

# WEBIO

## User Manual



Preliminary - User Manual Version 4.0.1  
Addendum to WebIO v2 manual for WebIO v4  
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# Table of Contents

Product Information.....	3
WebIO Introduction .....	4
WebIO Networking .....	6
X10 Modules .....	6
WebIO Example Setup.....	6
WebIO Hardware Setup.....	7
Ethernet Connection.....	7
X10 Interface .....	7
Program Switch .....	8
1. Restoring Factory Default Settings .....	8
2. Allowing Storage of User Configuration.....	8
WebIO Network Setup .....	10
Setting a WebIO IP Address Using a DHCP Server .....	10
Getting an IP Address from a DHCP server .....	10
Locating WebIO on your network using WebIO-KeyOn Software .....	11
Manually Setting the WebIO IP Address Using ARP and Ping.....	13
Setting a Static IP Address (When no DHCP Server is Available).....	13
Routable Network Setup .....	14
Using WebIO .....	20
WebIO Functions.....	20
Controlling X10 Labeled Devices .....	21
Send X10 Commands .....	23
Toggle Commands.....	25
Timer .....	26
Passcode .....	27
X10 Query Device.....	27
Sensors .....	28
Sensor Admin.....	30
Automation .....	32
Admin .....	35
Setting IP Address .....	37
Setting Date Time .....	37
Setting A User Passcode.....	38
WebIO Security.....	38
Login.....	40
Edit Device Labels.....	41
Appendix A .....	44
WebIO Detailed Manual Network Setup .....	44
LAN setup with DHCP:.....	44
LAN Setup without DHCP:.....	45
Appendix B .....	46
Limited Warranty .....	46
Appendix C .....	47
Technical Specification.....	47
Product Information.....	49

# Product Information

This manual is an addendum to WebIO v2 manual. This manual covers added WebIO features in version 4.0. For “core” WebIO features such as X10 control and IP address setup, see WebIO Manual version 2.

## **Owner’s Record**

The model number, serial number and MAC address is located on the bottom of the device. Record the model number, serial number and MAC address in the space provided below. These numbers are important for user use and configuration of the Product. Refer to these numbers whenever you call upon Key Eleven or authorizes service center regarding this product.

Model No. AFX1110

Serial No. \_\_\_\_\_

MAC Address \_\_\_\_\_

# WebIO Introduction

WebIO is Internet automation server and gateway, providing both local Ethernet and remote Internet control of lamps, appliances and other electrical devices and remote monitor of wireless sensors in the home or office. Utilizing X10 PLC technology, WebIO sends signals down existing power lines to control X10 compatible PLC devices. WebIO version 4 also includes a wireless sensor receiver for monitor of wireless entry sensors, motion sensors, sump pump sensors and more. By containing a built-in web server, WebIO allows remote users with Internet access to connect to a WebIO via web browser on a computer laptop or cell phone/Smartphone.

WebIO is built on the idea that an expensive and complex personal computer is not needed to provide Internet access to an X10 power line control network. Instead, WebIO is a low cost, small self-contained device that provides all the functionality of an Ethernet to X10 gateway that is as easy to install as a home Internet router.

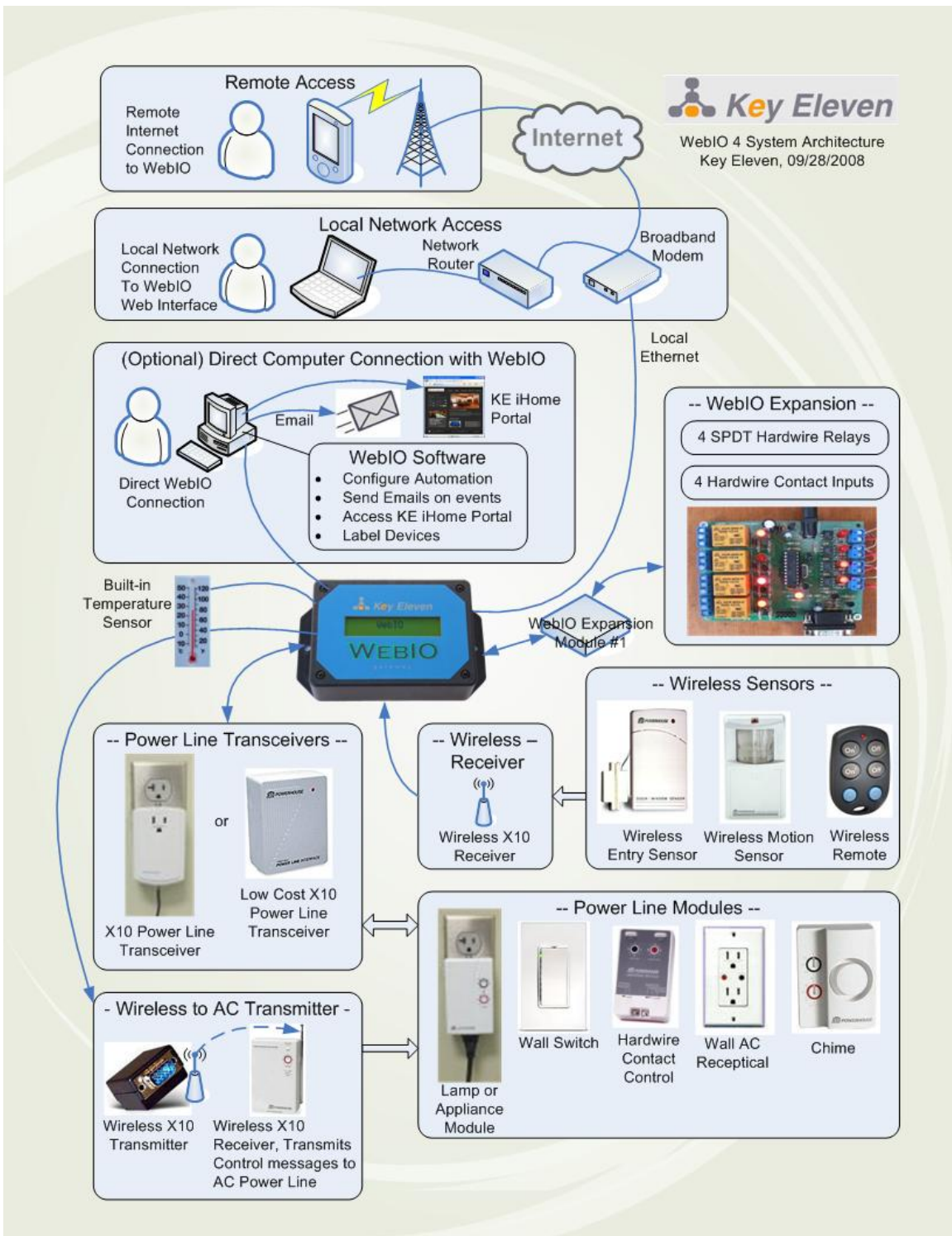
WebIO communicates with X10 modules that support “On”, “Off”, “Query” and other X10 functions. This includes appliance modules, lamp modules, AC receptacles, light switches, dry contact modules, relays and many others readily available devices from suppliers of X10 PLC devices.

## **WebIO TCP/IP Networking**

WebIO provides an RJ45 interface for an Ethernet connection to a local area network. An IP address may be assigned to a WebIO from a DHCP server or a static IP address can be set using the WebIO Setup utility software.

For remote monitoring and control, WebIO requires a routable Internet connection, allowing a user to connect to a WebIO from anywhere in the world via the Internet.

WebIO network access security is provided via user assignable passcode. WebIO configuration settings are protected from unauthorized web access via “*program mode*” switch located on the WebIO back connection panel. Additional security requires user supplied VPN device or other network security systems.



The diagram above displays the many networking integration, device control, sensor monitor and notification features of a WebIO version 4 system.





# WebIO Hardware Setup



Rear View of WebIO

## Ethernet Connection

WebIO provides an RJ45 jack for Ethernet connection to your Local Area Network. The left LED of the RJ45 jack will light when the WebIO is correctly connected to an Ethernet LAN.

## X10 Interface

WebIO provides an RJ12 6pin modular interface for connection to an X10 transceiver. When used with a Smart Home PowerLinc II™ X10 transceiver, power for WebIO is provided by the PowerLinc II.

When used with the PSC05/TW523 X10 transceivers, which do not supply power, the WebIO barrel connector is used with a 9-12volt dc (center pin positive) power adapter. Also, an internal WebIO jumper (J6) must be moved from the left to the right position (nearest barrel connector) to enable the barrel connector for power. This also disables the RJ12 connector (X10 transceiver connector) as the power source.

