

# **WallTime NTP Clock and Notification System**

## **Operations Manual**

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# **WallTime NTP Clock and Notification System: Operations Manual**

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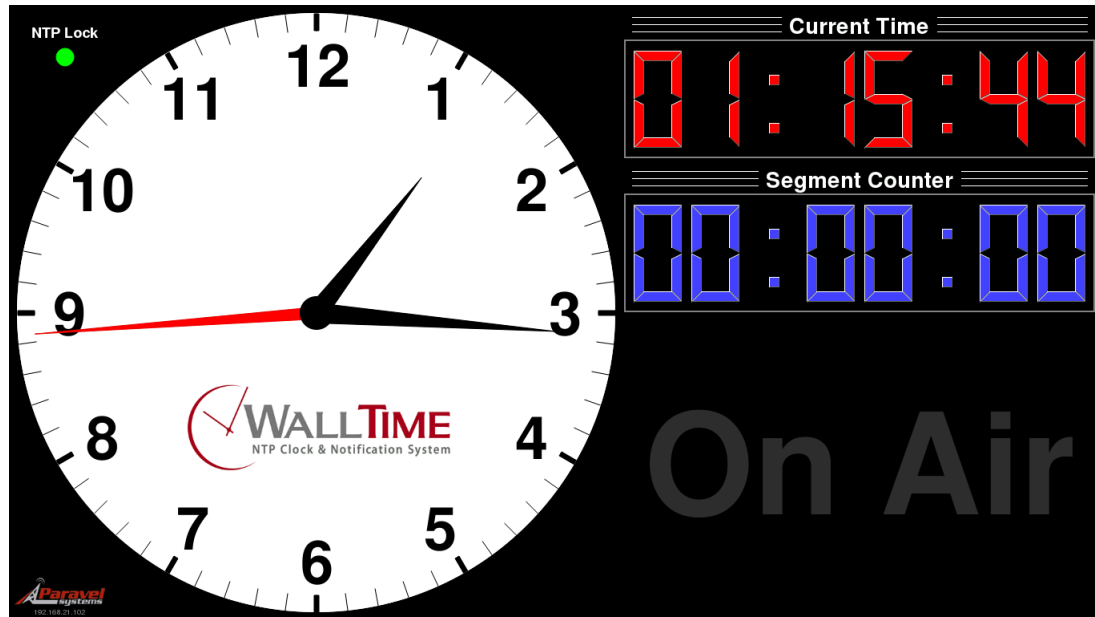
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# Chapter 1. General

## Getting Started



WallTime is a digital device that displays both time and status information in one of two display styles: a stylish realtime clock in both analog and digital formats; or a full screen Notifications status display. Output display is by means of a connected video monitor or television (not included). In addition to the time and status displays, WallTime can act as a segment timer and programmable text display.

All time readouts in WallTime are kept accurate automatically by synchronization with one or more external time servers running the Network Time Protocol (NTP), including those freely accessible via the public Internet. All device interfacing is done by means of the unit's integrated 100BaseTX Ethernet port.

The WallTime Analog Clock with Widgets display is divided into three functional areas known as "widgets", with the left-hand portion occupied by the Analog Clock widget and the right-hand portion by two user-configurable widgets. As set at the factory, these two right-hand widgets are the Digital Clock and OnAir Light widgets. Other available widgets include the Text Widget (used for displaying arbitrary text content) and the Notifications Widget (used for displaying the status of up to 36 LiveWire™ or Modbus™ TCP GPIO lines in real time).

The full Notifications status is similar to the Notifications widget, expanded to occupy the entire screen area. Both the Analog Clock and the Notifications mode allow for user customization of the display by means of a bitmapped logo.

## Connections

### Video Output

WallTime will work with most any monitor or television with a 16:9 aspect ratio (often referred to as "HDTV" or "widescreen") and an HDMI input, with optimum results on units capable of displaying 1920x1080 resolution (also known as "1080p" mode). 16:9 displays with a DVI input can also be used

though use of an inexpensive HDMI-to- DVI adapter dongle (not included). The WallTime unit can be attached to the back of the display by means of adhesive velco tape (included).

## Ethernet

Connect the unit to an Ethernet switch port capable of 100BaseT or better connections. If operation with LiveWire GPIO is desired, the unit must be connected directly to a LiveWire switch.

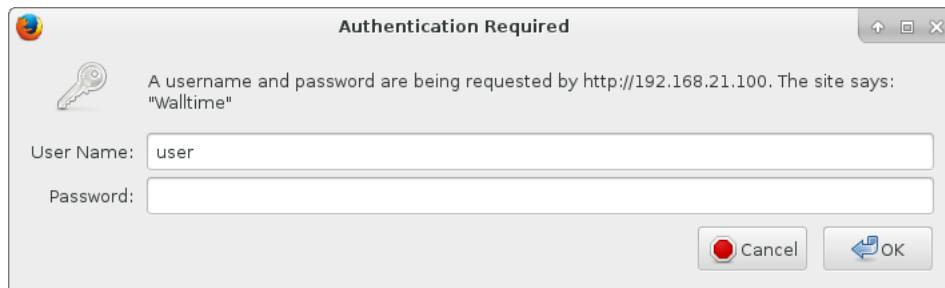
## Power

WallTime can be powered by means of any standard 5 vdc micro-USB power source with a capacity of 2.4 A or more. An appropriate "wall-wart" type supply is included with the unit.

