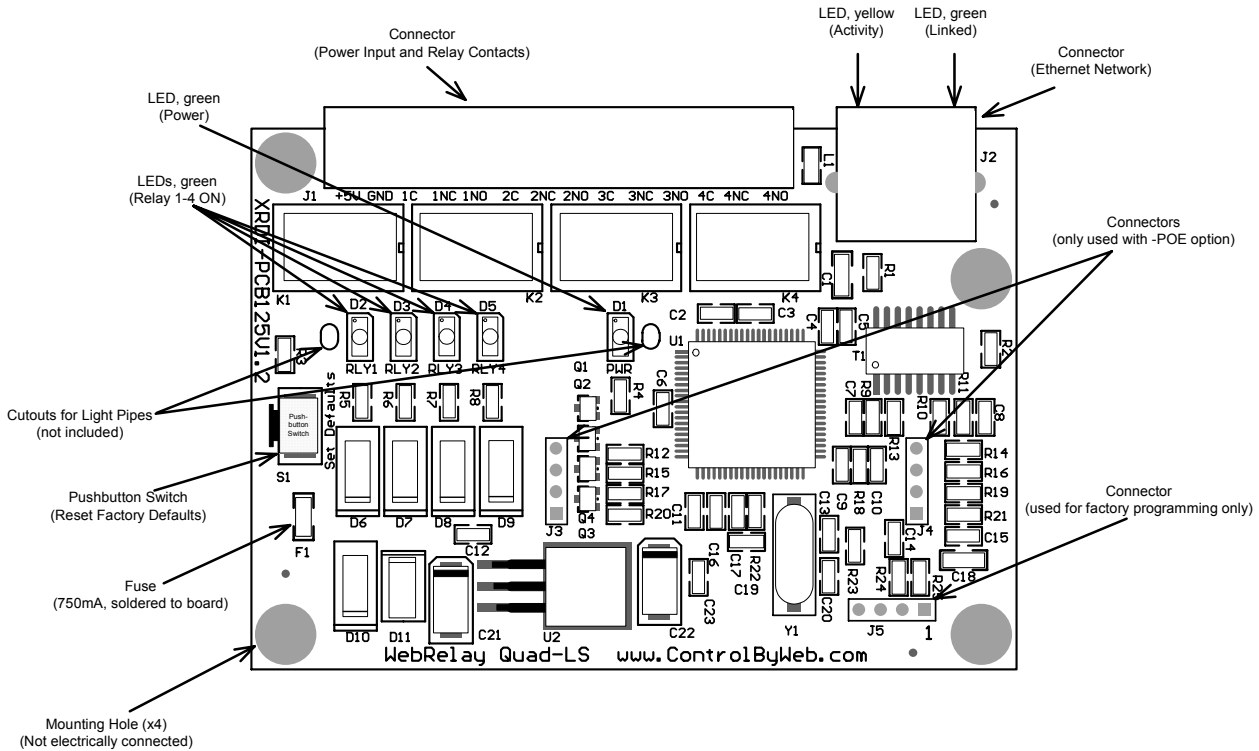

WebRelay Quad   **WebRelay Quad with POE**

1.2 General Layout of the Circuit Board

The WebRelay-Quad™ board is compact in size measuring only 3.524 inches (8.951cm) by 2.500 inches (6.350cm). It has a 14-pin removable terminal connector for convenient connection to power and relay contacts, and an RJ-45 connector for connection to an Ethernet network. It has seven LEDs to indicate the status of each of the four relays, power, network linked, and network activity. All of the connectors and LEDs that are required by the user are mounted near the top edge of the board so that they can be accessed through a panel if desired (an optional light pipe can be used to view LEDs through a panel). A tiny pushbutton switch is included on the board that can be used to reset WebRelay-Quad™ to the factory default settings. Detailed mechanical information is provided in appendix C, near the end of this manual.

Section 2: Installation and Setup

Installation consists of connecting WebRelay-Quad™ to an IP network, providing power, configuring via a web browser, and wiring relay contacts to the device(s) that will be controlled.

2.1 Connection

Connection to power and relay contacts is made through the 14-pin connector (provided). The network (and power on POE units) is connected through the RJ-45 connector on the front of the unit. Pin 1 of the 14-pin connector is the pin <u>furthest away</u> from the Ethernet connector.

14-pin connector pinout:

Pin	Description
1	+5VDC power supply input. Connect to the positive side of a regulated 5VDC power supply. The power supply must be able to deliver at least 500mA. WebRelay-Quad™ units that have the power-over-ethernet option (-POE) do not require a power supply to be connected to this pin when the unit is connected to an 802.3af compliant power source.
2	Power supply ground (-) connection.
3	Relay 1 Common Contact
4	Relay 1 Normally Closed Contact
5	Relay 1 Normally Open Contact
6	Relay 2 Common Contact
7	Relay 2 Normally Closed Contact
8	Relay 2 Normally Open Contact
9	Relay 3 Common Contact
10	Relay 3 Normally Closed Contact
11	Relay 3 Normally Open Contact
12	Relay 4 Common Contact
13	Relay 4 Normally Closed Contact
14	Relay 4 Normally Open Contact

2.1.1 Power Supply Connection

The WebRelay-Quad™ unit requires power for its internal web server circuitry. A 5VDC power supply must be connected to WebRelay-Quad™ through the relay socket connector. Alternatively, WebRelay-Quad™ units with the Power Over Ethernet option may be powered through the Ethernet connection instead of using an external power supply.