WebIO supports multiple X10 power line transceivers:

- The Smart Home PowerLinc II™ serial interface X10 transceiver (with RJ12 6pin modular connector) in TW523 mode. With this transceiver the WebIO also receives power, so no extra power supply is needed.
- The X10 Pro PSC05 (TW523) transceiver. An additional 9-12 Volt DC, center pin positive, power supply is required to power the WebIO. Along with a jumper changed within WebIO.
- The PL513/PCS04 transmitter. With the PL513, WebIO can transmit X10 signals but not receive message replies from 2-way X10 modules. In addition a separate power supply is required for WebIO.
- The XM10 transceiver for 230VAC power in UK countries. In addition a separate power supply is required for WebIO.

## Program Switch

The WebIO **Lock-Program** switch is located on the rear of a WebIO. This switch is used as a security device to prevent unauthorized remote users from configuring the WebIO. To prevent unauthorized or accidental configuration, it is important to leave this switch in the **Lock** position.

The Program Switch performs the following functions:

1. Restore factory default settings.
2. Allow storage of user configuration.
3. Display current IP address

### 1. Restoring Factory Default Settings

To restore WebIO to factory default settings perform the following tasks:

- a. Remove power.
- b. Switch the Lock-Program Switch to the **Program (Prg)** position (away from power barrel connector)
- c. Reapply power. The WebIO boot process will display the message "Factory Default".
- d. Set the switch back to the **Lock** position.

Restoring to factory defaults performs three tasks:

1. Removes the user set static IP address. The factory default is to accept an IP address from a DHCP server.
2. Clears user-set passcode, disabling the use of a passcode until a new passcode is entered.
3. Clears all user defined X10 device labels.

### 2. Allowing Storage of User Configuration

Setting the Program Switch to the **Prg** position while the WebIO is powered allows the user to perform these tasks:

1. Program a static IP address
2. Set a passcode as described later in this manual.
3. Define labels/names for X10 devices and wireless sensors

WebIO will save these setting to non-volatile memory for recall even if power is lost and restored.

The function of the Program Switch is also used for security. Remember to set the Program Switch to the normal (**Off/Lock**) position after programming to prevent unauthorized remote users from configuring WebIO.



**IMPORTANT:**

The function of the WebIO Lock-Program switch is also used for security. Remember to set the Program switch to the normal (**Off/Lock**) position after setup programming to prevent unauthorized remote users from configuring your WebIO.

The Lock position also prevents an accidental **Restore to Factory Defaults** on unintentional power cycle of WebIO.

# WebIO Network Setup

WebIO can operate with either an IP address obtained from a DHCP server, by using the WebIO Setup utility software, or by using a computers operating system's ARP and Ping tools.

## **Setting a WebIO IP Address Using a DHCP Server**

### **Getting an IP Address from a DHCP server**

If WebIO is not configured with an IP address (default setting), WebIO will then accept an IP address from a DHCP server (A DHCP service in your home router).

When using DHCP with WebIO, Internet routing to the WebIO may not be practical in the case where WebIO is power cycled (rebooted) and then receives a different IP address than previously assigned. Also Routers may not have the ability to forward to an IP address in the range of the DHCP assigned address. To avoid this problem when using a router with DHCP enabled it is best to us a *static* DHCP service (or Bootp service) where the DHCP server assigns a defined IP address to the WebIO based on the WebIO MAC address.

Note: In some rare cases depending on DHCP server used, WebIO may prioritize DHCP over static, regardless of the WebIO Lock switch position. Such that if you assign WebIO a static IP address on a network with a DHCP server, WebIO may accept a new IP address received from the DHCP server. In some rare cases, in using the WebIO static IP function, you may need to not have a DHCP server (not so practical) or have the DHCP server always assign the same IP dependent on MAC address. (Static DHCP/bootp).

## Locating WebIO on your network using WebIO-KeyOn Software

When initially installed on a network, WebIO will accept an IP address as assigned by a DHCP server, such as a DHCP service built into home network routers (Linksys, Netgear, D-Link, etc). If you do not have DHCP service on your network, see the WebIO user manual 2.0 for configuring WebIO with an IP address using the WebIO Setup software. Note: WebIO version 4 does not have an LCD display as does version 2.

### Network setup steps:

1. Install and run the WebIO-KeyOn software on a PC computer on the same local network as WebIO. This software will be used to discover your WebIO's IP address as assigned by your DHCP server. See the WebIO-KeyOn manual for more information on installation and use. Note: There are other ways of finding WebIO's IP address, such as looking in your routers connected device list.

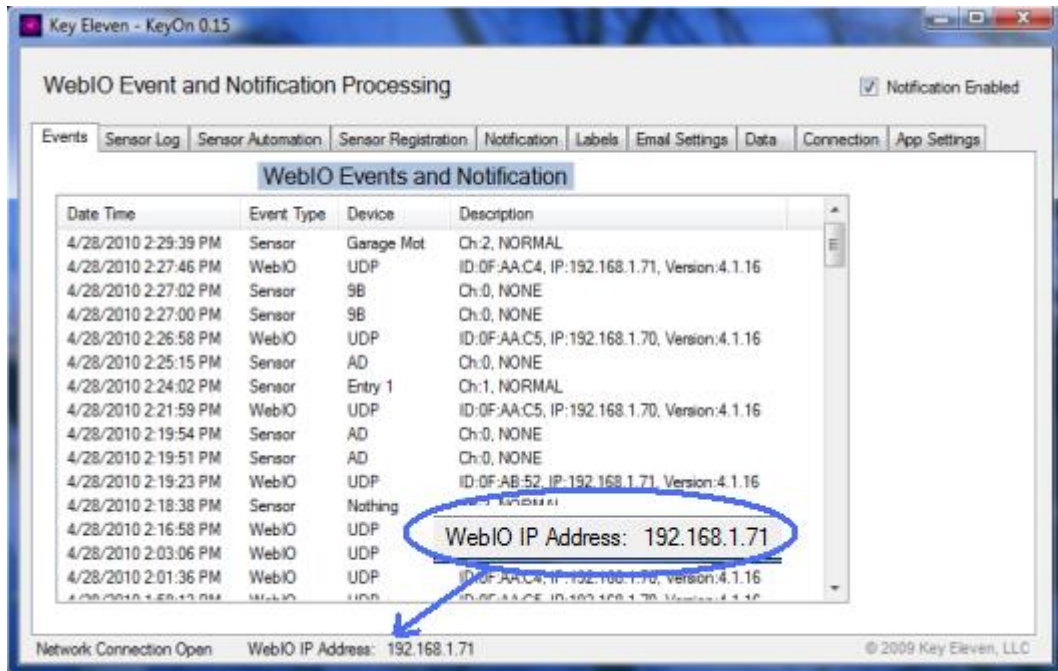


Figure 1: WebIO-KeyOn showing your WebIO's IP address

Note: WebIO-KeyOn PC software is located on the include WebIO CD-ROM. To install, find and copy directory "WebIO-KeyOn\_Vxxx" to your PC, run executable file: KeyOn.exe in the WebIO-KeyOn folder.

This software is used to configure WebIO, log sensor events and perform email and text notification.

Note: WebIO-KeyOn, open TCP/IP Port 4041 on your PC for receiving network messages from WebIO. On first run of this software, Windows operation system may require your acknowledgement to allow this port to be open.

2. Power up WebIO. When WebIO boots it sends out a network message which WebIO-TM receives to “find” WebIO on the network (See figure 1 above). Also every time WebIO version 4 receives a wireless sensors message, WebIO will relay the message on the network for WebIO-TM to receive, this also allows WebIO-TM to “re-discover” WebIO on the network if needed.
3. Connect to your WebIO using an internet browser. Example. If your WebIO is at IP address 192.168.1.10 then enter URL address: <http://192.168.1.71> into your computer’s web browser, such as Internet Explorer (IE), Opera, Firefox, etc.



Figure 3: Connection to WebIO (Sensor page) using Internet Explorer web browser

4. Set WebIO with a Static IP address. This is useful so WebIO’s LAN IP address isn’t re-assigned an IP address by your routers DHCP service if WebIO is rebooted. For more information on WebIO IP address and Internet access to WebIO see “WebIO for Internet Access” at: <http://www.webio.us/doc/router-setup.html>

To instruct WebIO to store its IP address in Flash memory, see the section “**Using WebIO – Setting an IP address**”.

## Manually Setting the WebIO IP Address Using ARP and Ping

### Setting a Static IP Address (When no DHCP Server is Available)

ARP and Ping can be used to set the WebIO IP address. There must not be a DHCP or BOOTP server on the same network as WebIO when using this method for setting the IP address.

Windows 9x example:

IP for WebIO: 192.168.1.25

MAC for WebIO: 00-03-75-1f-0c-9f

PC's IP address: 192.168.1.150

1. Enter the desired IP address for the MAC address of the WebIO into your PC's ARP table. From a Windows command prompt Enter:

```
arp -s 192.168.1.25 00-03-75-1f-0c-9f 192.168.1.150
```

2. Ping the IP address of the WebIO by entering the following command at a Windows command prompt.

```
ping 192.168.1.25.
```

When received, the WebIO will accept this address.

