



Simple Network Contact Closure



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Caltrans District 3**

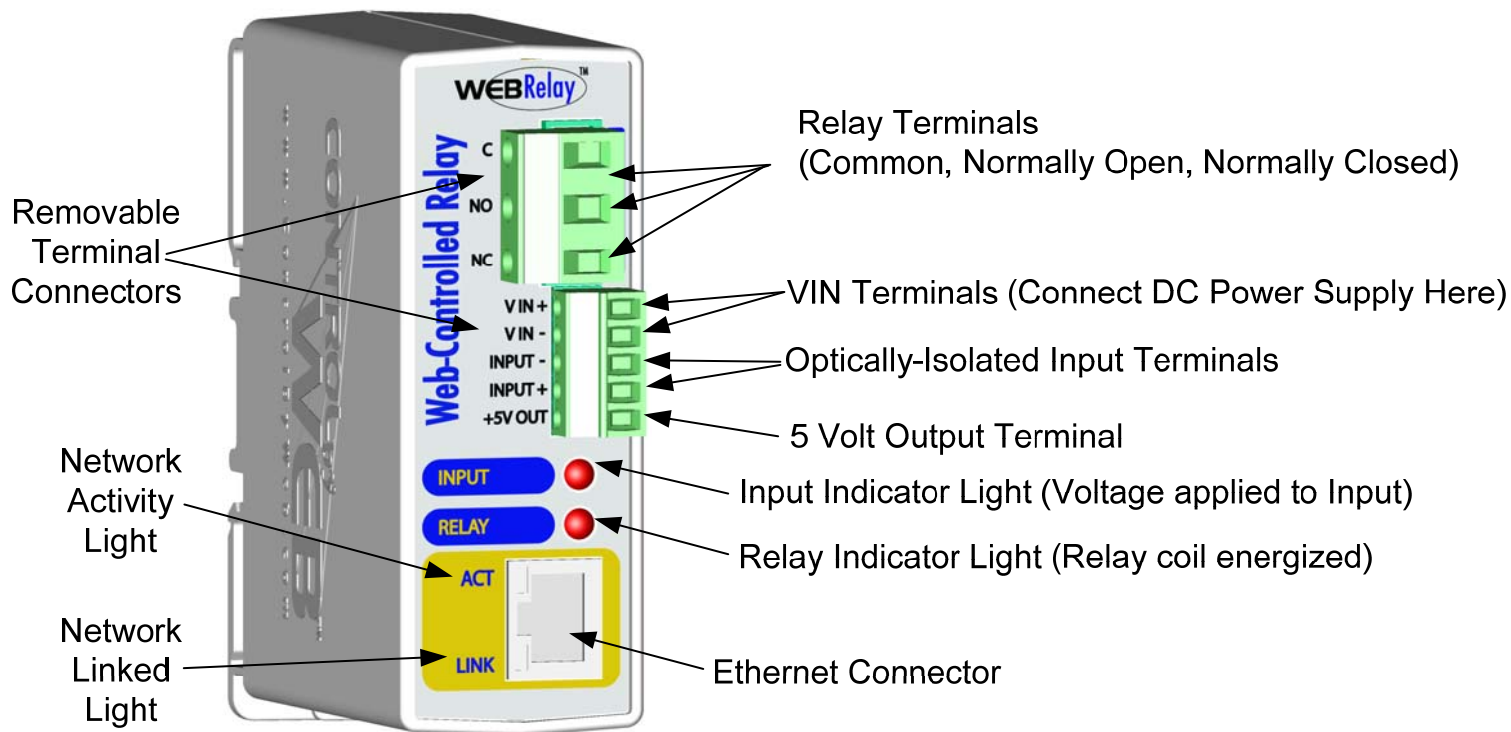
The Problem- To control Extinguishable Messages signs in remote locations.

The Alternatives-

- 1) A cellular based radio was used in the past, which used the overhead control channels on the analog cellular network. A web page was used to control the radios. The downside to this solution was it required using the vendors Gateway to access the radios. This meant the vendor was also responsible for providing the webpage. The analog network was being phased out, which meant a new digital radio was required. This was a good time to look for a change.
- 2) Use a telular phone to connect a digital cellular phone to an analog X-10 device.

The Solution- A GPRS radio with an Ethernet output coupled to a Webrelay.

The Advantage- Direct access to the GPRS radio network. Easily monitored and controlled via built-in web page or by XML message.



Appendix B: Specifications

Power Requirements:

Model X-WR-1R12-1I5-5

Voltage: 5VDC \pm 5%

Current (operating at 10Mbps): 318mA max

Current (operating at 100Mbps): 460mA max

Model X-WR-1R12-1I5-I and X-WR-1R12-1I24-I

Voltage: 9~28VDC

Current at 9V (operating at 10Mbps): 224mA max

Current at 9V (operating at 100Mbps): 319mA max

Current at 24V (operating at 10Mbps): 88mA max

Current at 24V (operating at 100Mbps): 121mA max

Model X-WR-1R12-1I5-E

POE Class 1 (0.44Watt to 3.84Watt range). Optionally can be powered with external 5VDC power supply.