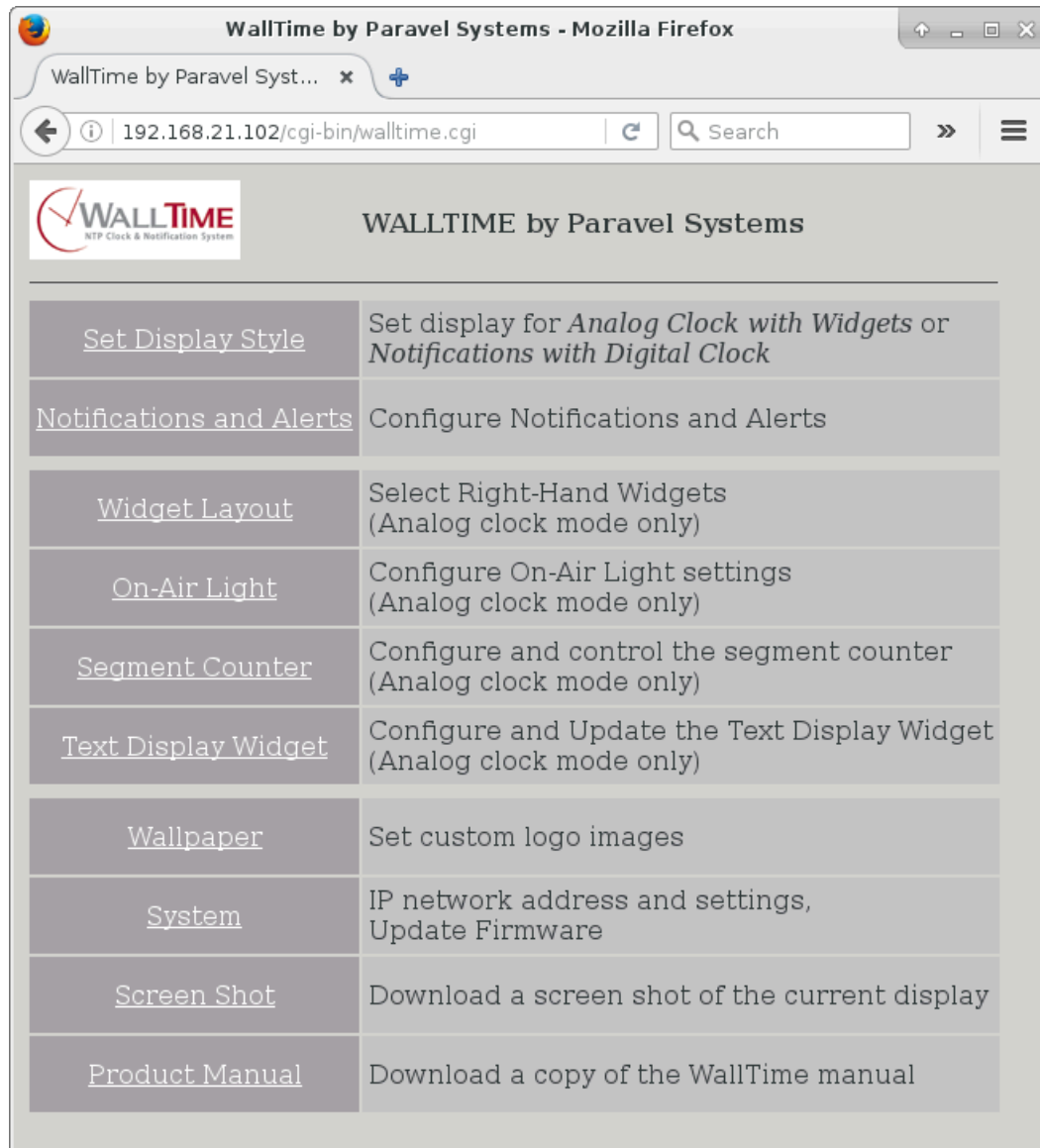
## Initial Configuration

Before being placed into service, the WalTime unit must be configured with valid IP address parameters. As shipped from the factory, the unit is set to use an IP address of **192.168.21.100**.

Using any standard we browser, navigate to that IP address. Log in with a User Name of **user** and no password.



The system will then display the main menu.



Click the [System](#) link to display the System Settings page.

Walltime Configuration (IP Settings) - Mozilla Firefox

Walltime Configuration (I... x +

192.168.21.102/cgi-bin/walltime.cgi Search

[Home](#) | [Style](#) | [Notifications](#) | [Widgets](#) | [OnAir Light](#) | [Counter](#) | [Text Widget](#) | [Wallpaper](#) | [System](#)

### IP Settings

Network address: 192.168.21.102

Netmask: 255.255.255.0

Gateway: 192.168.21.1

DNS 1: 8.8.8.8

DNS 2: 8.8.4.4

### Time Settings

Time Display Mode: 12 hour

Seconds Hand Sweep Mode: Continuous

Time zone: America/New\_York

NTP server 1: 0.pool.ntp.org

NTP server 2: 1.pool.ntp.org

### Connection Password

New password: (5-8 characters: letters and numbers)

Retype new password: (verify)

### Advanced Settings

Time Offset (milliseconds): 0

Display Geometry: Normal

WARNING: System will restart after applying new settings.

Apply

### Running Firmware Version: 2.0.0rc23

Install updated firmware package: Browse... No file selected. Install

[Browse](#) the available firmware packages.

Enter the appropriate IP configuration information in the IP Settings section. If the network connection does not have access to the public Internet, it will also be necessary to change the default NTP Server values so as to specify at least one address for a reachable NTP server in the Time Settings section. The timezone to be used can also be set in this section, as well as the display style (12 hour "AM/PM" or 24 hour "military" style).

The style of the seconds-hand motion on the analog clock can also be set by means of the Seconds Hand Sweep Mode dropdown menu, with **Continuous** or **Step** modes available.

For situations where it is desirable to offset the time display --e.g. to compensate for a broadcast delay or satellite signal propagation delay-- the desired offset (in milliseconds) can be entered in the Time Offset field.

Click the Apply button when finished. After restarting, WallTime will be ready for service.

## Setting the Display Style

The style of the output display (either Analog Clock with Widgets or Notification Status with Digital Clock) can be set by clicking on the Style tab on the top of the screen.

## WallTime GPIO Notifications

WallTime supports the use of GPIO [General Purpose Input Output] signals as a means of providing notifications and display of the state of external events. A notification can be anything that has a binary --i.e. ON or OFF -- state, such as a silence sense or transmitter alarm. WallTime supports three different types of GPIO signals for this purpose:

LiveWire GPI	GPI interfaces (both physical and virtual) used in the Axia LiveWire AoIP system.
LiveWire GPO	GPO events generated by console surfaces in the Axia LiveWire AoIP system. Certain other software products --e.g. the Rivendell Radio Automation System -- also have the ability to originate such events.
Modbus	Input events generated by devices using the Modbus TCP protocol.

When configuring a notification in WallTime, at least three parameters will always be required:

Type The type of GPIO signal. Possible values are LiveWire GPI, LiveWire GPO or Modbus.

For GPIO types of LiveWire GPI or LiveWire GPO, the next two items are:

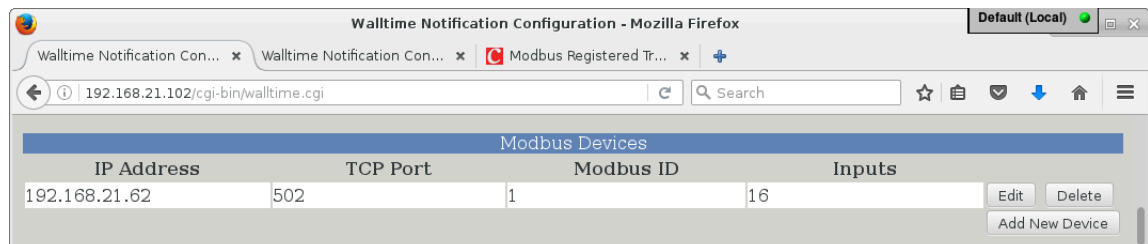
LiveWire Source (1 - 32767)	The LiveWire source number of the GPIO event, in the range 1 - 32767.
LiveWire GPIO Line (1 - 5)	The number of the line (sometimes referred to as the 'pin' in the Axia documentation) within the GPIO event for the specified Source Number, in the range 1 - 5.