To instruct WebIO to store its IP address in Flash memory, see the section "**Using WebIO – Setting an IP address**".

For more information on setting an IP address see Appendix A.

# Routable Network Setup

To setup WebIO for remote Internet access, WebIO will need to be assigned either an Internet IP address, or more commonly, placed behind a router (LAN side) that has an Internet IP address and is configured to forward via IP port forwarding to the IP address of the WebIO. This method is referred as “router port forwarding” and “Network Address Translation” (NAT)

## **Router Setup (router port forwarding)**

Most routers have a feature that allows a user-configuration for port forwarding. Port forwarding is used to allow an outside request from the Wide Area Network (WAN) side of the router to be routed to a *specific* IP address of a device or computer existing on the *inside* router network, referred to as the Local Area Network (LAN).

Message requests sent over a TCP/IP network (such as the Internet) use port numbers as a way to specify a specific service on a server. For example, a Web service will listen on port 80 where as an email service on the same server will listen on port 25. This way a message directed to the server using an IP address will specify a port number to direct the message to the appropriate service (web service or e-mail service). As another example, when a web browser asks a web server for a web page, the browser sends a message to the server, referring to its IP address and referring to the web services port number on the server. By default a web browser sends requests to port 80, the default port used by web servers.

When setting up a router to forward a port to the WebIO, using the default of port 80 is suggested. However the WebIO will accept an HTTP connection on any port, allowing for router setup in the case that an existing web server on the LAN side of the router is already assigned to port 80. The WebIO would then need to be assigned to a different port such as 81 or 8080.

When using a port other than 80, you will need to specify the port number on the browsers URL using “:” {and port number}. For example to specify port 8081 at IP address 24.119.179.20, enter: `http://24.119.179.20:8081`. Or when using a domain name, enter: `http://www.keyeleven.com:8081`

## WebIO Setup for Internet Access

This document describes how to setup WebIO for routable access from the Internet. WebIO requires a routable internet connection to be accessed from anywhere on the Internet. WebIO's built in web page interface can then be accessed from a remote PC computer or cell phone/Smartphone using a web browser such as Internet Explorer (IE), Firefox, Opera, etc.

The setup described here creates routable access by configuring a Port Forward in a Network Router (also known as Network Address Translation (NAT)). This configuration is just like what can be used for configuring an IP camera, web server or other network connected device requiring incoming connections from the internet.

A routable connection means that the network device involved (such as a WebIO) can be connected to ("called") from a computer or other device that is located on an outside network such as the Internet. Instead of making a "call/connection" out to a web server on the internet as does a computers web browser, WebIO requires the ability to be "called/connected to" from a device on the Internet/another-outside network such as a computer on a remote network with a connection to the Internet connecting to your WebIO.

The router involved must have an Internet IP address. A home router will be assigned an IP address from your Internet Service Provider (ISP). The Router's Wide Area Network (WAN) IP address is used to connect to your router from the Internet. A Router configured with a port forward to your WebIO (forwarding a TCP Port number to the IP address of your WebIO), will accept a connection from the Internet, and if this connection requests the port number assigned to your WebIO, the outside/Internet connection will then be forward to the WebIO connected to the Router's Local Area Network (LAN).

### Steps to setup WebIO for Internet access:

1. Find your WAN IP address. Your router should display this on its web page interface.
2. Set an IP address in WebIO (its LAN IP address).
3. Forward a Port in your router to the IP address of your WebIO.
4. Test the connection from a computer with a different Internet connection

### Detailed setup instructions (may be different for your router and network configuration)

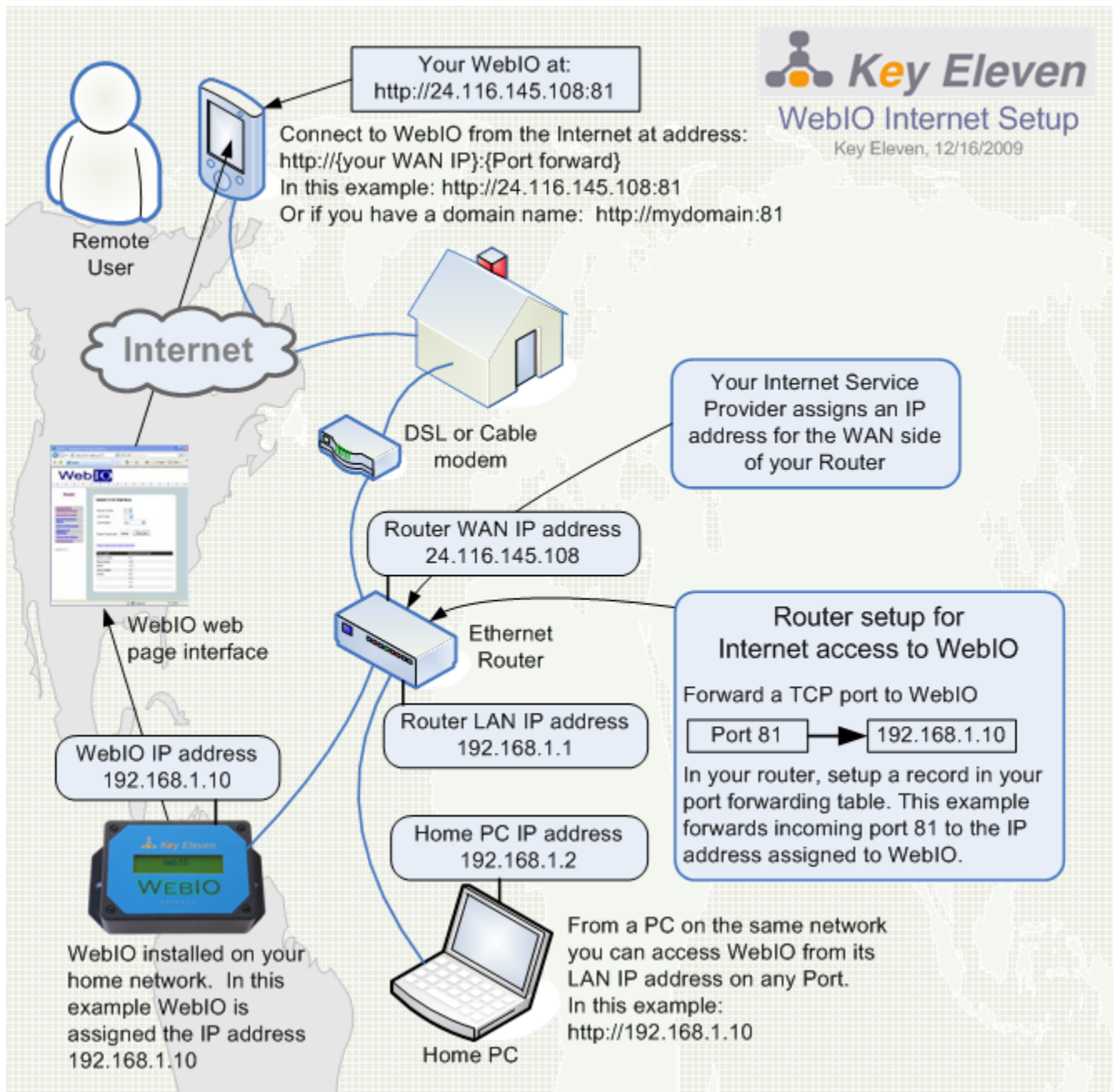
1. Figure out your local network address so you can determine an available Static IP address for WebIO. A network address defines the IP address range available on your logical network. Example: If a PC connected via Ethernet to your local network has an IP address of 192.168.1.100 and a subnet mask of 255.255.255.0,