Multiple WebRelay-Quad™ units may be connected to a single power supply by connecting their power supply inputs to a power supply in parallel. The power supply must be rated for at least 400mA for each WebRelay-Quad™ connected.

WebRelay-Quad™ units with the Power Over Ethernet option may be connected to an 802.3af compliant Ethernet port instead of connecting a 5V power supply. This eliminates the need for a 5VDC power supply because WebRelay-Quad™ is powered through the Ethernet port. The power in the Ethernet port comes from an 802.3af compliant hub, switch, or power injector which may be located in a utility closet which could be a distance away from WebRelay-Quad™. This option is very useful for WebRelay-Quad™ installations where power is not available for a 5V power supply.

2.1.2 Network Connection
Connect the Ethernet port to a 10 Base T or 10/100 Base T Ethernet connection. This typically connects to an Ethernet hub, switch, or router. For configuration, WebRelay-Quad™ 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.

2.1.3 Relay Connection
The relay contacts internally connect directly to the 14-pin connector. No internal fuse is provided. The relay contacts are rated at 1 Amp (24VDC). If the power source connected to the relay contacts can deliver more than 1 Amp, an external fuse or circuit breaker should be used. Direct access to Common, Normally Open, and Normally Closed contacts are provided.

2.2 Establishing Communications for Setup

WebRelay-Quad™ is set up using a web browser. The first task is to establish communications between a computer and the WebRelay-Quad™ device so that the browser-based configuration can begin. To do this, the computer and WebRelay-Quad™ 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 WebRelay-Quad™ so that they are on the same network. The first way (Option 1) is to change the IP address of WebRelay-Quad™ 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 WebRelay-Quad™ is set to by default.

2.2.1 Option 1: Assign a temporary IP address to WebRelay-Quad™
This option is used to TEMPORARILY assign an IP address to WebRelay-Quad™ without the need to change the IP address of the configuration computer. It is the recommended method for establishing initial communications. Note that WebRelay-Quad™ will only use this IP address as long as power is maintained. Once power is lost and restored, WebRelay-Quad™ will use the IP address assigned 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 WebRelay-Quad™ 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...

   <u>Windows</u>**:**
   Open a Command Prompt (on Windows XP, select START, then RUN, then type "cmd").
   Type...
   > *arp -s {new IP address} {serial number of WebRelay-Quad^{TM} }*

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

   For example, to set a WebRelay-Quad™ 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 WebRelay-Quad^{TM} }*

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

>   For example, to set a WebRelay-Quad™ 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 WebRelay-Quad^{TM} }*

>   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 WebRelay-Quad™ 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 WebRelay-Quad™ . By default, WebRelay-Quad™ comes from the factory with an IP address of 192.168.1.2. Communications with WebRelay-Quad™ may be established by assigning an IP address to the configuration computer that is on the same network as WebRelay-Quad™ (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 WebRelay-Quad™ 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.)
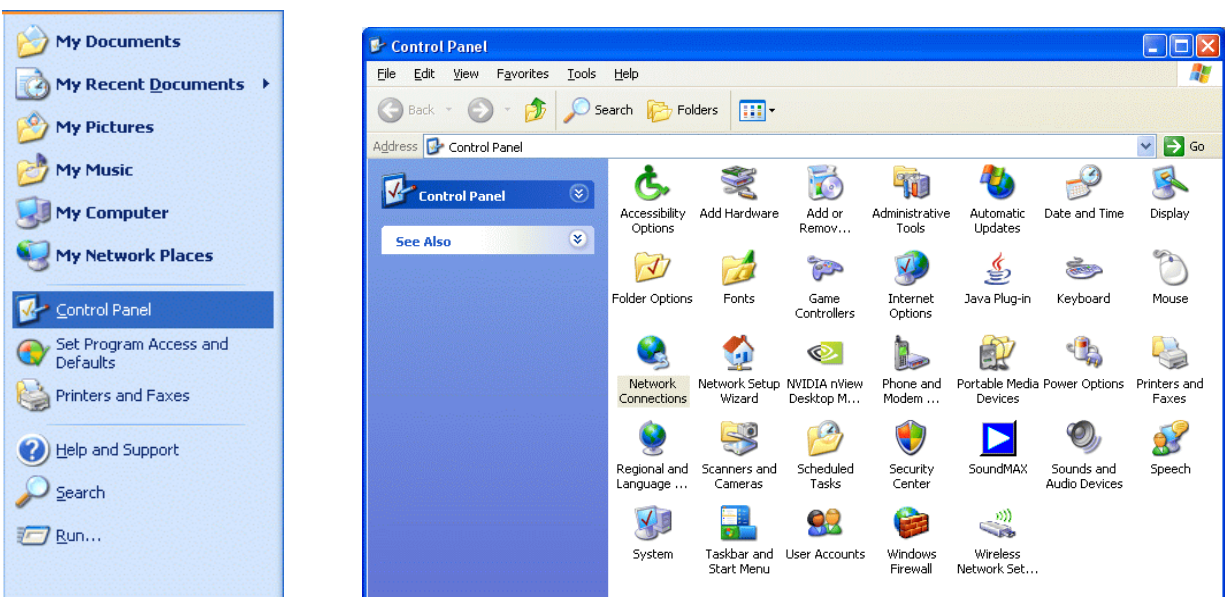
Step 2: Double click on the icon labeled Network Connections. The following window will pop up.