For the GPIO type of Modbus, the next two items are:

Modbus ID (1 - 254)	The Modbus ID number of the originating device, in the range 1 - 254. (See the 'Configuring Modbus Devices' section for an explanation of how to determine ID numbers).
Modbus Input Number (1 - 2000)	The input number of the source line on the Modbus device at the specified ID number, in the range 1 - 2000.

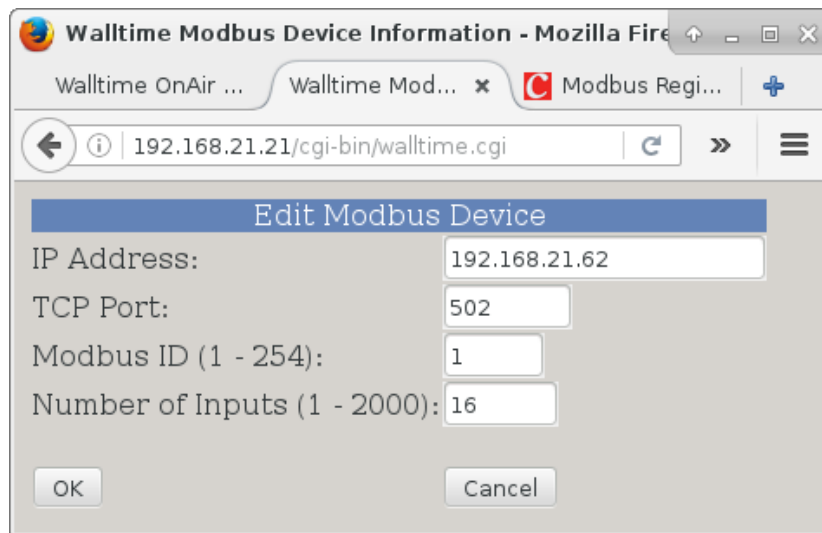
## Configuring Modbus Devices

A Modbus TCP device must be registered with at least one WallTime unit on the network before its line updates can be received. To access the list of current registrations, click the 'Notifications and Alerts' link on the main menu and scroll to the bottom of the page.





To add a new device, click the Add New Device button.



The screenshot shows a Mozilla Firefox browser window with the title 'Walltime Modbus Device Information - Mozilla Firefox'. The address bar displays '192.168.21.21/cgi-bin/walltime.cgi'. The main content area features a form titled 'Edit Modbus Device' with the following fields and values:

Field	Value
IP Address:	192.168.21.62
TCP Port:	502
Modbus ID (1 - 254):	1
Number of Inputs (1 - 2000):	16

At the bottom of the form are two buttons: 'OK' and 'Cancel'.

The following parameters must be provided:

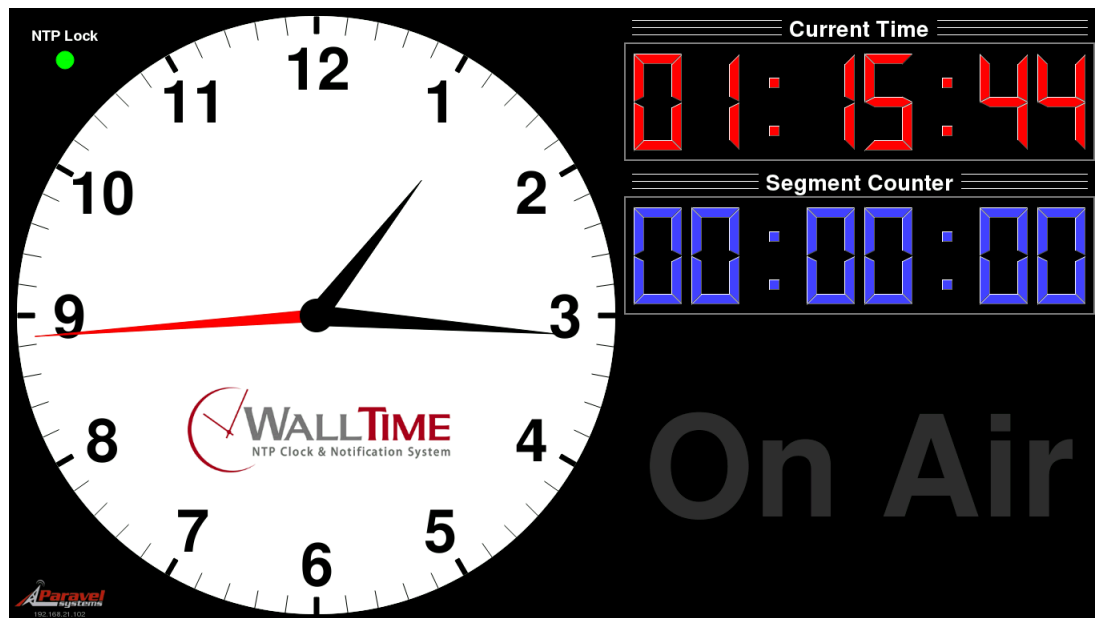
IP Address	The IPv4 address of the Modbus TCP device. This address must be unique --i.e. not shared with any other Modbus device used by WallTime.
TCP Port	The TCP port number of the Modbus TCP service on the device. This will almost always be <b>502</b> .
Modbus ID (1 - 254)	The Modbus ID of the device. This value must be unique --i.e. not shared with any other Modbus device used by WallTime.
Number of Inputs (1 - 2000)	The number of GPI inputs provided by the device.

## Using Modbus Devices with Multiple WallTime Units

When using one or more Modbus devices with multiple WallTime units that are connected to the same subnet, it is only necessary to register the Modbus device with one WallTime, which will then act as a "repeater" for the other WallTime units.

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## Chapter 2. The "Analog Clock with Widgets" Display Style

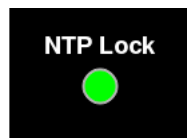


### The Analog Clock Widget



The analog clock widget occupies the left-hand portion of WalTime's display and consists of three elements:

### NTP Lock Display



The 'NTP Lock' display in the upper left-hand corner of the analog clock widget indicates the status of WallTime's connection to the NTP server(s). A green light indicates that the connection is good and the

clock synchronized, while red indicates that the clock is not currently synchronized and thus may not be displaying accurate time.