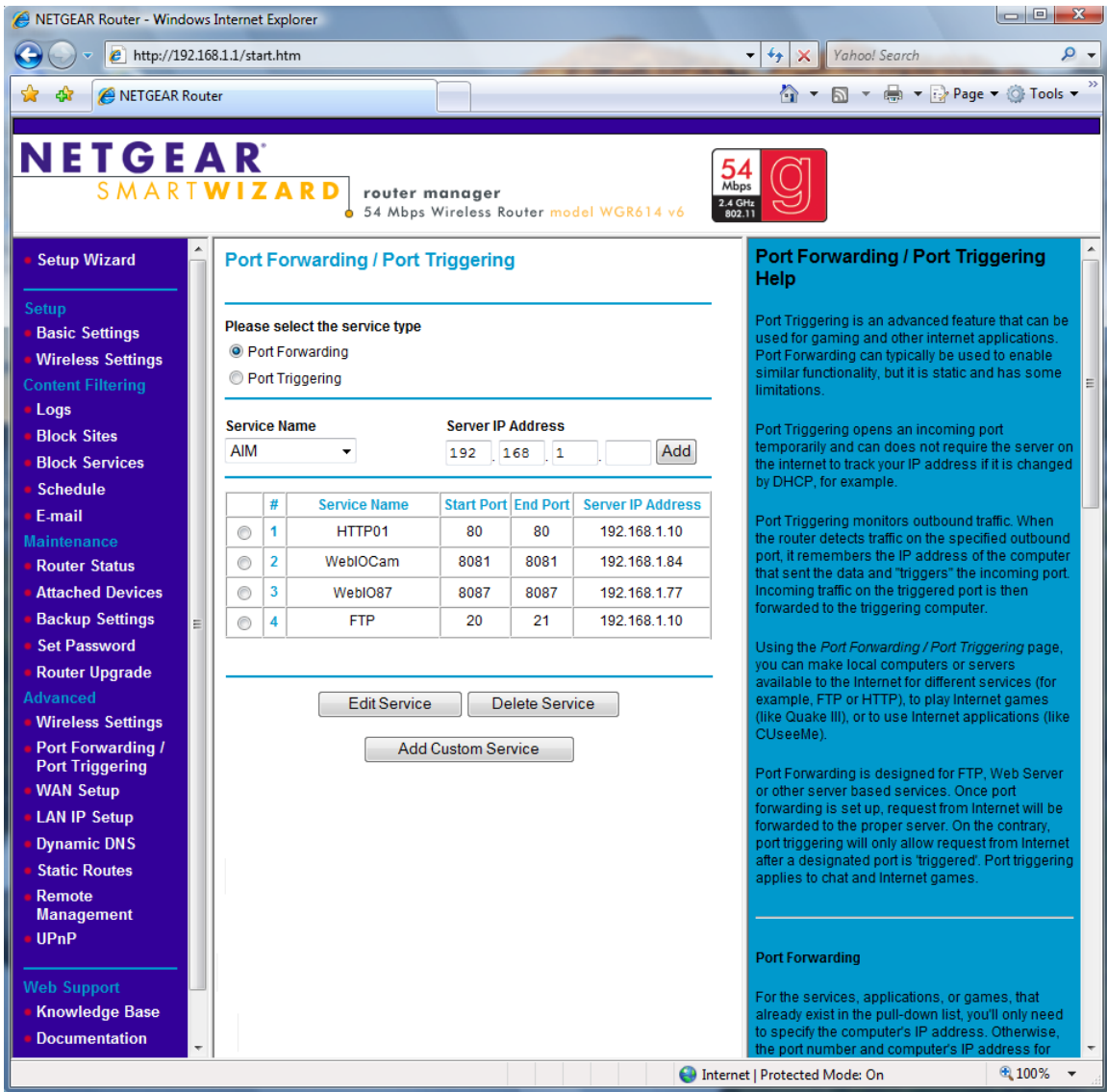
then your network address is 192.168.1.0. You would have an address range of 192.168.1.1 through 192.168.1.254. Another common network address for home networks is 192.168.0.0. You can use the IPCONFIG utility at the windows command prompt to find your network info.

2. Set WebIO with a Static IP address. When connecting WebIO to your network, it may have received an IP address from your Router's DHCP service, this IP address can change if WebIO gets rebooted (temporarily loses power). There are two ways to setup WebIO with a static IP address:
  - a. (Easiest and preferred method) From WebIO's "Change IP Address" web page, set a static IP address (example: 192.168.1.10 for a network address of 192.168.1.0). In some cases WebIO's IP address will need to be outside of your routers DHCP range and in some cases inside, depending on your router.
  - b. (Alternate method, if your router supports this) In your router set a static IP address for the MAC address of your WebIO. Your router will then be able to identify your WebIO by it's MAC address and then always give WebIO the a defined IP address when WebIO boots.
3. In your router forward a port to your WebIO. TCP/IP uses ports to connect devices/software together on network(s). WebIO will listen to any port number. The default port for a web server is 80. 80, 81, 8080, 8081, are good port numbers for forwarding to WebIO. If you already have a web server, IP camera or other device using a port such as port 80, then assign WebIO 81, or some other unused port. Some port numbers may be blocked by your ISP. Sometimes routers seem to have a bit of trouble getting new configurations to "stick", or have "save" buttons that are hard to find, and require a reboot, etc. To forward an IP address in your Router do these steps:
  - a. Connect to your router via web browser. Your router may have an IP address of 192.168.1.1 or 192.168.0.1. Connect via browser by typing in address: <http://192.168.1.1> (for example). Your router may also require a password login.
  - b. Find the web page on your router for forwarding a port. This may be called something other than "forwarding"
  - c. Create a new forward. Enter TCP port (example 8081). And the local IP address of your WebIO. (example 192.168.1.10)
  - d. Save settings.
4. Find your WAN IP address for your network/router. You can find this in your router's web page interface. It's the Internet IP address assigned to your router by your ISP. Note: this WAN IP can change depending on your ISP service. In some cases you can request a static IP or uses DDNS service with your own domain name.
5. Now connect to your WebIO from the Internet. From a computer not on your local network, connect to your WebIO by going to the address: <http://{your WAN IP address}:{port forward to you WebIO}>. example: <http://24.116.145.108:8081>

- a. Note, in many cases you can connect to your WebIO from its internet routable URL address, but in some cases some routers will not “loop-back” an internet address back into its own local network.
6. Test connecting to WebIO from a computer on another internet connection using URL address: `http://{your WAN IP address}:{the port number of your forward}` Example: <http://24.116.145.108:8087> You should have a friend or someone on a different internet connection try and connect to your WebIO. If successful then try and connect using the WAN IP:Port from a computer on your own network to see if your Router will loopback to your WebIO using the port forward. Note: If you use port 80, which is a web server’s default port, your browser will remove “:80” as it’s the default and need not be entered.
  - a. You can also test from a cell phone with Internet access and a web browser. Some cell phone browsers don’t work so well. Opera-mini seems to work well.
  - b. Note: In many cases you can test your port forward from the LAN side of your router. From a PC on the same network as WebIO, instead of entering the WebIO’s LAN IP address for a direct network connection to WebIO’s web server from your browser, you can use the Router’s WAN IP and WebIO’s Port as though your connecting from an outside/Internet connection. Your Router will receive your internal network request and understand that WebIO is really on its LAN and loop back your request to WebIO (on the same LAN) using the port you specified. Some routers don’t support this Loopback.
7. You may want to next get a domain name that points to you WAN IP address so you can connect my name. example: <http://webio.us:8087>



The diagram above shows the network configuration for making WebIO routable from the Internet.



Above is a screenshot of a NetGear router Port Forwarding configuration. Note entry #3 for WebIO on Port 8087 forward to LAN IP address 192.168.1.77.

# Using WebIO

## **WebIO Functions**

WebIO includes an embedded web server, for providing a simple interface to the user via web browser. This allows for simple operation with no additional software required to be installed on the user's PC. The simple web pages of WebIO even allow for operation from a mobile Smartphone or similar devices that provide a web browser.

When using a Smartphone with a web browser it become advantageous that WebIO uses HTML frames allowing the small phone screen size to focus on a single frame rather than the full web page.

### **The WebIO web interface provides for:**

- Controlling X10 devices by label/name
- Sending specific X10 commands
- Query of an X10 device state
- Wireless sensor states
- Setting a Static IP address
- Setting a User Passcode
- Editing device and sensor labels
- Reading WebIO temperature

The following sections describe the functions of WebIO.

## Controlling X10 Labeled Devices

The WebIO web interface provides two methods for controlling X10 Devices. The [Control Devices](#) page (shown below) allows for easy control of X10 On/Off commands for predefined X10 devices.



The screenshot shows the WebIO web interface in a browser window. The browser title is "WebIO - Key Eleven" and the address bar shows "http://192.168.1.71/". The page features a navigation menu with links for "Control Devices", "X10 Codes", "Sensors", "Sensors Admin", "Automation", "Exp", "Admin", and "Edit Labels". The main content area is titled "WebIO X10 Interface" and contains an "Enter Passcode:" field with four dots, an "Unlock" button, and a link "Clear passcode when finished". Below this is a section "Set dim level of last device set on:" with "up" and "down" links. A table lists predefined X10 devices with their labels, house/unit codes, and "On" and "Off" control links.

X10 Label	House/Unit Code	On	Off
Hall Lamp	A 1	<a href="#">On</a>	<a href="#">Off</a>
Outside lite	A 2	<a href="#">On</a>	<a href="#">Off</a>
Solar fan	M 5	<a href="#">On</a>	<a href="#">Off</a>
Solar vent	M 6	<a href="#">On</a>	<a href="#">Off</a>
Garage Radio	C 5	<a href="#">On</a>	<a href="#">Off</a>
Door Lock	G 6	<a href="#">On</a>	<a href="#">Off</a>
Garden pump	G 7	<a href="#">On</a>	<a href="#">Off</a>
Room light	G 8	<a href="#">On</a>	<a href="#">Off</a>

The [Control Devices](#) page (above) shows a table of predefined X10 Devices. The **On** and **Off** columns contain links for setting the On/Off state of the device in the selected table row.