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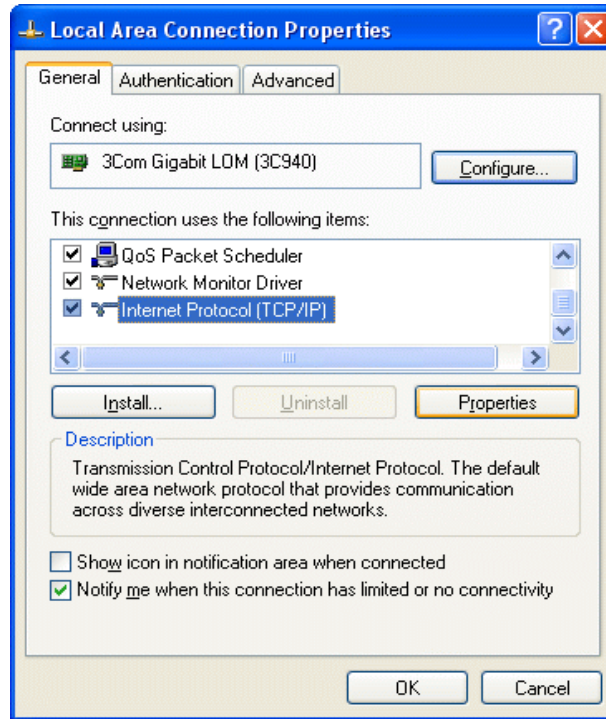
Step 4: On the Local Area Connection Properties page scroll down to Internet Protocol (TCP/IP), select it, and then click the button labeled properties.

Step 5: Before making any changes to the network settings, write down the current settings so that they can be restored once WebRelay-Quad™ 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.
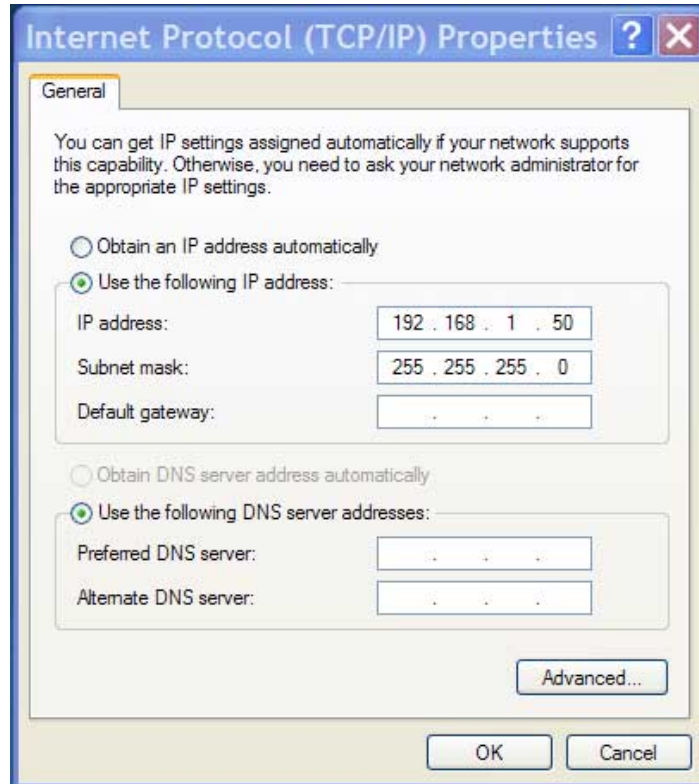
2.2.3 Open Configuration Web Page
Once the network is set up, open the configuration setup page by typing the following URL into the browser: http://192.168.1.2/setup.html (note that if option 1 above was used for initial configuration, replace the IP address given here with the newly assigned IP address). A password is required to change any parameters. The default password is 'webrelay' (do not include quotes, password is case sensitive).