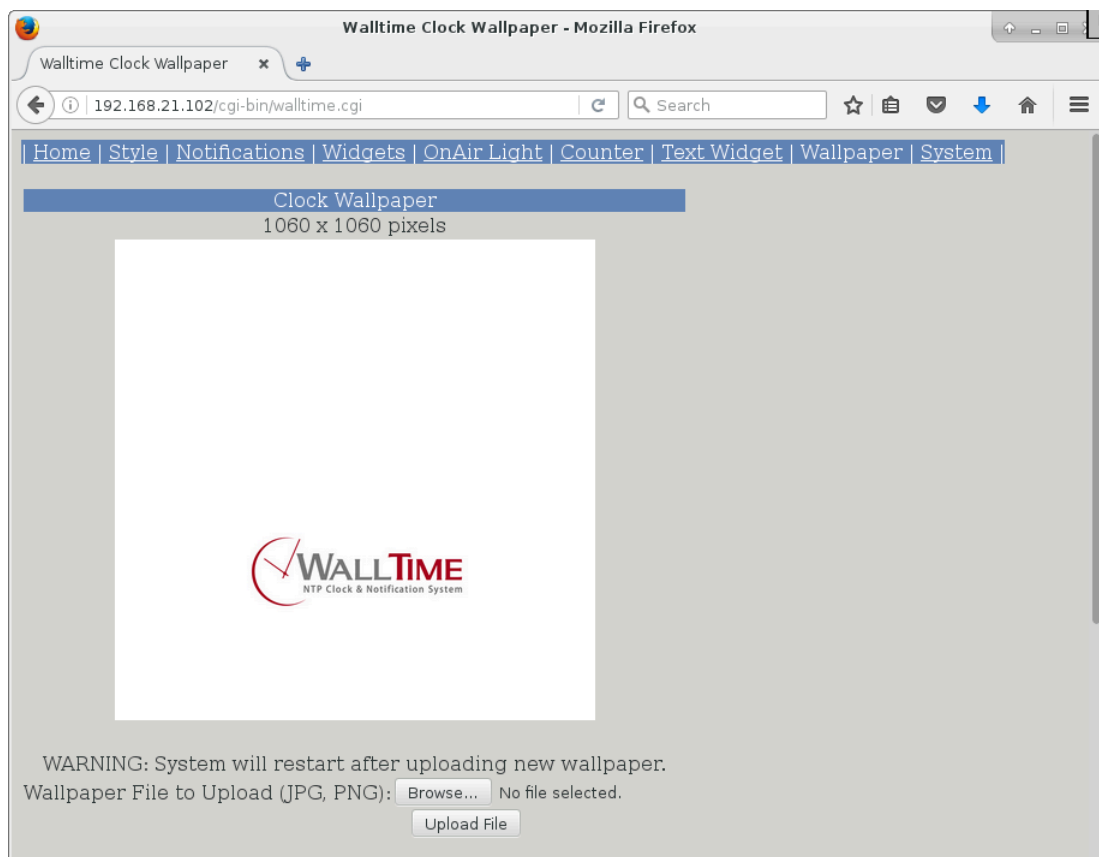
## IP Address Display



The 'IP Address Display' in the lower left-hand corner of the analog clock widget shows the currently configured IP address of the unit.

## Analog Clock

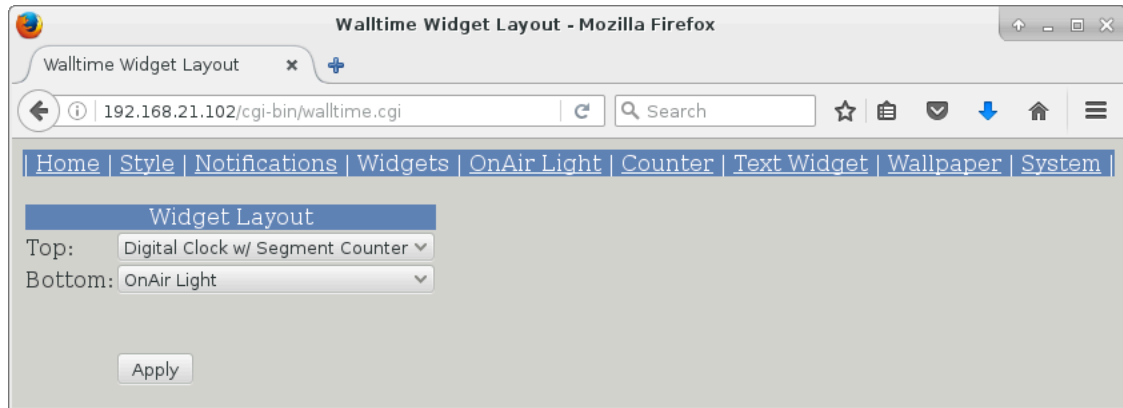
The logo displayed on the analog clock is user-configurable. To set it, click the **Wallpaper** link on the main menu of the WallTime web interface.



The logo consists of a 1060x1060 pixel PNG or JPG image, which becomes the background to the overall analog clock face when uploaded.

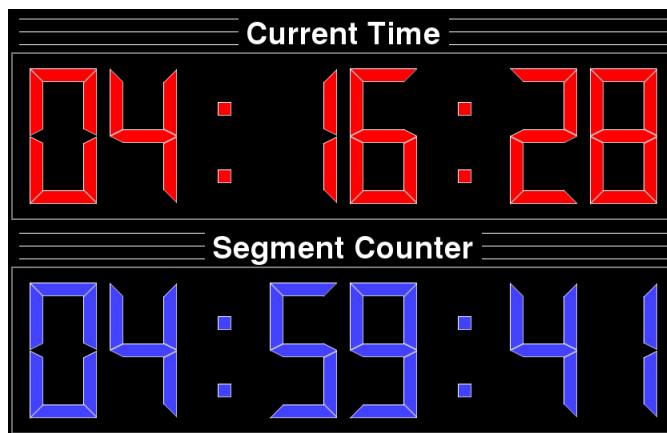
## Selecting Widgets

When using the Analog Clock style, the widgets to be displayed on the right-hand portion of the display can be set by clicking the **Widgets** tab on the top of the screen of the WallTime web interface.



Select the desired widget for each location and then click the `Apply` button. (NOTE: it is not possible to have the same widget appear in both positions).

## The Digital Clock Widget



The Digital Clock Widget consists of a digital time readout (labeled `Current Time`), which is a repeat of the time displayed in the Analog Widget in digital format. Optionally, if `Digital Clock w/ Segment Counter` was selected when configuring the widget, a built-in timer (labeled `Segment Counter`) is also displayed.