When a WebIO passcode is set/enabled, the On/Off links will not trigger X10 commands until the correct passcode is entered in to the **Enter Passcode** field and the **Unlock** button is clicked. After the passcode has been submitted the [Clear passcode when finished](#) link must be selected to re-lock the WebIO from X10 operations.

The **Set dim level of last device set on** up and down arrow buttons are used to adjust the dim level of a lamp module that supports X10 dim commands. Only the last lamp module set on or off will be affected by the dim commands.

The [Control Devices](#) web page interface is designed for convenience to the user for operating several X10 commands with ease. This is accomplished by using X10 labels, on/off links and a single passcode unlock process.

It is important for the user to understand that the unlock process sets WebIO into an unlocked state allowing anyone access to sending X10 commands. This is due to WebIO not having a capability of tracking secure HTTPS sessions with users as is common with full featured Internet web servers. So it becomes important to clear the passcode when finished with using the [Control Devices](#) interface to **re-lock** WebIO from X10 command use.

Also, WebIO will enter locked mode whenever an incorrect passcode is entered and a passcode is set/enabled.

Also note that [X10 Codes](#) web page interface does not set WebIO into an **unlocked** state but instead requires the correct passcode to be entered with every X10 command function when passcode is set/enabled.

**IMPORTANT:**

When using the [Control Devices](#) interface and a WebIO passcode is set/enabled. The [Clear passcode when finished](#) link must be selected to **re-lock** WebIO from unauthorized use of X10 command functions.



## Send X10 Commands

Another method for controlling X10 devices is to use the [X10 Codes](#) web page. This page allows for manually selecting X10 device House code, Unit code, and the Command to be sent. In addition a timer can be set for when the operation should occur.



The screenshot shows a web browser window titled "WebIO - Key Eleven" with the URL "http://192.168.1.71/". The page features the "WEBIO" logo and navigation links for "Control Devices", "X10 Codes", "Sensors", "Sensors Admin", "Automation", "Exp", "Admin", and "Edit Labels". The "X10 Codes" section is active, displaying a form for sending commands. The form includes dropdown menus for "House Code" (set to "A") and "Unit Code" (set to "1"), a "Command" dropdown (set to "On"), a "Repeat" input (set to "0") with "(Dim/Bright)" text, and a "Timer" input (set to "0") with "Minutes 0-254 (255-clear)" text. Below the form is a "Passcode" field with four dots and an "Execute" button. A table lists X10 devices and their codes, followed by a "Timer Status" and a "Query" field.

**WebIO X10 Interface**

House Code: A  
Unit Code: 1  
Command: On  
Repeat: 0 (Dim/Bright)  
Timer: 0 Minutes 0-254 (255-clear)

Enter Passcode\*: ●●●● **Execute**

X10 Label	House/Unit Code
Hall Lamp	A 1
Outside lite	A 2
Solar fan	M 5
Solar vent	M 6
Garage Radio	C 5
Door Lock	G 6
Garden pump	G 7
Room light	G 8

Timer Status: H:A U:1 C:2 T:0  
Query: A 1 = [refresh](#)

\*Timer and Query status requires page refresh  
\*passcode required each time when enabled

To execute an X10 function, select House code, Unit code and Command from the drop list boxes then set an optional timer and enter Passcode (if enabled) and click the **Execute** button.

A table of labeled X10 devices is provided for convenience along with timer and X10 Query status.

WebIO includes support for most of the X10 protocol commands.

**WebIO supports sending the following X10 commands**

- **On** – Used to turn on a device
- **Off** – Used to turn off a device
- **Dim** – Used to Dim a lamp module
- **Bright** – Used to Brighten a lamp module
- **All Units Off** – Used to turn all modules off of same House Code
- **All Lights On** – Used to turn all lights on of same House Code
- **All Lights Off** – Used to turn all lights off of same House Code
- **Status Request** (Query 2-way device), including receiving On/Off messages

The following X10 commands are not supported by WebIO.

**WebIO does not support the following X10 commands:**

- Pre-Set Dim High
- Pre-Set Dime Low
- Extended Data

WebIO adds additional non-X10-protocol commands.

**WebIO adds the following X10 functions**

- **On-Wait-Off** – Where *wait* is 4 seconds
- **Off-Wait-On** – Where *wait* is 4 seconds

### Toggle Commands

The WebIO Toggle action is: (on-wait-off) or (off-wait-on) with a 4 second wait state.

This feature is particularly useful for remotely rebooting Network Routers and other equipment where remote or local access to WebIO will be briefly interrupted.

For Example; In case of remotely rebooting a TCP/IP Network Router of which WebIO is connected, and the Router is connected to an X10 Appliance module: A WebIO toggle “off/on” command sent to the Routers X10 module, will power off the router, causing WebIO to be inaccessible via TCP/IP network. Then to complete the toggle command, WebIO waits 4 seconds and sends an “on”

command providing power back to the Router and access to WebIO after the Router has booted and become operational again.

The Toggle feature is new to WebIO version 1.0.30. WebIO version is displayed on the LCD as it is powered up.

Note: X10 is not necessarily practical for controlling and maintaining a secure and reliable environment for network equipment.

## Timer

The WebIO X10 command timer is new to version 2.0. This feature allows a command to be executed at a later time.

Time is configurable in minutes from **1-254**. A value of **0** is used to execute a command immediately. A value of 255 is used to cancel/clear an existing timer configuration. When using timer value of 255 to clear the timer, the House, Unit and Command values in the drop down boxes have no effect.

Only one timer exists such that only one X10 command can be configured to be sent on the configured time.

When a timer is set, WebIO can still be used to execute other X10 commands with a timer value of **0**. If a timer value other than **0** is used, the current timer configuration will be replaced by the new configuration.

The timer's time is only accurate to better than +/-2% of set time, such that a timer set for 60 minutes may occur up to 1 minute and 12 seconds early or late. Time is effected by WebIO temperature and time can be delayed slightly when used to execute other X10 commands or functions.

When a timer is set, its status can be viewed at the bottom of the [X10 Codes](#) page. To get an updated minutes remaining status, a page refresh is required. A message of **Not Set** is displayed if the timer is not currently set or has completed.

The timer status is reported as H:{House code} U:{Unit code} C:{Command}  
T:{minutes remaining}.

*Note: It is not recommended to use the timer function for critical applications, as X10 is not guaranteed to be reliable such that a person is not in a position to supervise the X10 action. Also the timer configuration can be lost due to WebIO losing and regaining power (power cycle). WebIO does not store the timer configuration in non-volatile memory as WebIO does not have a date-time clock to know the amount of time passed on power outage. Also WebIO has a watchdog feature that can cause auto reboot if a problem occurs, though this should be a very rare event.*

## Passcode

When a WebIO passcode is set/enabled, the passcode must be entered into the **Enter Passcode** field before clicking the **Execute** button. If no passcode or the incorrect passcode is entered, the WebIO will not execute the selected X10 function. Unlike the [Control Devices](#) page, the passcode must be entered for each command sent.

When no passcode is set/enabled, then this field can be left blank.

WebIO does not report when the incorrect passcode has been entered. This provides additional security, not allowing an unauthorized user to “discover” the correct passcode using trial and error.

Also note that [X10 Codes](#) web page interface does not set WebIO into an **unlocked** state but instead requires the correct passcode to be entered with every X10 command function when passcode is set/enabled.

## X10 Query Device

This feature provides for “*asking*” an X10 device for its state being “*on*” or “*off*” by using the X10 **Status Request** command. This feature is useful for validating that a device is in the expected state after sending an X10 command.

Get X10 device state feature is only supported by X10 devices that can reply to the **Status Request** command (often referred to as 2-way X10 devices). This feature also requires that WebIO be used with a “2-way” X10 Transceiver such as the Powerlinc or PSC05/TW523.

Note: Some X10 2-way devices seem to be more reliable at receiving commands than they are at replying to status requests.

WebIO will report a reply from a status request/query as either **on** or **off**. If no status reply is received within 4 seconds. WebIO will report with a **No Response** message.

To execute an X10 Query of a 2-way X10 module:

1. Select House code and Unit code of the device to query
2. Select Command “Query”
3. Enter passcode if required
4. Select [Execute] button
5. After a few seconds, select the “Refresh” link on the “Query” status line near the bottom of the [X10 Codes](#) web page.

## Sensors

The WebIO [Sensors](#) web page provides a current overview of up to 8 sensors. The sensor table shows the sensors assigned to WebIO channels 1-8 including the sensor ID, its current state and the date time of the last sensor reading.



The screenshot shows the WebIO web interface for 'Key Eleven'. The page title is 'WebIO - Key Eleven' and the URL is 'http://192.168.1.71/'. The main content area is titled 'WebIO Wireless Sensors'. It features a 'Security Mode' section with 'Unlocked' selected. Below this is a table of 'Wireless Sensors/Remotes' with 8 rows. At the bottom, there is an 'Activity History' section for 'Channel: 2' with a table of sensor states and dates. A dropdown menu for 'Activity Channel #' is set to '2', and there are buttons for 'Request Data' and 'Refresh Tables'.