2.3 Web-Based Setup

WebRelay-Quad™ 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 manual, 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 WebRelay-Quad™. 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 WebRelay-Quad™ (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 WebRelay-Quad™ unit.
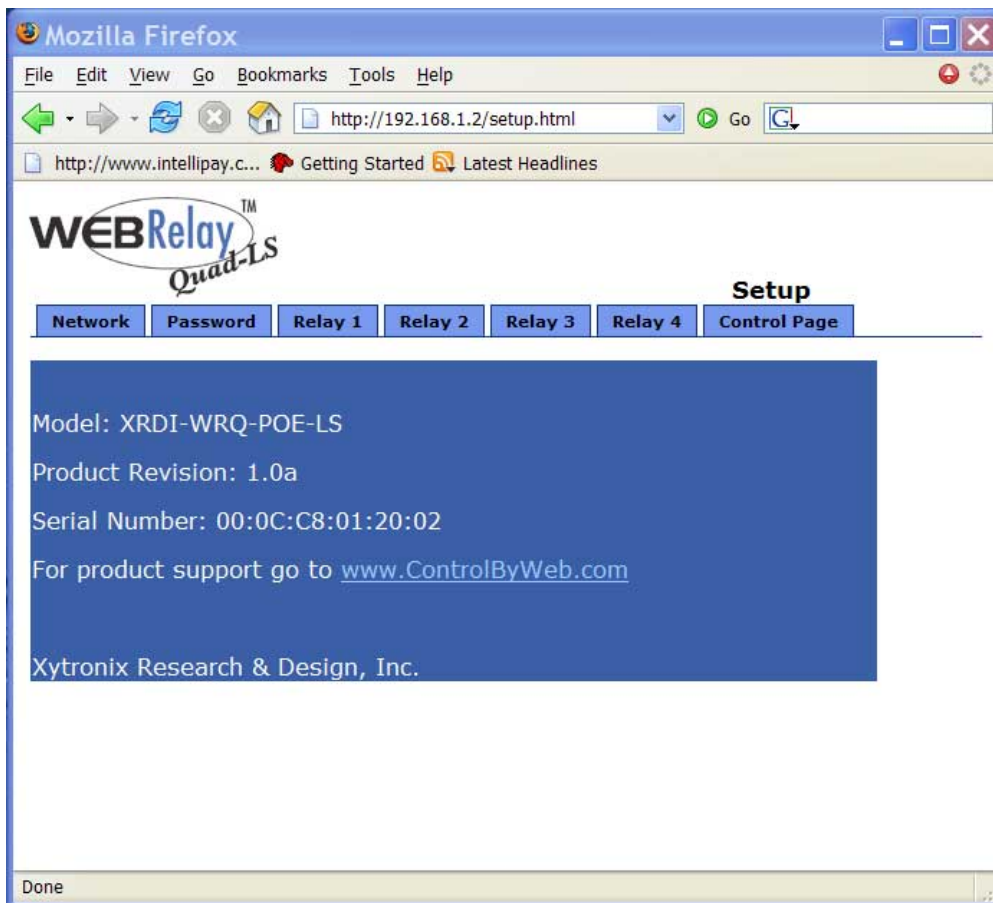
Navigating between setup pages is done by clicking on the tabs at the top of the page. All setup pages require a password. The default password is 'webrelay' (no quotes, all lower case) and no username is required. Once the password is entered, it will not be required again unless the password is changed 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 WebRelay-Quad™ 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 WebRelay-Quad™ 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:
> > WebRelay-Quad™ requires a static IP address. This is a unique address that identifies WebRelay-Quad™ 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 WebRelay-Quad™. The IP address is specific to the network where WebRelay-Quad™ 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 WebRelay-Quad™ 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, WebRelay-Quad™ will not be accessible from the Internet until the proxy server is properly configured (forward proper port to WebRelay-Quad™). This information is mentioned for convenience but details of setting up a configuration such as this is beyond the scope of this manual.

If WebRelay-Quad™ 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 WebRelay-Quad™ is used to control (or monitor) a device in another room or a nearby building.