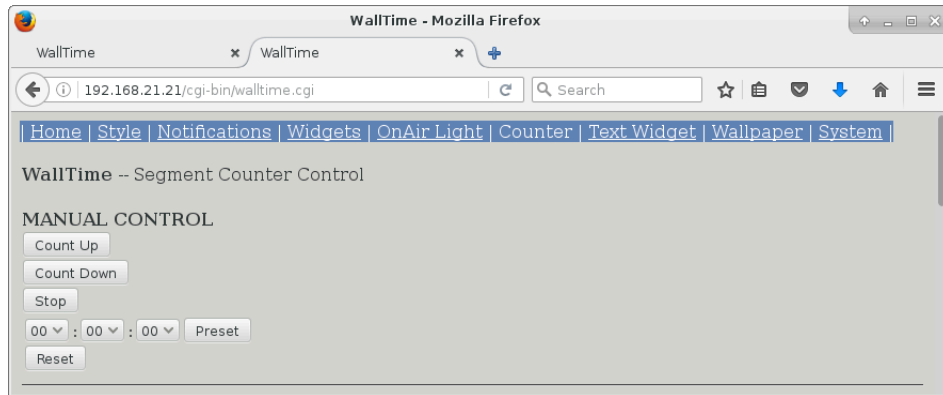
## Controlling the Segment Counter

To control the Segment Counter, click the `Counter` link on the main menu of the WallTime web interface.

The Segment Counter can be controlled three different ways: Manually, Automatically and by means of WallTime's built-in scheduler. All three methods can be configured by clicking on the `Counter` tab on the top of the screen.

## Manual Control

Manual control is accomplished by clicking on the appropriate buttons in the `MANUAL CONTROL` section.

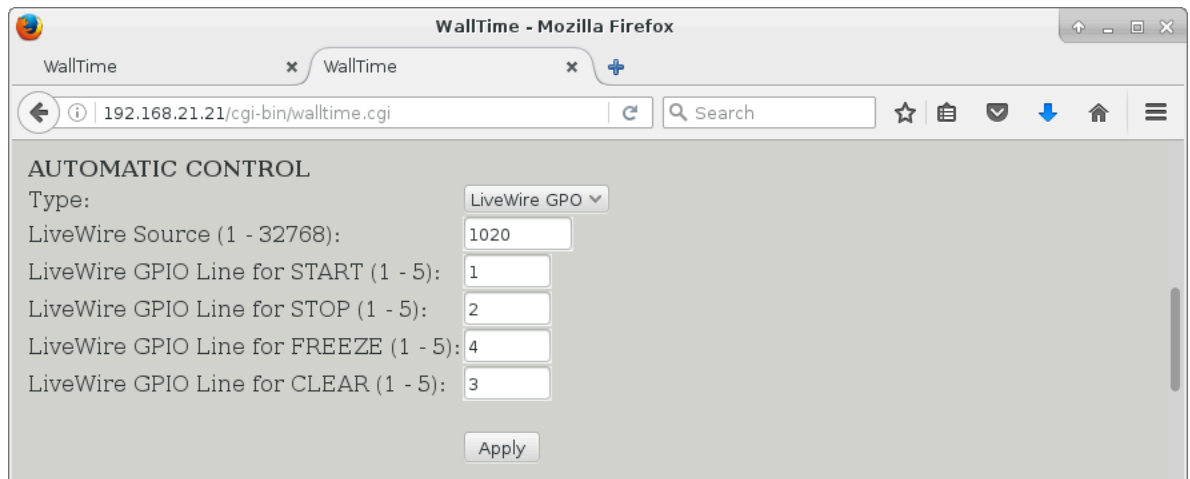


The value of the Segment Counter can be set by selecting the desired value and then clicking the Preset button, or set to all zeros simply by clicking the Reset button. The run status of the timer is controlled by clicking the appropriate Count Up, Count Down or Stop buttons.

In addition to WallTime's integrated web interface, the Segment Counter can be directly controlled by means of TCP/IP commands. See Chapter 7 "Remote Control" for details. An applet for controlling the counter directly from a Windows desktop is also available for download at <http://www.paravelsystems.com/>.

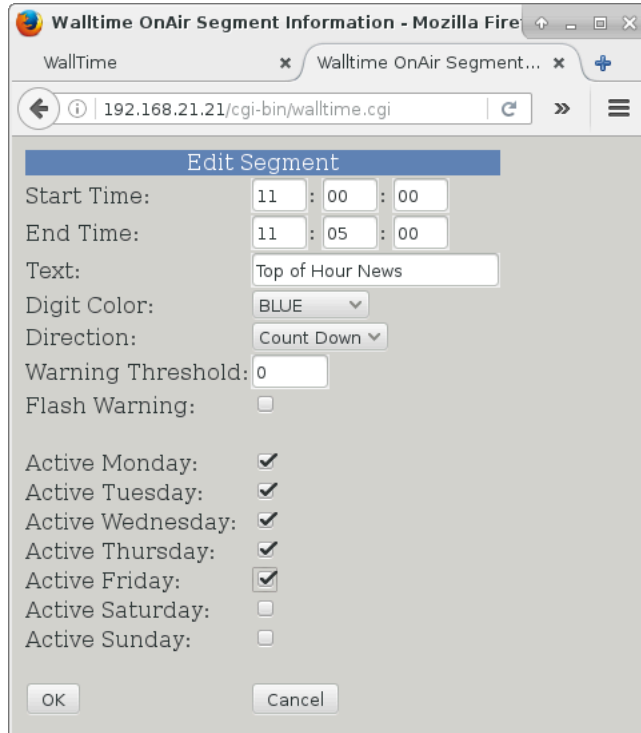
## Automatic Control

Automatic control allows the counter to be started, stopped or cleared by means of a status update from a LiveWire or Modbus GPIO device.



## Schedule Control

Scheduled operation can be accomplished by creating one or more segments by clicking the New Segment button in the SCHEDULE CONTROL section.



The beginning and end times of the segment are entered in the `Start Time` and `End Time` fields (values in 24 hour "military" format). The counter can be made to count either up or down by means of the `Direction` control. A `Warning Threshold` (in seconds) can set that will cause the background of the Segment Counter to flash during the final seconds of the segment.