### WebIO Wireless Sensors

Security Mode:  Unlocked  Locked

#### Wireless Sensors/Remotes

#	Label	ID	State	Date Time
1	Entry 1	96	Normal	4/29/10 1:10 p
2	Entry 2	AD	Alert	4/29/10 6:14 p
3	Remote 1	6D	Unlock	4/29/10 11:52 a
4	Garage Mot	03	Normal	9/12/09 5:21 p
5	Motion 2	8F	Normal	4/29/10 12:42 a
6	X10 Remote	01	Off	1/1/00 12:00 a
7	Sump Pump	81	Normal	4/29/10 1:34 p
8	Door Bell	E0	Normal	4/9/10 3:31 p

#### Sensors Activity History Channel: 2

State	Date Time
Normal	4/8/10 12:26 a
Normal	4/9/10 2:59 p
Alert	4/9/10 3:31 p
Normal	4/9/10 3:33 p
Normal	4/29/10 5:24 p
Alert	4/29/10 6:14 p

Activity Channel #: 2

[Refresh Tables](#)

The [Sensors](#) web page also shows the activity history of a selected sensor/channel. This list shows a history of a sensors last 6 sensor states not including redundant states. To make the activity history list of 6 states more meaningful WebIO does not store redundant “same” sensor states. When a sensor repeats its unchanged state more than 2 times, only the first state and last state of more than 2 unchanged state events are saved. Some wireless sensors periodically repeat their current state as a form of “heartbeat” message to demonstrate the sensor is “still alive” and working. For example if an entry sensor on a door is open, an Alert message will be received and saved, when the door closes a Normal message will be received and saved. Over the next several hours the entry sensor will repeat the Normal Message, where WebIO will only save the first Normal message (after the door was closed) and the most current Normal message. When the door is opened a second time, an Alert message is sent and saved by WebIO. In this example WebIO will have stored the First Alert, the First Normal, and the last normal before the second Alert, and store the second Alert.

The top of the [Sensors](#) web page also displays the current WebIO **Security Mode** of Unlocked or Locked. Although this mode is displayed via checkboxes, the user cannot change the WebIO security mode from the web page interface. The security mode is only changed by using a WebIO registered wireless security remote, where pressing the “ARM” button places WebIO into Lock mode and the “Disarm” button places WebIO into Unlock mode. The security mode affects automation on wireless sensors, such that a sensor going into Alarm state will also trigger a defined Alarm automation if WebIO is in Lock mode.

To update the current sensor states table and the sensors activity history, select WebIO sensor channel for refresh and select the [Request Data] button. This will then send you to the a web page requesting you to wait 4 seconds before selecting a link to return to the [Sensors](#) web page. This wait period is due to the time it takes WebIO to update the sensors tables with the current sensor states.



## Sensor Admin

The WebIO [Sensor Admin](#) web page is used to register up to 8 sensors to the 8 WebIO sensor channels.



WebIO is compatible with many X10 wireless security and automation sensors. It is important to know the distinction between the two types of sensors. Security sensors have an internal unique id. This unique ID sometimes changes when the sensors batteries are replaced, requiring the sensor to be re-registered with WebIO. Where X10 automation sensors and remotes are addressed using the standard X10 House/Unit code combination.

To register a sensor with WebIO, you can either use this WebIO web interface or use the WebIO-KeyOn PC software, which can be a better tool for managing your sensor network with WebIO.

To register a sensor with WebIO web interface:

1. Activate the sensor
2. Select the [Refresh Sensor Read] Button on the WebIO Sensor Admin web page. This updates the info below with the value of the last sensor message received by WebIO. Note: It may be necessary to select this button a couple times.
3. Note the sensor info provided, where:

- a. **CH:** displays the sensors register channel. For an unregistered sensor this will have the value of 0.
  - b. **ID:** displays the sensor's ID
  - c. **State:** displays sensors state as a hex value
  - d. **Time:** displays the date time of the reading
4. Verify that the WebIO received your sensor's transmission by time of reading, or if you know the sensors ID (or address for X10 automation sensors).
5. Place the WebIO Lock/Program switch into "Prg" position.
6. Select the channel # to register this sensor to.
7. Select the [Register Sensor] button.
8. To verify successful registration, activate the sensor again and go to the WebIO [Sensors](#) web page and refresh the page by using the [Request Data] button/command. You should now see your sensor in the current sensor states summary table in the row of it's registered channel.
9. Name your sensor using the WebIO [Edit Labels](#) web page.

## Automation

The WebIO [Automation](#) web page is used to assign X10 commands or Expansion port relay commands to be sent based on wireless sensor states.



Automation - Wireless Sensor X10 Triggers

Ch	Label	Alert/Lock/On	AT	Normal/Unlock
1.	Entry 1	A 2 2	1	M 1 3
2.	Entry 2	M 2 2	1	A 1 3
3.	Remote 1	A 1 2	0	A 1 3
4.	Garage Mot	M 2 2	1	A 1 3
5.	Motion 2	M 1 2	1	0 0
6.	X10 Remote	R 2 66	0	R 2 65
7.	Sump Pump	A 1 2	0	A 1 3
8.	Door Bell	A 5 2	0	A 5 3
9.	Alarm	P 9 2		A 1 3

Edit Automation Triggers

Edit Trigger for Channel:  and Sensor State:

House:  Unit Code:  Command:

Alert Triggers Alarm in Lock Mode:

Above is the WebIO web page for configuring automation.

Note that this internal WebIO automation can also be configured using the WebIO-KeyOn PC computer software, which provides a more readable user interface.

Steps to configure automation for a sensor channel:

1. Under Edit Automation Triggers, select the desired channel number
2. Select the sensor state for this automation. Sensor automation has two states “Alarm/On/Lock” or “Normal/Off/Unlock”. Entry and motion sensors use the state terms “Alarm” and “Normal”, where X10 automates use the terms “On” and “Off”, and security remotes use “Lock” and “Unlock”.
3. Select the X10 module house/unit codes of the device to control
4. Select the X10 module Command (note that command names are associated with numbers:
  - On = 2
  - Off = 3
  - On-Wait-Off = 21
  - Off-Wait-On = 22
  - Bright Up = 4
  - Dim Down = 5
  - All Units Off = 1
  - All Lights On = 6
  - All Lights Off = 7
  - Query = 15
  - Expansion port Relay state A = 65
  - Expansion port Relay state B = 66
5. Select whether this sensor going into Alert state also triggers the Alarm automation when WebIO is in Security Lock mode. This Alarm Trigger flag (AT) is represented by a 1 for true or 0 for false under the “AT” column.
6. Place the WebIO Lock-Prg switch into the “Prg” position.
7. Select the [Update] button. The webpage will return to login page, navigate back to the Automation page and to verify your update took place. Also note that the command names only show as numbers.
8. Repeat for additional automation settings.
9. When finished, return the WebIO Lock-Program switch to the “Lock” position.

An automation example: An entry sensor attached to a door is triggered to send out a wireless “Alert” message when a door opens, WebIO received the wireless entry sensor message, looks up the sensor channel number in its automation table and executes a single defined X10 power line command to ring a chime set to house/unit code A5. A lamp module also set to A5 will turn on as well. Also if WebIO is in “Security Lock Mode”, and the entry sensors WebIO Channel is defined to Alarm in Lock Mode, the defined alarm X10 command is also executed, which could be set to ring an alarm, etc. WebIO also sends wireless