I/O: 1 Optically Isolated Input, 1 Relay Output

Relay Contacts:

Contact Form: SPDT (form c)

Contact Material: AgSnO₂

Max Voltage: 125VAC, 100VDC

Max Current: 12A

Relay Control Options: ON/OFF or Pulsed

Pulse Timer Duration: 100ms to 86400 Seconds (1 day)

Accuracy of pulse timer: 99.99%

Optically Isolated Input:

Input Voltage: 3-12VDC (5V Input models)

Input Current: 4.7mA – 25mA (5V Input models)

Input Voltage: 11-28VDC (24V Input models)

Input Current: 4.9mA – 13.4mA (24V Input models)

Input Isolation: 1500V

Network: 10/100 Base-T Ethernet

Network Setup: static IP address assignment, TCP port selectable

Connectors:

Power/Input: 5-position, removable terminal strip, 3.81mm terminal spacing
(Replacement part number, Phoenix Contact 1803604)

Relay: 3-position, removable terminal strip, 7.62mm terminal spacing
(Replacement part number, Phoenix Contact 1767012)

Network: 8-pin RJ-45 socket

LED Indicators: 4

-Input voltage applied

-Relay coil engaged

-Network linked

-Network activity

Physical:

Operating Temperature: -20° to 70°C (-4°-158°F)

Size: 1.41in (35.7mm) wide X 3.88in (98.5mm) tall X 3.1 in(78.0mm) deep

Weight: 5oz (142 grams)

Enclosure Material: Lexan 940 (UL94 V0 flame rated)

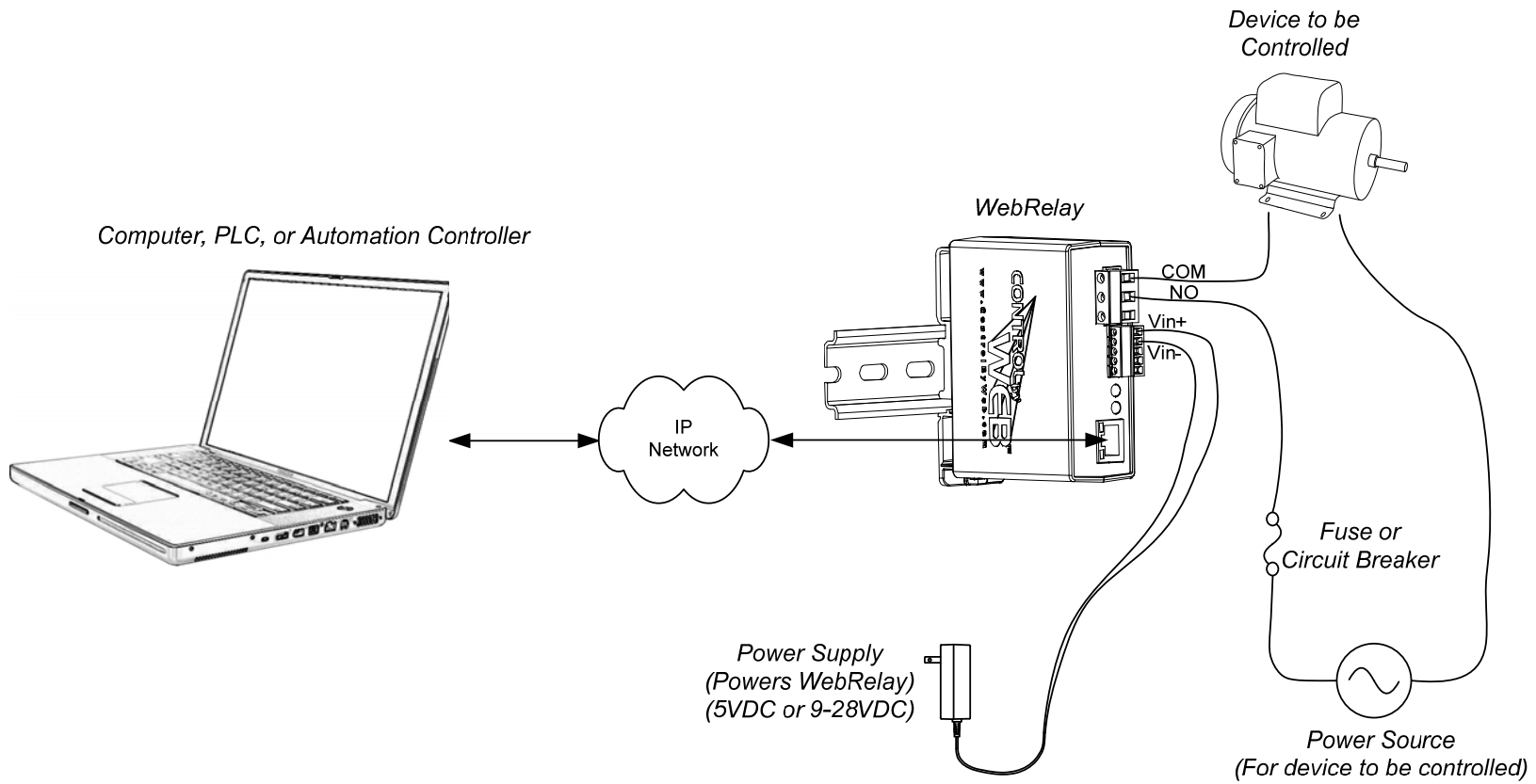
Password Settings:

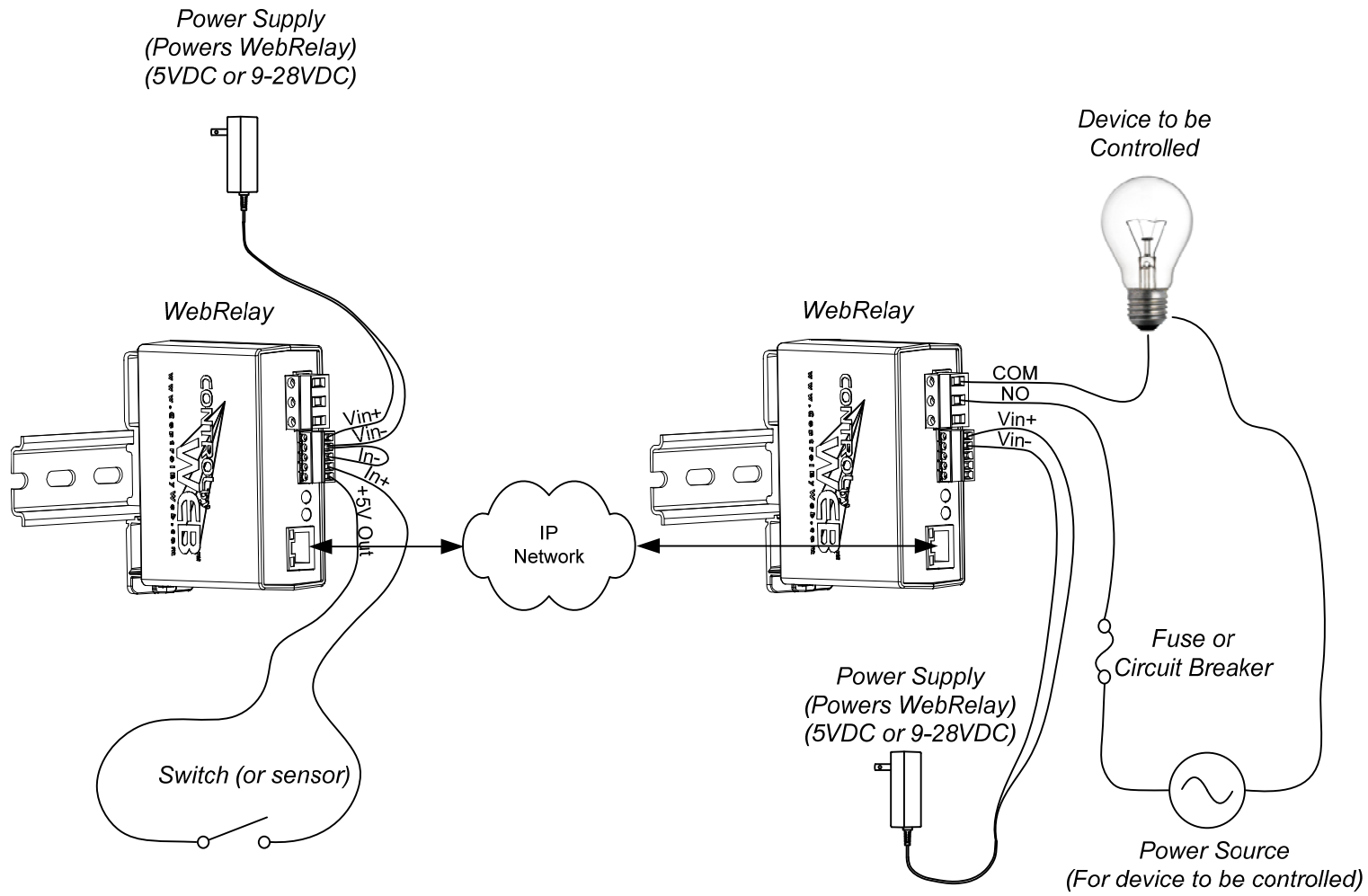
Password protection on setup page: Yes

Password protection on control page: Optional

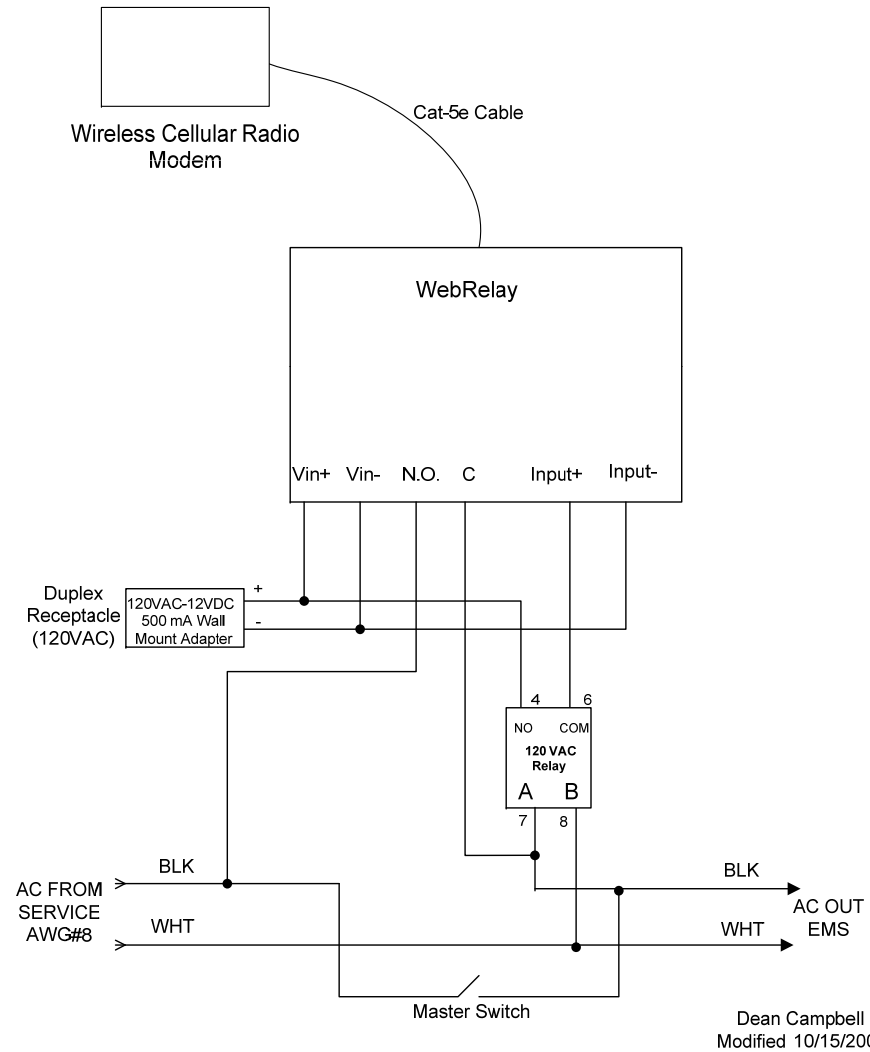
Password Encoding: Base 64