If WebRelay-Quad™ 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 WebRelay-Quad™ units are installed on the same network, each unit must have its own unique IP address. For example, WebRelay-Quad™ 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.).
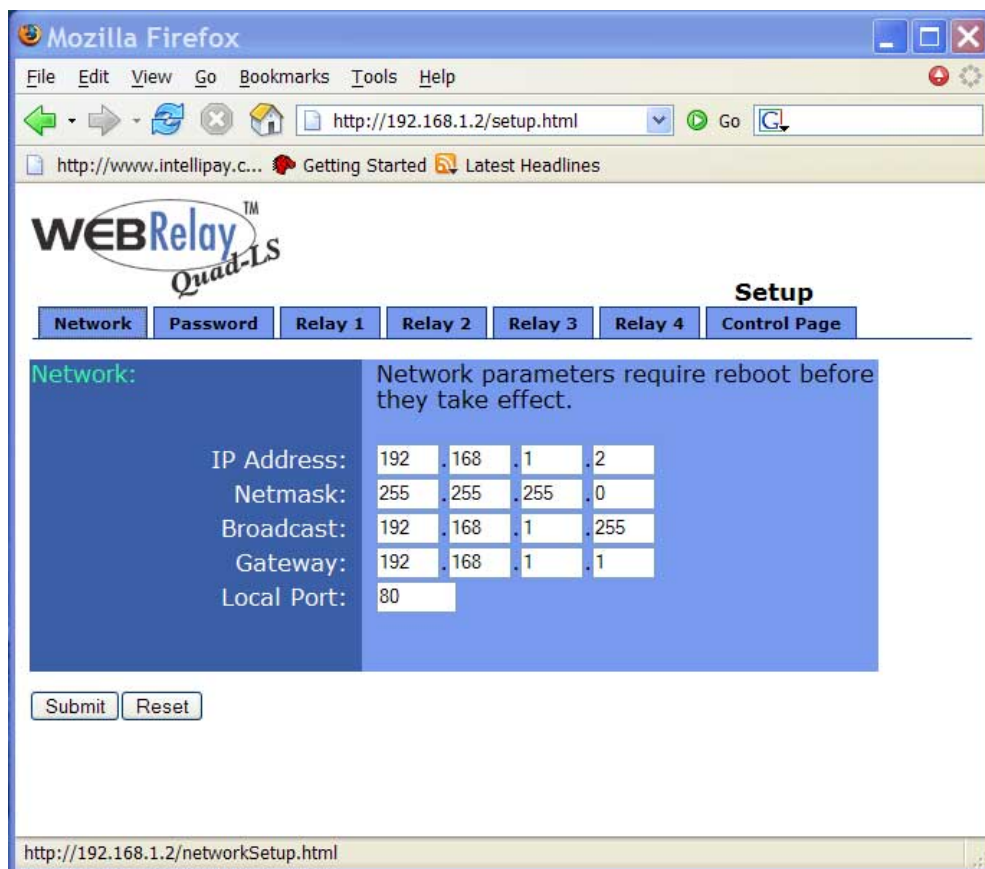
2. Netmask:
    This specifies the size of the local network. This must be obtained from the network administrator. By default, the netmask is set to 255.255.255.0.

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 WebRelay-Quad™ from looking for a gateway.

5. TCP Port:
> This specifies the TCP port used for communications with WebRelay-Quad™. 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 WebRelay-Quad™ 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 WebRelay-Quad™ 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 WebRelay-Quad™ unit which uses that port. The WebRelay-Quad™ units could then be accessed from outside the private network by entering the IP address of the gateway and the port for the desired WebRelay-Quad™ unit. Note that whenever any port is assigned other than port 80, all communications with that WebRelay-Quad™ device must include the port. For example, if WebRelay-Quad™ 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.   This setup allows five WebRelay-Quad™ units to be accessed on a private network behind a gateway. Note that this screenshot is simply an example of a typical router setup page. Routers will vary.
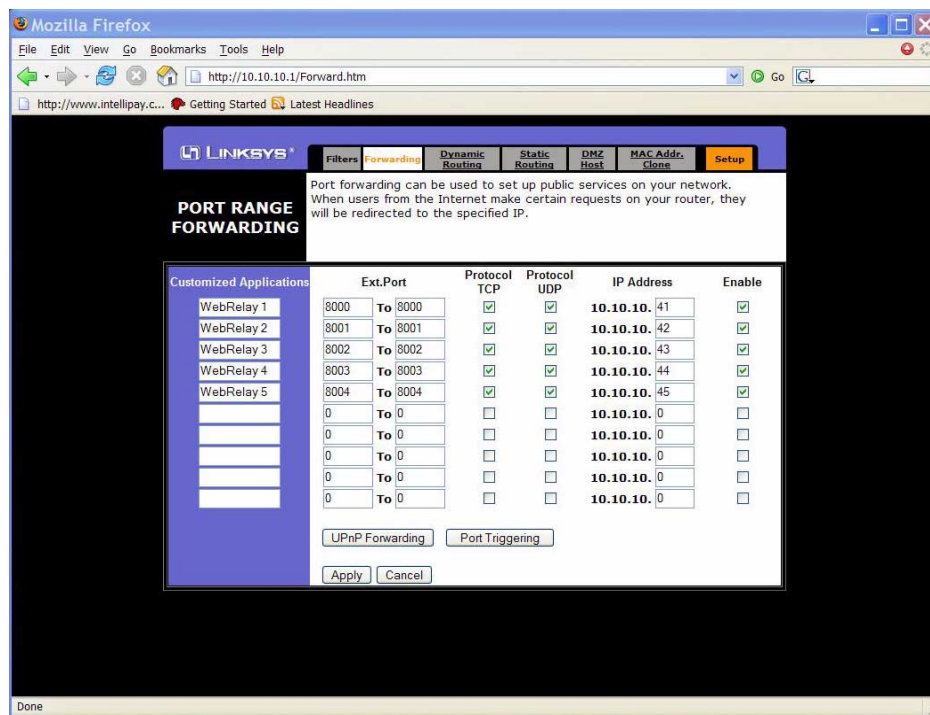
> In the example, the five WebRelay-Quad™ devices are assigned IP addresses of 10.10.10.41 to 10.10.10.45. The WebRelay-Quad™ device with IP address 10.10.10.41 is assigned port 8000. The second WebRelay-Quad™ device with IP address of 10.10.10.42 is assigned port 8001. This pattern continues through 10.10.10.45 which is