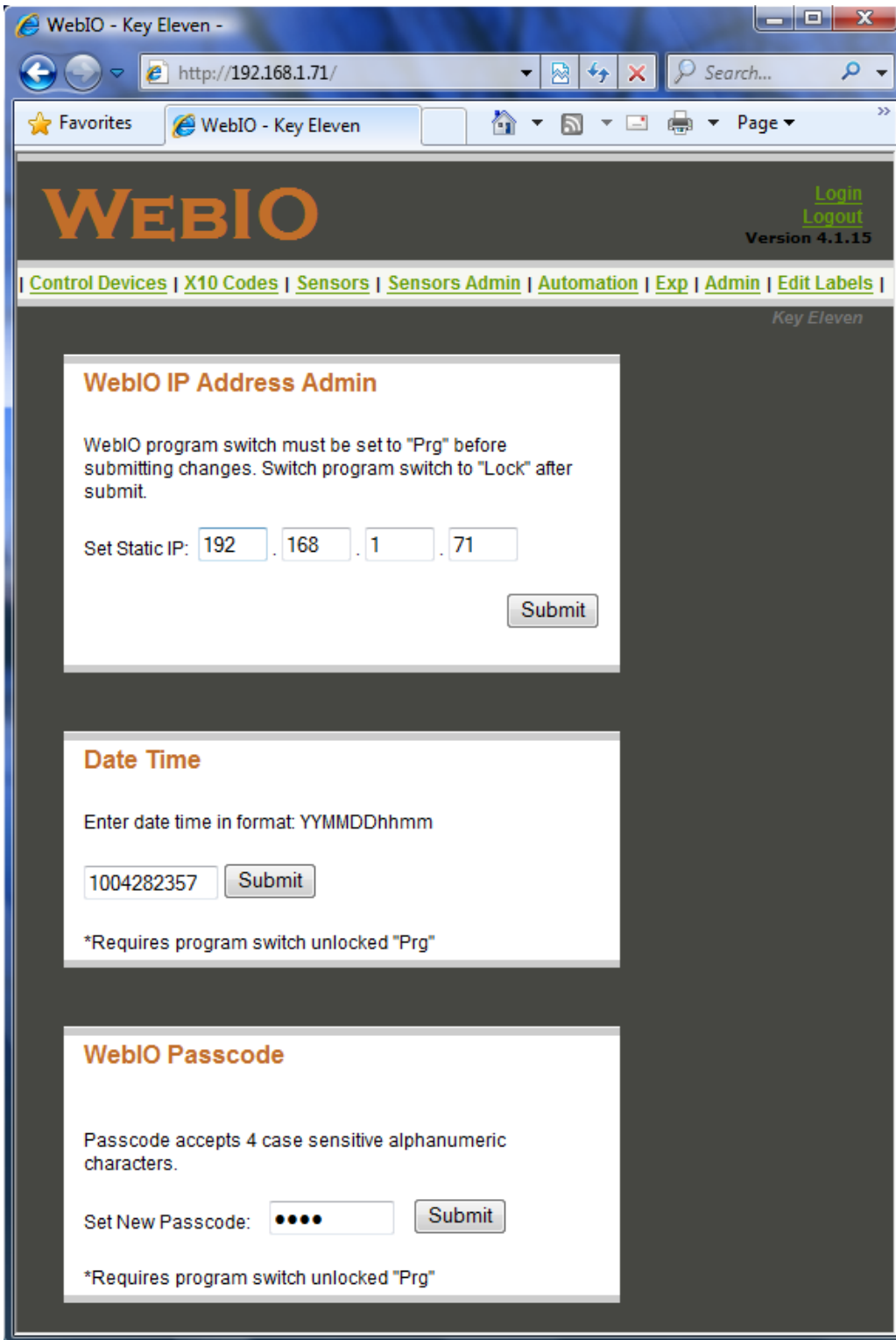
sensor message over the TCP/IP Ethernet network to the WebIO-KeyOn software for further automation and/or Email/Text message automation.

The WebIO [Automation](#) web page screenshot above shows that Channel #1 named "Entry 1" is a Security Entry sensor. When this sensor sends an "Alert" the automation executes X10 A2-On ("On" appears by number "2"). If WebIO is in Security-Lock mode, the Alert Triggers the Alarm automation which is defined to executes P9-On. Alert Triggers Alarm flag is represented by a "1" under the "AT" column. When the entry sensor (Channel 1) sends a "Normal" message the automation executes for X10 M1-Off.

## Admin

The WebIO, [Admin](#) web page provides an interface for:

1. Setting a static IP address to the WebIO non-volatile memory.
2. Setting the Date Time (used for time stamping sensor readings)
3. Configuring a WebIO Passcode



To reset the WebIO IP address back to accepting a dynamic IP and to clear the WebIO passcode and clear the X10 and Sensor Labels, reboot WebIO (cycle power on and off) with the WebIO Lock-Prg switch in the "Prg" position. See the section titled "**Restoring Factory Default Settings**"



## Setting IP Address

The WebIO, [Admin](#) web page provides an interface for saving an IP address to the WebIO non-volatile memory.

WebIO can be configured to remember a static IP address, even when power is cycled. This is useful when a DHCP server is not available to assign the WebIO a dynamic IP address or a specific static IP address, or you do not want to manually assign an address each time the WebIO is power cycled. Another use for assigning a static IP address is when a router or other software process needs to know the WebIO assigned IP address for routing messages or connecting to WebIO.

To save an IP address:

1. Move the WebIO Lock-Program switch to the **Prg** position.
2. From a browser go to the WebIO [Admin](#) web page, enter the IP address and submit the page.
3. Switch the Lock-Program switch back to the **Lock** position to prevent remote programming and prevent the restoration to factory defaults on reboot.

Note: If you used ARP to set an IP address for the WebIO, the WebIO IP Admin page may only accept the same IP as in your PC's ARP table. To assign a different IP address to WebIO, first clear your ARP table using **arp -a**. Then display your ARP table use **arp -d** {IP address to delete}, to remove an IP address before using the above procedure to save a different IP address in WebIO.

## Setting Date Time

The WebIO, [Admin](#) web page provides an interface for setting the date time of the WebIO battery backed real-time clock. This time clock is used by WebIO to date time stamp the receiving of wireless sensor messages. The date time of sensor messages are stored in WebIO EEPROM memory for sensor activity tables.

To set the date time, Enter the date time in YYMMDDhhmm format using 24 hour clock. For Example: for 3:42 Pm on April 21, 2010, enter: 1004211542

Although setting the clock uses 24 hour format, WebIO only displays times in the 12 am/pm format.

To Set Date time:

1. Move the WebIO Lock-Program switch to the **Prg** position.
2. From a browser go to the WebIO [Admin](#) web page, enter the date time in the YYMMDDhhmm format and select the [Submit] button.
3. Switch the Lock-Program switch back to the **Lock** position to prevent remote programming and prevent the restoration to factory defaults on reboot.

## Setting A User Passcode

A WebIO can be configured with a passcode for preventing unauthorized control of X10 devices. When a passcode is set both the [Control Devices](#) and the [X10 Codes](#) web pages will require the **passcode** field to contain the correct passcode to send an X10 command. When the passcode is incorrect WebIO gives no indication of invalid passcode and no indication that it did not perform the X10 command. This provides additional security, not allowing an unauthorized user to “discover” the correct passcode using trial and error. But recall that to verify a device state, use the [Get X10 Device State](#) web page for supported X10 2-way devices.

The WebIO, [Admin](#) web page provides an interface for saving a passcode to the WebIO non-volatile memory.

### **Setting a WebIO Passcode:**

1. Move the WebIO Lock-Program Switch to the **Prg** position (toward the X10 transceiver connection)
2. From a browser go to the WebIO [Admin](#) web page, enter a 4 character alphanumeric (case sensitive) (plus ASCII non-white-space symbols) passcode and submit the page.  
WebIO will only use the first four characters when a passcode of more than 4 characters are entered.
3. Switch the Lock-Program Switch back to the **Lock** position to prevent remote programming and prevent the restoration to factory defaults on reboot.

When a passcode is set, WebIO will display the passcode on the LCD for 2 seconds on its boot process (when power is applied)(LCD Models of WebIO only).

Note that a combination of 4 alphanumeric characters plus symbols provides for over 71 million combinations.

To remove a passcode WebIO must be restored to factory defaults. See the section titled “**Restoring Factory Default Settings**”

### **WebIO Security**

The WebIO passcode provides a minimum amount of security. All WebIO information including the passcode sent from a users web browser to the WebIO web server is not encrypted, this means that it is possible for someone with the right tools and knowledge could discover your passcode. For this reason it is not suggested that a WebIO open to the Internet (Internet routable) be used for critical applications such as controlling a thermostat.

Even though WebIO doesn't provide high Internet security, there are methods for adding high security that are beyond the scope of this manual.

Two examples of a secure WebIO setup:

1. A Virtual Private Network (VPN) can be setup that provides an encrypted tunnel over the Internet between a remote user's computer or LAN and a local router of which the WebIO is hiding behind.
2. WebIO can be hidden behind a secure web server, which relays remote messages to the WebIO.

## Login

The WebIO, [Login](#) web page provides a simple interface to “Unlock” WebIO for use. To Login, enter your WebIO passcode, select the [Submit] button, after the page submit, select the “Home” link. On successful login, the home link will now refresh the WebIO web page with a navigation bar of links to other WebIO pages.



Note: A successful Login “unlocks” WebIO for access to WebIO web pages. This allows you to refresh current sensor states, but further passcode entry is still required to execute X10 Commands. The [Control Devices](#) web page provides another “unlock” control for the simple control provided on the Control Devices page but be sure to select the “clear passcode when finished” link when finished to re-lock WebIO. The [X10 Codes](#) web page requires entry of the passcode each time an X10 command is executed. This requiring the passcode on each command to execute is the most secure form of using WebIO as no other user can submit a command for execution without a passcode. Entry of passcode is also required each time an Expansion port command is executed.

Note: WebIO passcode Lock and Unlock is not to be confused with the wireless sensor security WebIO Lock-mode.

## Edit Device Labels

WebIO provides for the naming of X10 devices and wireless sensors. Rather than memorizing devices by X10 Address or wireless security sensor ID, a friendly name can be assigned. In the case of X10 module, a name is assigned to a **House Code** and **Unit Code** and its associated **On** and **Off** functions. Eight X10 devices can be named on the WebIO web interface.