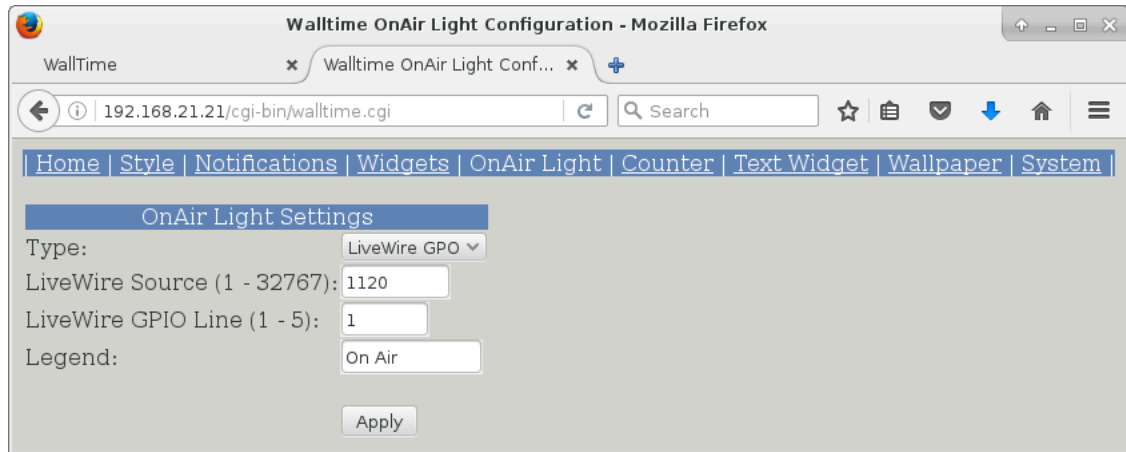
## The On-Air Light Widget



The On-Air Light Widget is a digital version of the traditional warning light fixtures found in and around many studios. It can be controlled by means of a LiveWire/Mobus GPIO input or via WallTime's TCP/IP interface.

## Configuring the OnAir Light

The OnAir Light can be configured by clicking on the `OnAir Light` link on the main menu of the WallTime web interface.

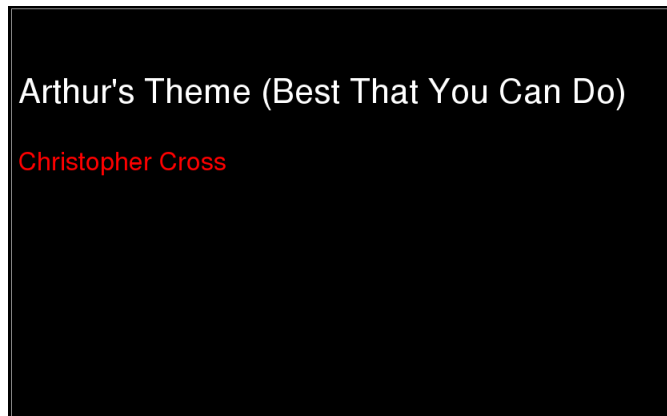


The first three fields are for configuring the GPIO notification.

The Legend field is for the text to appear on the widget.

In addition to GPIO notifications, the OnAir Light can be directly controlled by means of TCP/IP commands. See Chapter 7 "Remote Control" for details.

## The Text Widget

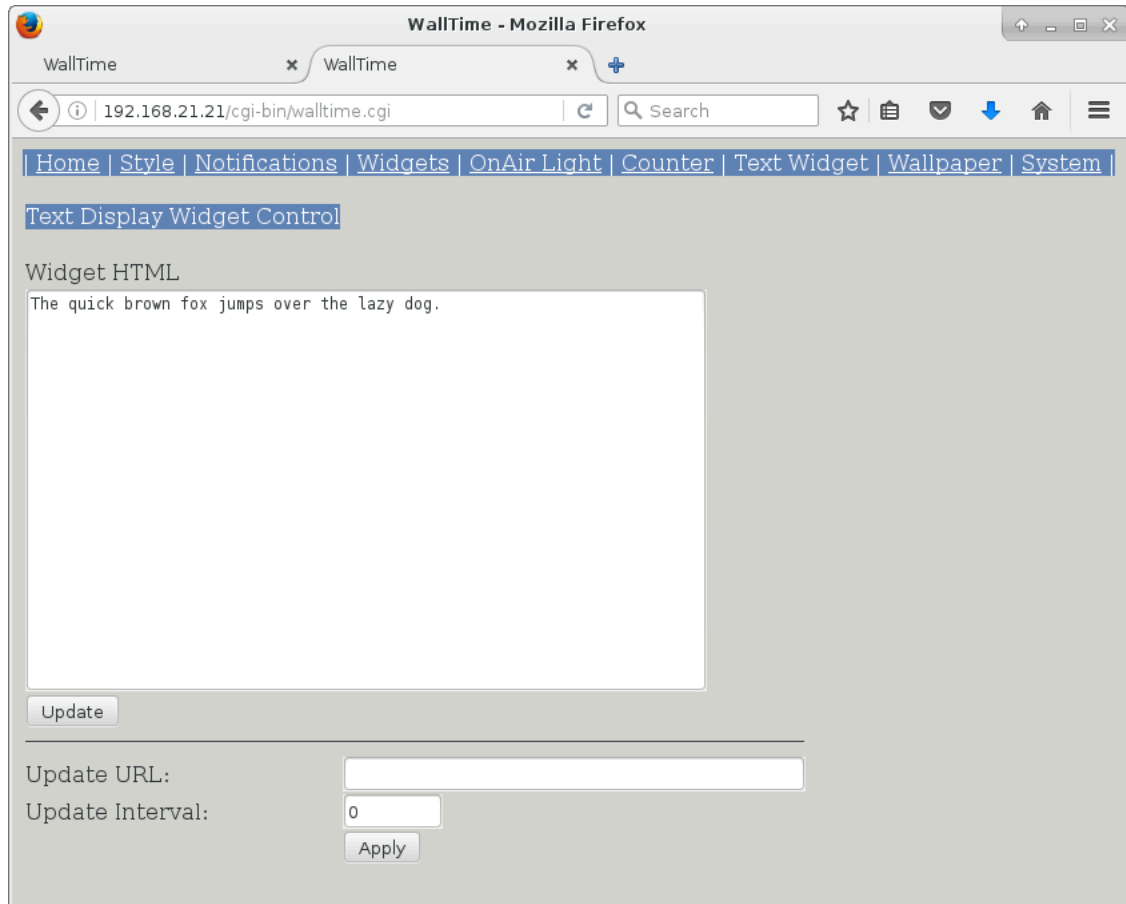


The Text Widget can display simple HTML documents, set in WallTime's integrated web interface or pushed to it by means of standard http PUSH calls.

## Updating the Text Widget

The content of the Text Widget can be set by clicking on the Text Widget link on the main menu of the WallTime web interface.

## The "Analog Clock with Widgets" Display Style



To change the HTML being displayed, edit it in the `Widget HTML` window and then click the `Update` button.