assigned the port 8004. To access the WebRelay-Quad™ units from the Internet, enter the IP address of the gateway plus the port number of the desired WebRelay-Quad™ unit.

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 browsers history after setting the password.

2.3.4 Relay Setup Pages

These pages are used to set up the function of each of the four relays, and how each relay is represented on the control page. All four pages are identical, with the exception of the Relay 1 page which also includes a field for the main header text on the control page, the option to automatically refresh the control page, and the time duration for auto refresh.

The following settings (1-3) are only included on the Relay 1 setup page and not on Relay 2,3 or 4 setup pages.

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 WebRelay-Quad™ 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 relay via the web browser, the web page will automatically reload the control page to display current information. If, however, the relay state changes due to a change due to a command sent from another machine, the relay 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 interval in seconds that the page will be refreshed. It can be set from 1 to 32 seconds.

The following settings (4-15) are included on all four relay setup pages. The settings correspond only to the relay associated with that page.

4. Relay Description:
This text is used to describe the function of the relay on the control page. This text will not appear if the 'Display Relay Status' is set to *No*, the 'On/Off Buttons' is set to *0*, and the 'Pulse Button' is set to *No*. This field can be up to 20 characters in length.

5. Display Relay Status:
When this option is set to *Yes*, the relay status will be displayed on the control page. If it is set to *No*, the relay status will not be displayed.

6. Status ON Color:
When the 'Display Relay Status' option is set to *Yes*, this field specifies the color that will be displayed when the relay is *on* (coil energized).

7. Status ON Text:
When the 'Display Relay Status' option is set to *Yes*, this field specifies the text that will be displayed when the relay is *on* (coil energized).

8. Status OFF Color:
When the 'Display Relay Status' option is set to *Yes*, this field specifies the color that will be displayed when the relay is *off* (coil not energized).

9. Status OFF Text:
When the 'Display Relay Status' option is set to *Yes*, this field specifies the text that will be displayed when the relay is *off* (coil not energized).

10. ON/OFF Buttons:
This option allows the user to specify *0*, *1*, or *2* buttons to turn the relay on or off. *Zero* buttons disables the users ability to turn the relay *on* and *off* (a pulse button may still be included... see below). *One* button may be used to toggle the relay *on* and *off*. *Two* buttons gives the user one button to turn the relay *on* and another button to turn the relay *off*.

11. Button 1 Label:
When *1* or *2* buttons is selected in the 'ON/OFF Buttons' option, this field specifies the text that will be displayed in pushbutton number 1.

12. Button 2 Label:
When *2* buttons is selected in the 'ON/OFF Buttons' option, this field specifies the text that will be displayed in pushbutton number 2.

13. Pulse Button:
This option allows the user to include a pulse button to control the relay. If the pulse button is included, the relay will *pulse* for the time specified in the 'Pulse Duration' field in the 'Relay/Input' page each time the button is pressed.

14. Pulse Button Label:
When the 'Pulse Button' option is set to *Yes*, the text entered here will appear in the pulse button on the control page.

15. Pulse Duration:
When WebRelay-Quad™ receives a command to *pulse* the relay, this is the time in seconds that the relay will pulse *on*. This time can be set from 0.1 seconds to 6000 seconds (100 minutes). The factory default setting for this is 1.5 seconds.