Max password length: 10 characters

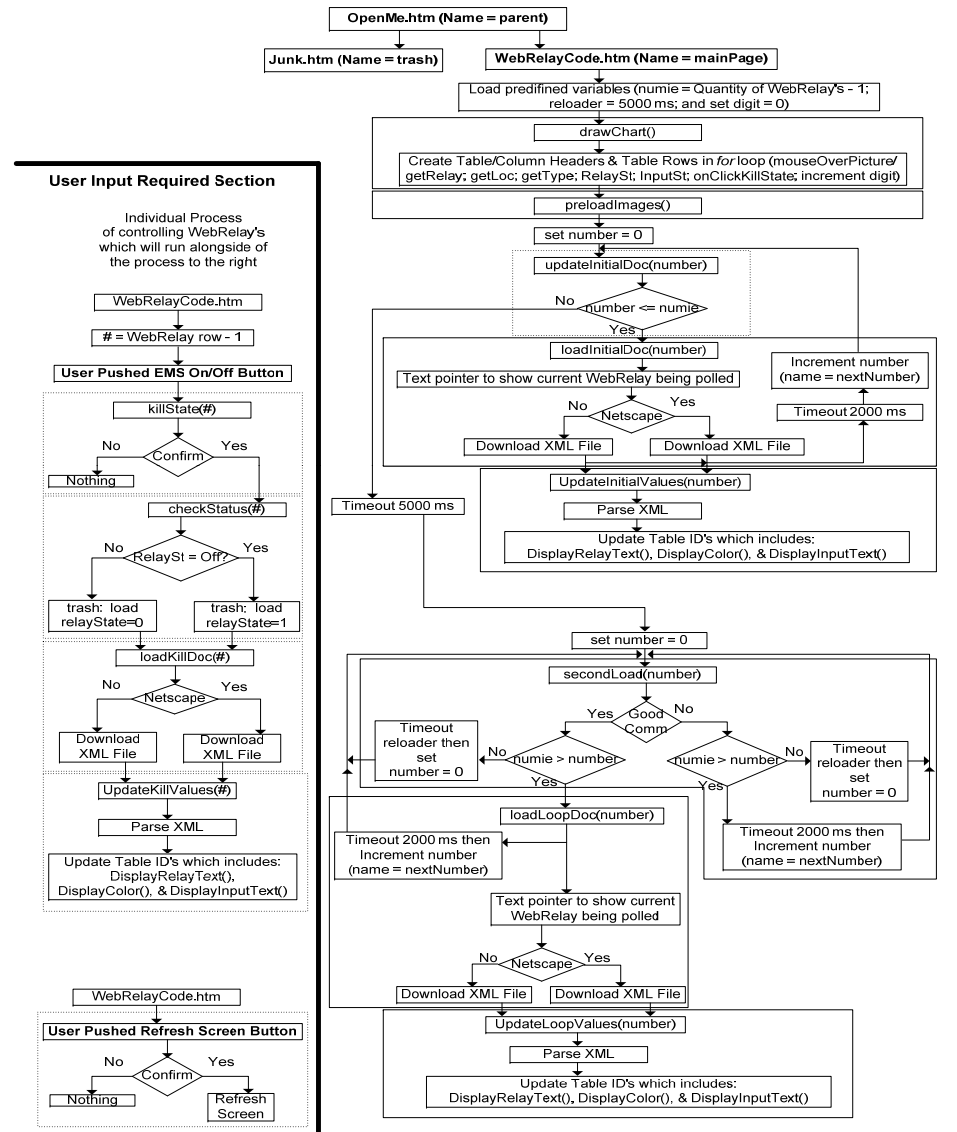




EMS Digital Cellular Control Wiring Diagram

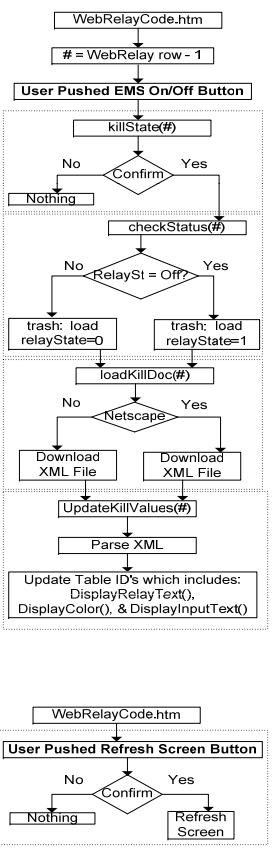