The Text Widget can also be set to update itself from a static URL at a set interval. To configure this, enter the URL from which to pull updates in the `Update URL` field and the interval between updates (in seconds) in the `Update Interval` field.

In addition to WallTime's integrated web interface, the Text Widget can be directly updated by means of standard http PUT commands. See Chapter 7 "Remote Control" for details.



## Configuring the Notifications Display Widget



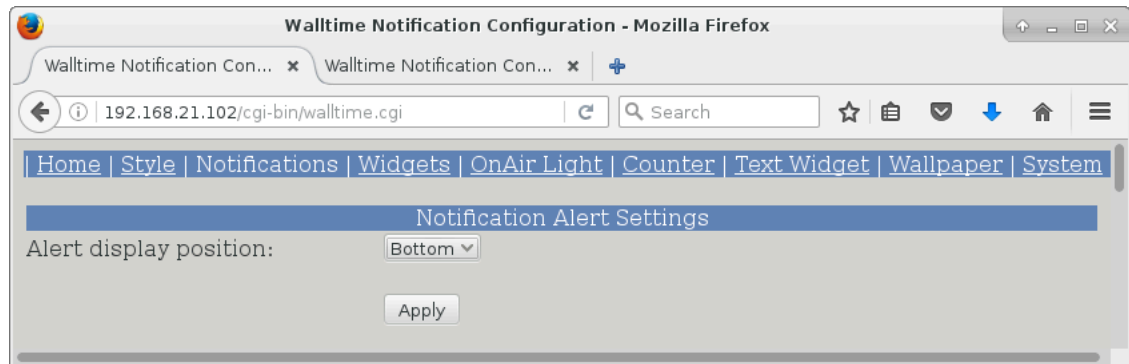
The Notifications Widget is essentially a 'miniature' version of the full-screen display provided by the "Notification Status with Digital Clock" display style, shrunk down to fit within the space provided for a widget. Please see the "Notification Status with Digital Clock" Display Style chapter for information on configuration.

## Chapter 3. The "Notification Status with Digital Clock" Display Style



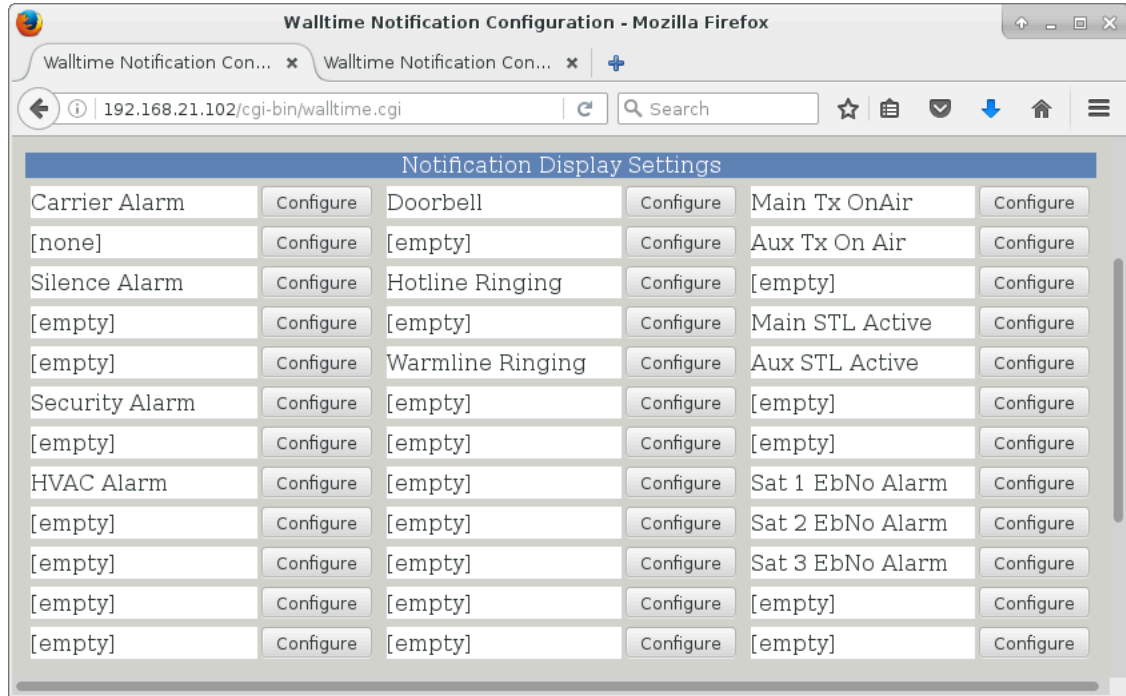
## Configuring Notifications

Configuration is done by clicking on the `Notifications` and `Alerts` link on the main menu of the WallTime web interface.

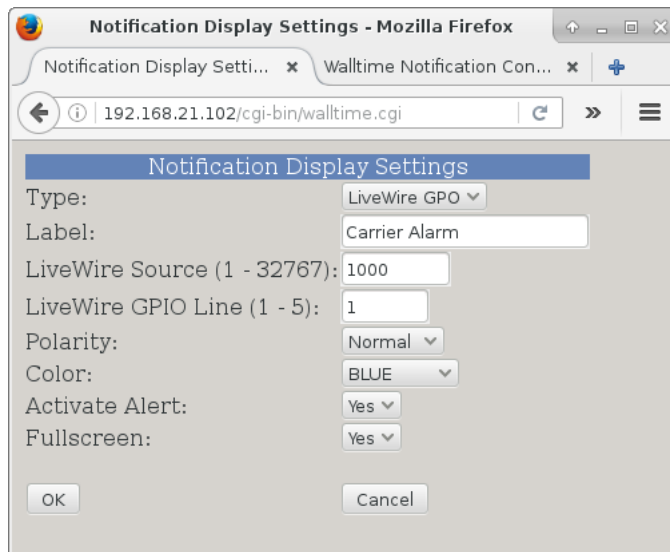


The `Alert Display Position` setting controls where notification alerts will be displayed; with choices being being the `Top` or `Bottom` widget positions. While one or more alerts are active, the underlying widget will not be visible. NOTE: This setting has effect only when using the "Analog Clock with Widget" display style.

## The "Notification Status with Digital Clock" Display Style



To configure a particular notifications entry, click on its corresponding Configure button.