Section 3: Operation

WebRelay-Quad™ 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 with default settings is shown below.
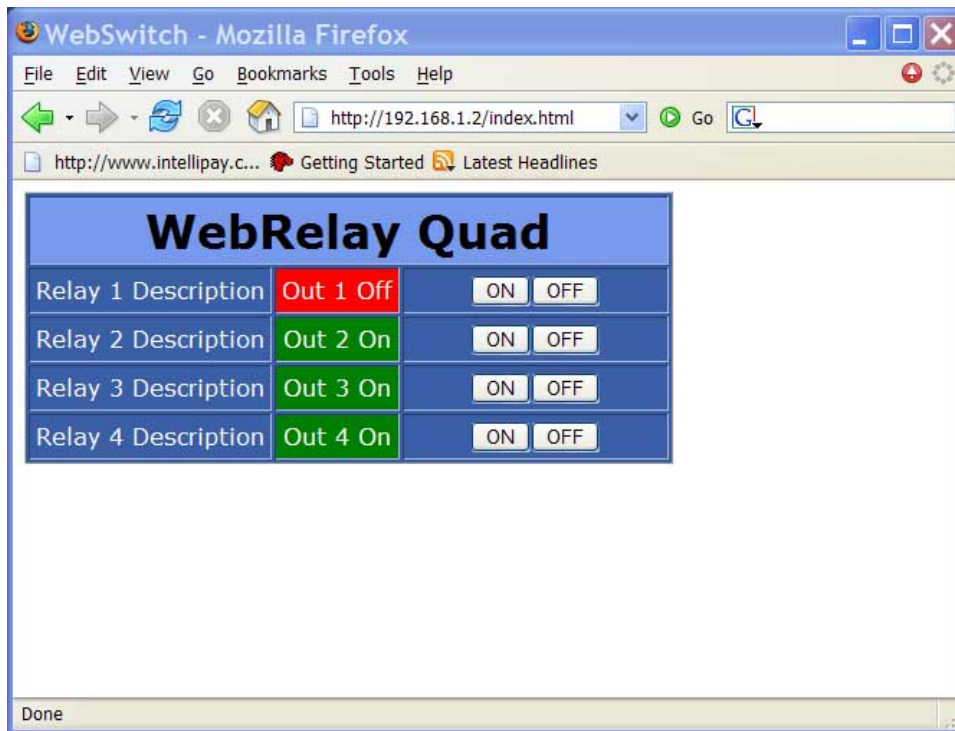
3.2 XML Operation