WebRelay Flow Chart



User Input Required Section

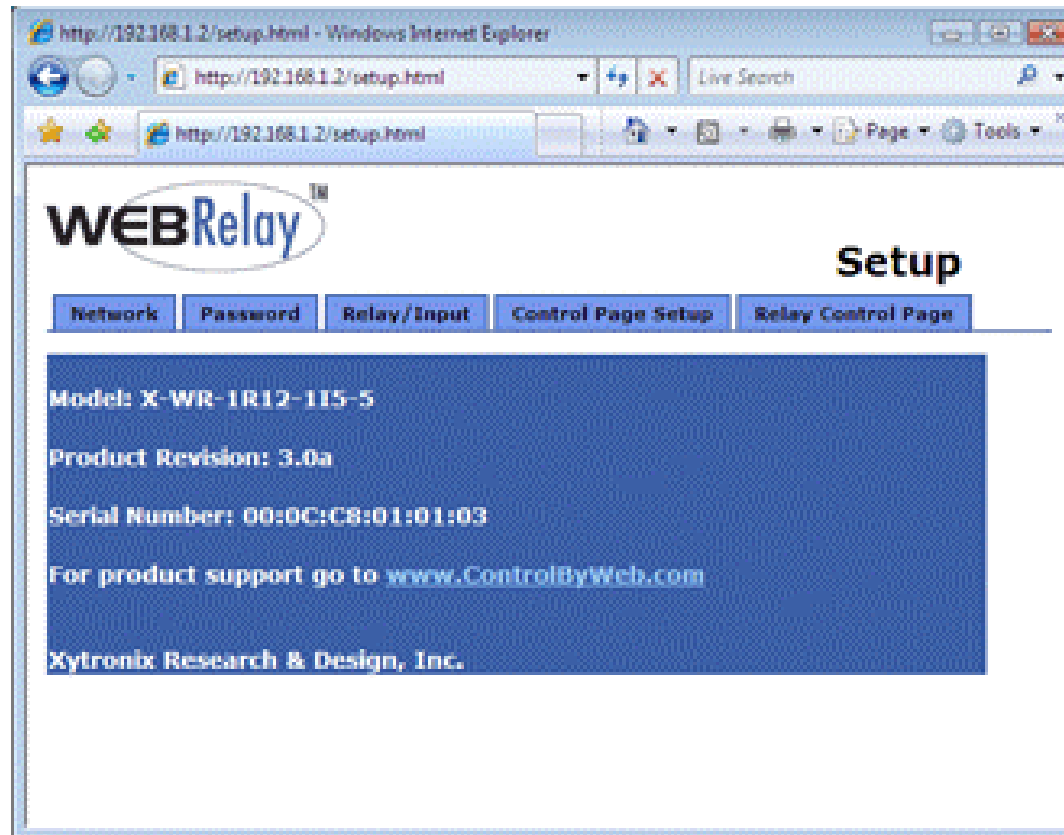
Individual Process of controlling WebRelay's which will run alongside of the process to the right