In addition to the standard three fields (see the "WallTime GPIO Notification" section), the following fields are available:

Label	The text to display for this Notification line.
Color	The background color of the indicator to display when the selected GPIO input is active.
Activate Alert	When set to Yes, treat activation of this notification as an alert. When in the "Analog Clock with Widget" display style, this will cause one of the two right-hand widgets (as configured in "Alert Display Position", above) to be overlaid with the Label for this notification. When in the

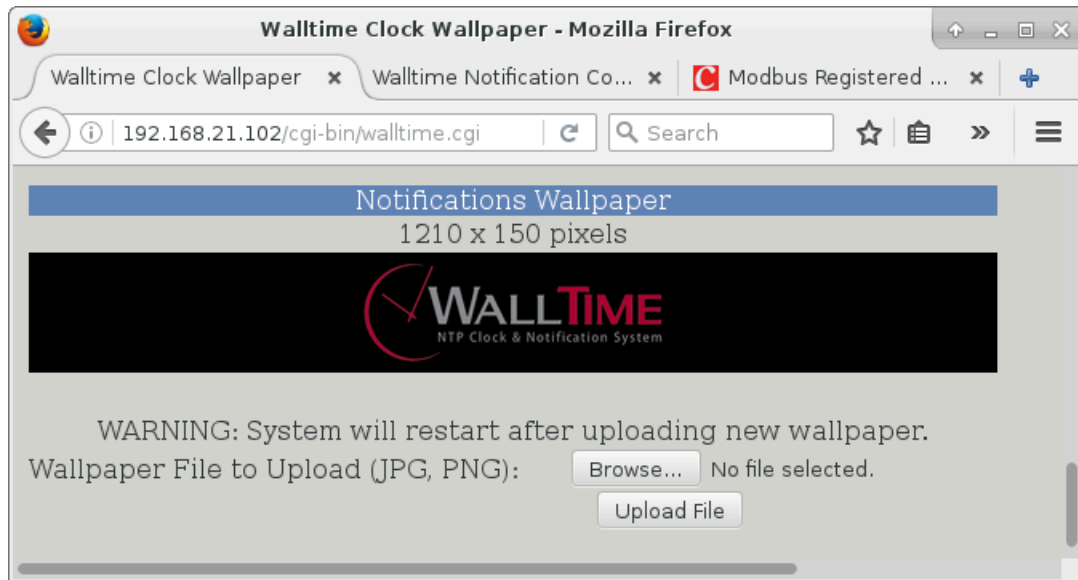
"Notification Status with Digital Clock" display style, the banner area at the bottom of the display will be overlaid with the Label for this notification.

Fullscreen

When set to Yes, and if "Activate Alert" (above) is also set to Yes, the entire display screen area will be overlaid with the Label for this notification for five seconds after initial activation.

## Banner Customization

The banner displayed on the bottom of the display when in "Notification Status with Digital Clock" display style is user-configurable. To set it, click the **Wallpaper** link on the main menu of the WallTime web interface and scroll to the bottom of the page.



The logo consists of a 1210x150 pixel PNG or JPG image.

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# Chapter 4. Remote Control

In addition to its built-in web control interface, many aspects of WallTime's operation can be controlled remotely by means of commands sent via TCP/IP. This opens many possibilities for integration with various other systems. This section examines the methods available and provides some simple "cookbook" recipes to demonstrate how these remote capabilities can be exercised. These recipes assume a basic familiarity with using the command-line interface on a computer.

## Running the Recipes

Many of the examples given in this section use one of the following tools to exercise the specific function under discussion. All are included in most default Linux / OS X / Windows setups or freely available for download via the Internet:

Curl	Open source command line tool and library for transferring data with URL syntax. Available at <a href="https://curl.haxx.se/">https://curl.haxx.se/</a> .
Netcat	The classic "Swiss Army Knife" for TCP/IP networks. Included with most Linux and OS X setups. A version for Microsoft Windows™ is available at <a href="http://www.securityfocus.com/tools/139">http://www.securityfocus.com/tools/139</a> .

## Time Offset

The time offset of both the analog and digital clock displays can be altered dynamically by means of the following command, sent to UDP port 6060:

**TO *offset*!**

Where ***offset*** is the offset to apply (in milliseconds).

## Example

Use a series of netcat (nc) commands to change the time offset so that the displayed time is one hour behind normal (-3600000 milliseconds), then set it back to normal (0 milliseconds).

```
echo TO\ -3600000\! | nc -u ip-addr 6060
```

```
echo TO\ 0\! | nc -u ip-addr 6060
```

## Segment Counter

In addition to the built-in web methods, WallTime's Segment Counter can be controlled by means of text commands sent to UDP port 6060. The following commands are available:

Set Count Mode      **SM *mode*!**

Where ***mode*** is one of the following:

**U**    Count Up

**D**    Count Down

Preset Counter	<b>PS <i>secs</i>!</b>
	Where <b><i>secs</i></b> is the values to which to preset the counter, in seconds.
Reset Counter	<b>RS!</b>
	Set the counter to 00:00:00.
Start Counter	<b>ST!</b>
	Start the counter.
Stop Counter	<b>SP!</b>
	Stop the counter.

## Example

Use a series of netcat (nc) commands to put the Segment Counter into 'countdown' mode, preset it to 01:00:00 and then count down to 00:00:00:

```
echo SM\ D\! | nc -u ip-addr 6060
```

```
echo PS\ 60\! | nc -u ip-addr 6060
```

```
echo ST\! | nc -u ip-addr 6060
```

## On-Air Light

In addition to LiveWire and Modbus GPIO, WallTime's On-Air Light can be controlled by means of text commands sent to UDP port 6060. The following commands are available:

Turn On      **LP 1!**

Turn Off     **LP 0!**

## Example

Use a netcat (nc) command to turn ON the On-Air Light:

```
echo LP\ 1\! | nc -u ip-addr 6060
```

## Text Widget

The content of WallTime's Text Widget can be updated dynamically by means of standard http PUT commands, sent to the URL:

```
http://ip-addr/webwidget
```

## Example

Use a curl command to display the phrase "Hello World!" in the Text Widget:

```
echo Hello\ World\! | curl -u user:password -T - http://ip-addr/webwidget
```

---

# Chapter 5. Restoring Factory Defaults

If necessary (due to a lost password or other reason), the WallTime unit can be restored to "factory default" settings by means of the following procedure:

1. Obtain a USB thumb drive. Download the file at [http://static.paravelsystems.com/walltime/firmware/factory\\_defaults.dat](http://static.paravelsystems.com/walltime/firmware/factory_defaults.dat) to the root folder of the drive.
2. Remove power from the WallTime unit, then insert the thumb drive into one of the USB sockets located on the end of the unit.
3. Reapply power to the unit and let the unit boot up until the Factory Reset message appears.



**Factory defaults set. Remove USB key and reboot.**

4. Remove power from the WallTime unit, then remove the USB drive.
5. Reapply power to the unit and let it boot up normally. The unit will now be set back to factory defaults.