The WebIO, [Edit Labels](#) web page interface provides for assigning names to X10 address to be saved to the WebIO non-volatile memory. Just as with the IP address and Passcode, X10 labels are protected using the WebIO program switch.

### Assigning Device Labels:

1. Move the WebIO Lock-Program switch to the **Prg** position (toward the X10 transceiver connection)
2. From a browser go to the WebIO [Edit Labels](#) page, for each label, enter **Label** name and its associated **House Code** and **Unit Code**. This same interface can also be used to edit existing labels.
3. When completed, click-select the **Submit** button
4. Verify Labels by navigating to the [Control X10 Labeled Devices](#) page.
5. When satisfied, switch the Lock-Program switch back to the **Lock** position to prevent remote programming and prevent the restoration to factory defaults on reboot.

When WebIO is restored to factory defaults, all labels are returned to bank with default House and Unit Codes. See the section titled “**Restoring Factory Default Settings**”

WebIO device labels can also be configured using the WebIO Setup utility software. See **WebIO Setup software manual**.



Shown above is the [Edit Labels](#) web page interface for X10 Modules.

Note that edit of X10 labels and Sensor labels can also be performed by the WebIO-KeyOn PC computer software for WebIO v4 or the WebIO-TM software for WebIO version 3.



Above: The [Edit Labels](#) web page also provides an interface for naming wireless sensor channels.

# Appendix A

## **WebIO Detailed Manual Network Setup**

### **LAN setup with DHCP:**

1. Connect WebIO to a 10/100BT hub or switch. The left green LED of the WebIO RJ45 jack will light when correctly connected.
2. After about 5 seconds the WebIO will indicate its IP address. An IP address of 0.0.0.0 indicates the WebIO had not yet received an IP address for the DHCP server. It can take a minute or more for the WebIO to receive an IP address.
3. Change the position of the Program Switch to update the display with the current IP address. After receiving an IP address, the program switch should be set in the normal (off) position to prevent reset to factory default if rebooted and to lock out unauthorized remote programming.
4. Connect to the WebIO using a web browser. Connect to the URL of the WebIO by manually typing its IP address: `http://{IP address}`  
For example: `http://192.168.1.100`
5. A successful connection will display the main WebIO page.
6. At this time you may choose to set a Static IP (see instructions: Setting Static IP Address). Without a Static IP, upon reboot of the WebIO it may receive a different DHCP assigned IP address.

Note: In some rare cases depending on DHCP server used, WebIO may prioritize DHCP over static, regardless of the WebIO Lock switch position. Such that if you assign WebIO a static IP address on a network with a DHCP server, WebIO may accept a new IP address received from the DHCP server. In some rare cases, in using the WebIO static IP function, you may need to not have a DHCP server (not so practical) or have the DHCP server always assign the same IP dependent on MAC address. (Static DHCP/bootp).



## LAN Setup without DHCP:

1. This setup requires the use of ARP and Ping. A DHCP or BOOTP server must not be present as these will interfere with an ARP command. If either a DHCP or BOOTP server exists, connect the WebIO using a crossover cable to a PC.
2. Connect WebIO to a 10/100BT hub or switch. The left green LED of the WebIO RJ45 jack will light when correctly connected.
3. Use ARP and Ping to assign an IP address to the WebIO. From a PC running Windows, open a command window.
  - a. Obtain your IP address:
    - i. Under Window9x, Enter: `ipconfig`
    - ii. Linux, Enter: `ifconfig`
  - b. Enter the IP address and MAC address of the WebIO into your ARP table: `arp -s {WebIO IP address} {WebIO MAC address} {your PC IP address}`.
    - i. Windows 9x Example:  
`arp -s 192.168.1.101 00-aa-00-62-c6-01 192.168.1.10`
    - ii. Linux Example:  
`arp -s 192.168.1.101 00:aa:00:62:c6:01 192.168.1.10`
  - c. Assign the IP address to the WebIO, Enter: `ping {WebIO IP address}`,
    - i. Example: `ping 192.168.1.100`
  - d. If the ping receives a reply, then the WebIO has received the IP address. If no reply is received, see Troubleshooting - Assigning IP address using ARP and Ping.
4. Verify that the WebIO has received the IP Address (ensure the reply is not from another device). Change the position of the Program Switch to update the display with the current IP address. The Assigned IP address should be displayed.
5. Connect to the WebIO using a web browser. Connect to URL: `http://{IP address}` for example: `http://192.168.1.100`
6. A successful connection will display the main WebIO page.
7. At this time you should assign a Static IP address (see instructions: Setting Static IP Address). Without a Static IP, upon reboot of the WebIO it will look for a DHCP server or default to IP 0.0.0.0.
8. If using a crossover cable, the WebIO can now be plugged into the LAN with no need to power down.

# Appendix B

## **Limited Warranty**

Key Eleven, LLC. Warrants this Product (not including any accessories) against defects in material or workmanship as follows:

**Labor and Parts:** For a period of 60 day from the date of purchase, if this Product is determined to be defective, Key Eleven will repair or replace the Product, at its option, at no charge, or pay the labor charges to any Key Eleven authorized service facility. After the Warranty Period, you must pay for all labor charges.

To obtain warranty service, you must take the Product, or deliver the Product freight prepaid, in either its original packaging or packaging affording an equal degree of protection, to Key Eleven at your expense.

This warranty does not cover customer instruction, installation, set up adjustments or signal reception problems.

This warranty does not cover cosmetic damage or damage due to acts of God, accident, misuse, abuse, negligence, commercial use, or modification of, or to any part of the Product. This warranty does not cover damage due to improper operation or maintenance, connection to improper voltage supply, or attempted repair by anyone other than a facility authorized by Key Eleven to service the Product. This warranty does not cover Products sold AS IS or WITH ALL FAULTS, or consumables (such as fuses or batteries). This warranty is valid only in the United States.

Proof of purchase in the form of a bill of sale or receipted invoice which is evidence that the unit is within the Warranty period must be presented to obtain warranty service.

Repair or replacement as provided under this warranty is the exclusive remedy of the consumer. Key Eleven shall not be liable for any incidental or consequential damages for breach of any express or implied warranty on this product. Except to the extent prohibited by applicable law, any implied warranty of merchantability or fitness for a particular purpose on this product is limited in duration to the duration of this warranty.

In no event shall Key Eleven be liable for special, incidental, consequential or other damages resulting from the possession or use of this product, including without limitation damage to property and, to the extent permitted by law, personal injury, even if Key Eleven knew or should have known of the possibility of such damages.

Some states do not allow the exclusion of limitation of incidental or consequential damages, or allow limitations on how long an implied warranty lasts, so the above limitations or exclusions may not apply to you. In addition, if you enter into a service contract with Key Eleven within 60 days of the date of sale, the limitation on how long an implied warranty lasts does not apply to you. This warranty gives you specific legal rights, and you may have other rights which vary from state to state.

# Appendix C

## Technical Specification

### Technical Features

- Built in web interface for X10 power line control and WebIO configuration
- LCD display for indication of IP address, configuration messages and user messages
- DHCP client for easy Ethernet network installation - Static IP address settings when DHCP is not available
- Supports X10 power line “on”, “off” and “query” commands
- Supports popular X10 power line transceivers (Powerline and TW523)
- No computer required, WebIO is a total power line control system and web server in a box
- Very low cost embedded systems design based on two 8-bit microcontrollers
- No operating system, true micro code for reliable functionality and rapid boot process
- WebIO configuration is secured via a physical “program mode” switch to prevent unauthorized configuration via web interface
- Hardware watchdog for insured uptime

### Specifications

Model Number	AFX1110
Ports	1 RJ45 10 Megabit Ethernet 1 serial ports for PLC transceiver
Storage	EEPROM for configuration storage of IP address and security key
Expansion ports	Internal GPIO lines
Indicators	LCD interface for power, IP address, Communication activity and Gateway status LED Ethernet status indicators
Power Line Controller	Supports the SmartHome X10 PowerLinc Also supports the X10 TW523 (requires 9-12VDC power, center tap positive (+) at the 2mm barrel connector)

### Environmental

Dimensions	1-7/16" x5-1/4" x3" (HxWxD)
Unit Weight	6.0 oz.
Enclosure	Plastic enclosure with mounting holes
Power	Input 9-12VDC Power consumption 64mA at 12VDC Sleep mode as low as 34mA, 12VDC

Power Supply (included)	Input: AC120V~ Output: DC12V 250mA
Operating Temp.	0° to +50°C, (limitations due to LCD display)
Storage Temp.	-10° to +60°C, (limitations due to LCD display)
RoHS	Not RoHS compliant

# Product Information

For more information and software updates, visit the WebIO web site:

<http://www.webio.us>

<http://www.keyeleven.com>

or contact:

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Moorhead, MN 56560 USA



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