number = counting value
= WebRelay reference that is trying to be changed by the user

Dotted lines are to segregate what the individual functions are doing that are labeled as the first process entering the dotted line.

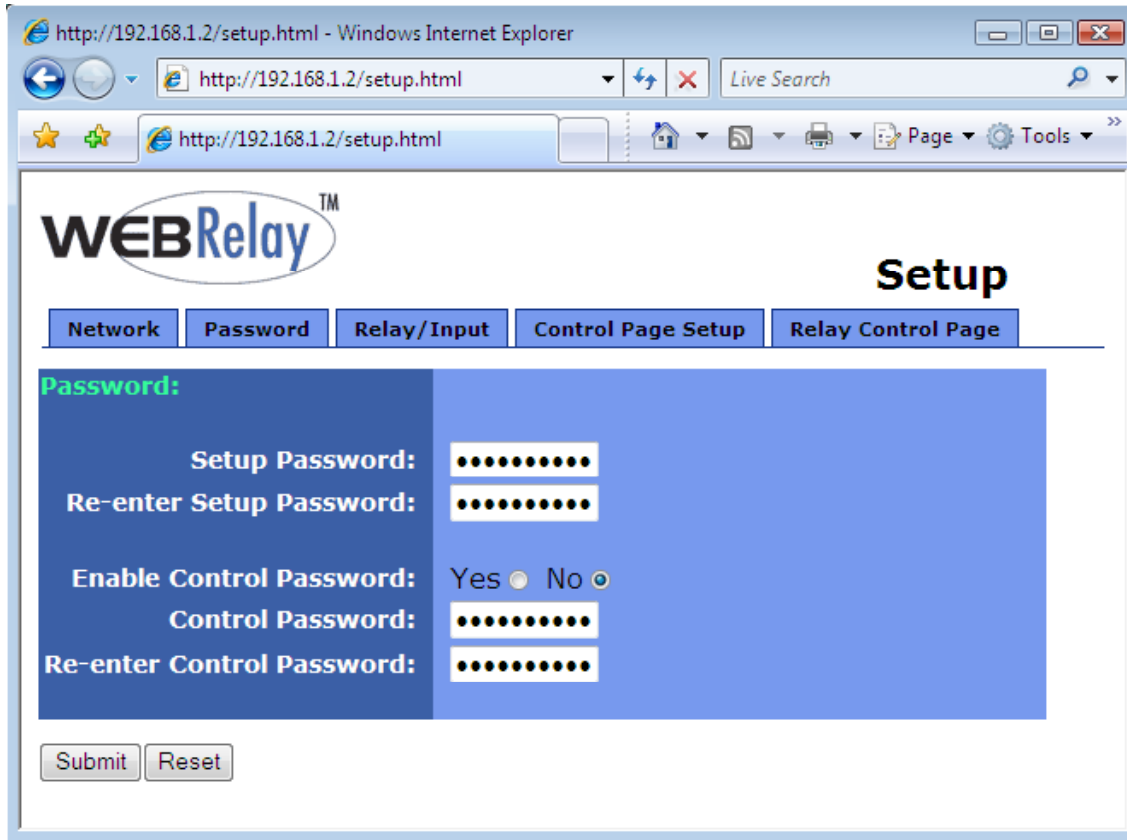
WebRelay Screen Shots:



Initial setup display. Contains basic information about WebRelay.



Network setup.



Password setup.