Custom computer applications may be created to monitor and control WebRelay-Quad™ without using a web browser. Monitoring the state of the relays is done by sending a request to port 80 (or port specified in setup) for the XML page. Control of the relay 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>0</relay1state>
    <relay2state>1</relay2state>
    <relay3state>1</relay3state>
    <relay4state>1</relay4state>
  </datavalues>
```

The tags `<relay1state>`... `<relay4state>` indicate the current state of each of the four relays. Values for the tags are described below.

<relayXstate>   0=off(coil off)
                   1=on (coil energized)

Commands can be sent to WebRelay-Quad™ which control the relays. Commands are sent using variables called relay1State, relay2State, relay3State and relay4State. Two examples of using relayState are given here.

Turn relay1 'off': http://192.168.1.2/state.xml?relay1State=0
Turn relay1 'on': http://192.168.1.2/state.xml?relay1State=1
Pulse relay1: http://192.168.1.2/state.xml?relay1State=2 (note that pulse time is specified in setup pages).

Multiple relays can be changed with a single command by submitting multiple relayXState variables separated by an ampersand symbol (&). All four relayXState variables can be included, or only a subset. The relayXState variables can be in any order. Relays that are already in the desired state will not be affected by on/off commands. Note that pulse commands will reset the pulse timer each time a command is received.

The following line illustrates how to turn 'on' relay 1, turn 'on' relay 2, and turn 'off' relay 4.
http://192.168.1.2/state.xml?relay1State=1&relay4State=0&relay2State=1

Note that when the above commands are sent to WebRelay-Quad™, its current state is returned in the form of an XML page. The commands can also be sent without having WebRelay-Quad™ return the XML page. This is accomplished by adding the noReply field as follows.

Turn relay3 'on' without returning state: http://192.168.1.2/state.xml?relay3State=1&noReply=1
Turn relay3 'off' without returning state: http://192.168.1.2/state.xml?relay3State=0&noReply=1

Password :
If the control password is enabled in the WebRelay-Quad™ 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?relay2State=1&noReply=1 HTTP/1.1
 Authorization: Basic bm9uZTp3ZWJyZWxheheQ== (Ends with two \r\n)

where bm9uZTp3ZWJyZWxheheQ== is the base 64 encoded version of the username and password
 none:webrelay

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 desired password into the website and pressing encode.

Appendix A: Restoring Factory Default Settings
In the event that the IP address or passwords are forgotten, WebRelay-Quad™ may be restored to its original factory
default settings. To do this, first remove the power from the unit. For non-POE (Power Over Ethernet) units, this
may be accomplished by disconnecting the 14-pin connector. For POE units, simply disconnect the network line.
Next, press the small button that is located on the side of the board. When the button is pressed, a tactile feel can be
detected. 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.

Appendix B: Specifications

Power Requirements:
Power Supply Voltage: 5V ± 5%
Power Supply Current: 350mA
Power Over Ethernet Option: POE Class 2 (3.84 to 6.49 Watt)

I/O: 4 Relays (Direct access to dry contacts)

Relay Contacts:
Contact Form: SPDT
Contact Material: Ag (Au clad)
Max Voltage: 24VDC
Max Current: 1A
Min Load: 1mA @ 5VDC

Relay Control Options: ON/OFF or Pulsed
Pulse Timer Duration: 100ms to 6000 Seconds (100 minutes)
Accuracy of pulse timer: ±0.1%

Network: 10Base-T Ethernet
Network Setup: static IP address assignment, TCP port selectable

Connectors:
Power/Relay Contacts: 14-pin removable terminal strip
Network: 8-pin RJ-45 socket

LED Indicators: 7
-Input voltage applied
-Relay coils (1-4) engaged
-Network linked
-Network activity

Physical:
Operating Temperature: 32°-158°F (0°-70°C)
Size: 3.524in (89.510mm) wide X 2.600in (66.040mm) (including connectors) tall
X 0.660in(16.8mm) high (0.950in (24.1mm) high with POE option)
Weight (Standard): 1.7oz (48.2 grams)
Weight (with POE option): 2.3oz (65.2 grams)

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: Mechanical Information

The following illustration shows mechanical details for the WebRelay-Quad™ board. Note that when accessing WebRelay-Quad™ through a panel, a light pipe (Lumex LPF-C07130S) should be used to view the LEDs. The board is designed so that the light pipes will easily snap into place. The light pipe is designed for seven LEDs, but only five LEDs are used for this application. The unused light conduits can be cut off for proper mounting. Note that light pipes are not included with the WebRelay-Quad™ board but are available at electronics distributors.
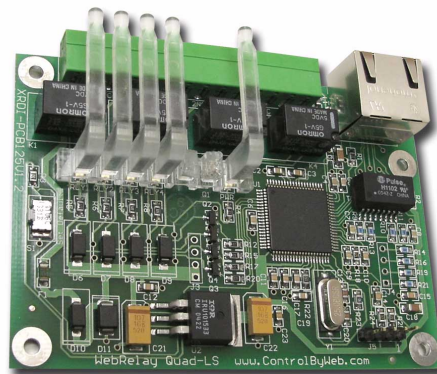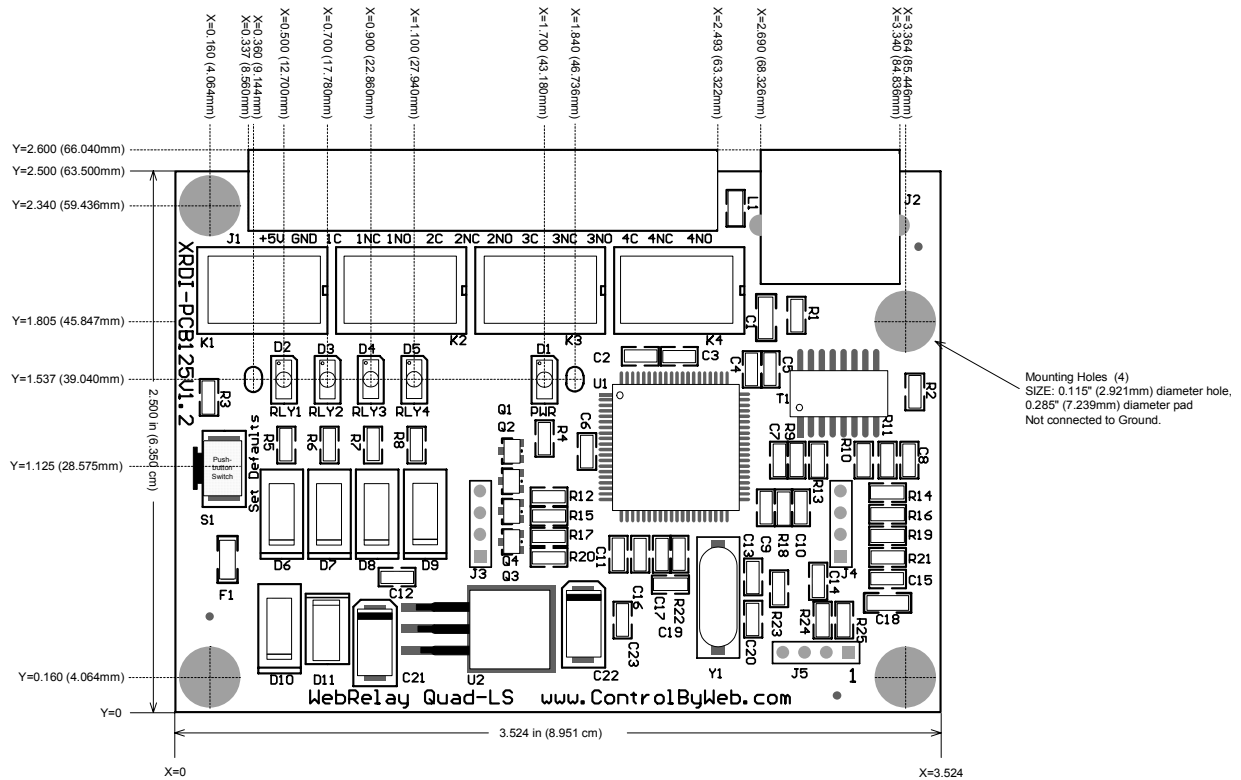
**WebRelay Quad
with Light Pipes Installed**

Appendix D: Open TCP Legal Notice

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