Relay/Setup. Input and relay function settings.

http://192.168.1.2/setup.html - Windows Internet Explorer

http://192.168.1.2/setup.html

http://192.168.1.2/setup.html

WEBRelay™

Setup

Network Password Relay/Input Control Page Setup Relay Control Page

Relay/Input:

Relay Mode: Standard Automatic Reboot

Ping IP Address: 192 . 168 . 1 . 15

Successful Ping Period: 60 secs

Unsuccessful Ping Period: 10 secs

Delay Before First Ping After Reboot: 120 secs

Reboot Timer 1 (T1): 10 secs

Reboot Timer 2 (T2): 5 secs

Reboot Timer 3 (T3): 2 secs

Reboot Options: pulse off T1 secs

Failed Pings Before Reboot: 5

Max Reboot Attempts: 10

Remote Relay Options: no remote relay control

Remote Relay IP Address: 192 . 168 . 1 . 3

Remote TCP Port: 80

Relay #: 0

Password:

Keep Alive: YES(No TX State)

Submit Reset

Relay/Setup (Automatic Reboot Mode). Auto reboot setup.

http://192.168.1.2/setup.html - Windows Internet Explorer

http://192.168.1.2/setup.html

http://192.168.1.2/setup.html

WEBRelay™ **Setup**

Network **Password** **Relay/Input** **Control Page Setup** **Relay Control Page**

Control Page Setup:

Main Header Text:	WebRelay
Relay Description:	Relay Description
Display Relay Status:	Yes <input type="radio"/> No <input type="radio"/>
Status ON Color:	Gr <input type="radio"/> Rd <input type="radio"/>
Status ON Text:	Relay ON
Status OFF Color:	Gr <input type="radio"/> Rd <input type="radio"/>
Status OFF Text:	Relay OFF
ON/OFF Buttons:	0 <input type="radio"/> 1 <input checked="" type="radio"/> 2 <input type="radio"/>
Button1 Label	ON OFF
Button2 Label	TURN OFF
Pulse Button:	Yes <input type="radio"/> No <input type="radio"/>
Pulse Button Label	Pulse
Display Input Status:	Yes <input type="radio"/> No <input type="radio"/>
Input Description:	Input Description
Input ON Color:	Gr <input type="radio"/> Rd <input type="radio"/>
Input ON Text:	Input ON
Input OFF Color:	Gr <input type="radio"/> Rd <input type="radio"/>
Input OFF Text:	Input OFF
Auto Refresh Page:	Yes <input type="radio"/> No <input type="radio"/>
Duration:	3 sec

Submit Reset

Control page setup. These settings customize the control page.

http://192.168.1.2/setup.html - Windows Internet Explorer

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WEBRelay™

Setup

Network Password Relay/Input Control Page Setup Relay Control Page

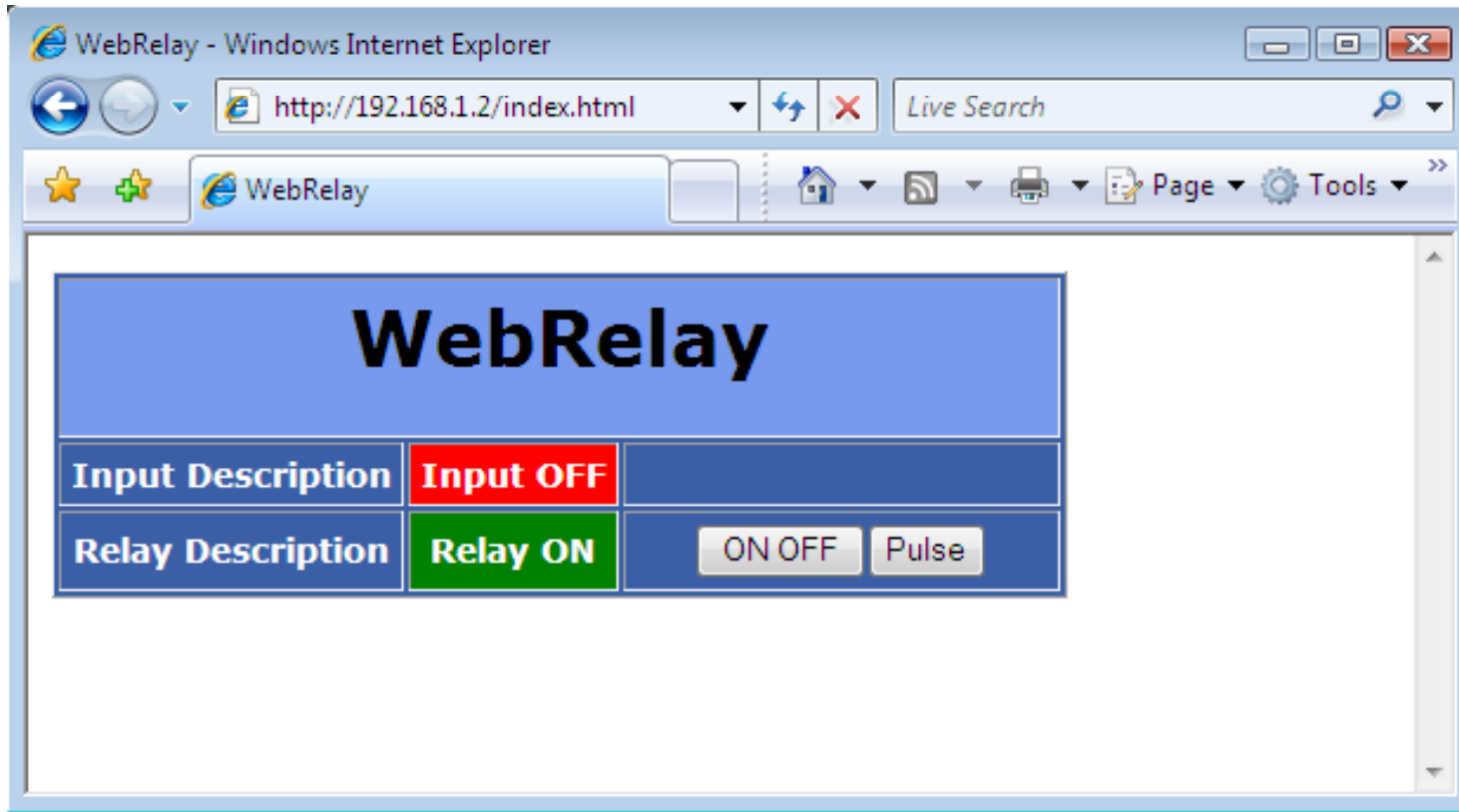
Control Page Setup:

Main Header Text:	WebRelay
Relay Description:	Relay Description
Display Relay Status:	Yes <input type="radio"/> No <input type="radio"/>
Status ON Color:	Gr <input type="radio"/> Rd <input type="radio"/>
Status ON Text:	Relay ON
Status OFF Color:	Gr <input type="radio"/> Rd <input type="radio"/>
Status OFF Text:	Relay OFF
Display Input Status:	Yes <input type="radio"/> No <input type="radio"/>
Input Description:	Input Description
Input ON Color:	Gr <input type="radio"/> Rd <input type="radio"/>
Input ON Text:	Input ON
Input OFF Color:	Gr <input type="radio"/> Rd <input type="radio"/>
Input OFF Text:	Input OFF
ON/OFF Buttons:	Yes <input type="radio"/> No <input type="radio"/>
Reboot Button:	Yes <input type="radio"/> No <input type="radio"/>
Auto Refresh Page:	Yes <input type="radio"/> No <input type="radio"/>
Duration:	3 sec

Submit Reset

Control page setup in reboot controller mode.

Built-In Web Server



WebRelay - Windows Internet Explorer

http://192.168.1.2/index.html

WebRelay


WebRelay

Input Description	Input OFF	
Relay Description	Relay ON	<input type="button" value="ON"/> <input type="button" value="OFF"/>
Reboot State	Waiting for boot	<input type="button" value="Reboot"/> <input type="button" value="Auto ON/OFF"/>

District 3 Web Relay Access Page

WebRelay Control Page - Microsoft Internet Explorer

File Edit View Favorites Tools Help

 **District 3 - EMS/CMS Control**
CALIFORNIA DEPARTMENT OF TRANSPORTATION

Please click on the location that you want to control

Relay Number	Rte #	Description	EMS Type
1	89	NB Tahoe City HAR	HAR
2	89	WB Tahoe City HAR	HAR
3	267	EB Kings Beach HAR	HAR
4	267	WB Kings Beach HAR	HAR
5	5	NB S/O Pocket Rd - 47th Ave HAR	HAR
6	50	EB at Camino - Camino HAR	HAR
7	50	EB WO Watt - Bradshaw HAR	HAR
8	50	WB EO Zinfandel - Bradshaw HAR	HAR
9	99	NB Calvine - 47th Ave HAR	HAR
10	99	SB JNO 12th Ave - 47th Ave HAR	HAR
11	80	EB at Gold Run	HAR
12	80	WB at Gold Run	HAR
13	80	EB at Baxter	HAR
14	80	WB at Baxter	HAR
15	80	WB JWO Blue Canyon #32 CMS - Reset	HAR
16	99	NB at Striplin Road - FOG	FOG
17	99	NB at Dillard Rd - FOG	FOG
18	99	NB at Sac/Sut Co Line - FOG	FOG
19	70	NB JNO 99/70 IC - FOG	FOG
20	80	EB at Bryte Bend Br. - HIGH WINDS	HIGH WINDS
21	80	WB at Capital Ave - HIGH WINDS	HIGH WINDS
22	80	EB at Gold Run #28	CMS - Reset

Trusted sites

Implementation Issues

- 1) The greatest trouble is getting a signal to the GPRS modem
- 2) The second problem was trying to create a simple single web page that would could control and maintain current status. The problem was the delay when attempting to poll for status using the XML messages due to latency and/or unreachable elements.

The Temporary Fix

A simple web page with direct links to each of web relay's web server

The Final Solution

To create a server side application that would poll for status and service a user's control requests with minimal delay.