LIFEGUARD
by Digital Aquatics

Lifeguard™ User Guide V1.1

Written for Lifeguard™ Firmware 1.14

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Digital Aquatics

Forward

Digital Aquatics thanks you for purchasing the Lifeguard™ monitoring system! This exciting system will protect your aquarium and help you stay aware of the condition of your tank.

Digital Aquatics' Lifeguard™ monitoring system protects your aquarium by monitoring the three parameters that most often lead to tank crashes: temperature, pH and water level (via a switch input). Lifeguard™ is a super-easy-to-use alternative for anyone who wants to protect their tank without using a controller. Lifeguard™ helps you respond quickly to out-of-bounds tank conditions by sending you email alerts when temperature or pH crosses user-definable thresholds, or when the switch input opens or closes.

Lifeguard™ features built-in network connectivity which will allow you to access the system remotely. Lifeguard™ enables you to keep an eye on your tank while you are at work, on an errand, or on vacation. Lifeguard™ can be used alone or as a backup to an aquarium controller such as a Digital Aquatics ReefKeeper™ system.

This guide will take you step by step through the installation and setup processes so you can get Lifeguard™ connected, configured and operating with your aquarium system. You can follow this manual like a book, starting from the beginning and working your way to the end, or use it as a reference for help with specific subjects. Either way, we hope this guide will help you get your Lifeguard™ system up and running in no time!

Contents

About This Guide

This guide is intended to give you a step-by-step tour of the Lifeguard monitoring system. Lifeguard is designed to be simple to setup and operate. This guide is designed to provide in-depth information about installing, configuring and using Lifeguard.

Icon Definitions

An exclamation point within an equilateral triangle is intended to alert the user of a cautionary notice to which attention should be given prior to the products usage.

A lowercase "i" within a circle is intended to alert the user to the presence of important operating information in the literature accompanying the product. This symbol is also used for Notes.

A jagged arrow within an equilateral triangle is intended to alert the user of a hazardous warning that involves the possibility of electrical shock.

System requirements

- An Ethernet network with an active internet connection,
- A network router with DHCP (Dynamic Host Configuration Protocol) enabled (highly recommended)
- A PC, laptop, tablet or smartphone (connected to the same network as Lifeguard) with a modern web browser that supports HTML 5 functionality. Supported browsers include
  - Internet Explorer 9.0+
  - Firefox 11.0+
  - Google Chrome 19.0+
  - Safari 5.1+

An Internet connection is required in order to sync the Lifeguard units time to the internet and use email alerts.

Disclaimers

- As with most electronic devices, contact with water will cause irreparable damage to the Lifeguard Monitoring System and is not covered under warranty.
- Lifeguard carries a limited 2 year warranty against manufacturer defects.
- All probes sold by Digital Aquatics have a limited 90 day warranty unless otherwise stated. Some probes may be covered under warranty by the probe manufacturer and not Digital Aquatics.

Warnings

- Do not use non-standard or 3rd party power supplies with Lifeguard.
- Do not apply power or voltage to the Advanced Switch Port.
- Do not connect inappropriate or damaged devices or cables to Lifeguard's ports.
- Do not connect devices or cables that are not designed to be connected to the respective ports.
- Do not connect a ReefKeeper™ bus cable to the Lifeguard temperature port.
- Do not use phone cables or phone accessories with Lifeguard.
- Do not connect Lifeguard to power through the USB port or Lifeguard may be damaged. The USB port on Lifeguard is intended for updating the firmware on the device using a flash drive. The USB port should never be connected to any other type of device or connection.

Failure to heed these warnings may result in irreparable damage to the Lifeguard unit and is not covered by the Warranty.

Although the Lifeguard system has been tested with a variety of devices to ensure compatibility, whenever two measuring devices are placed together there is a slight possibility that the devices will interact with each other's readings. In the rare event that such interactions occur, a standard grounding probe should be installed in the tank in which the Lifeguard system is installed.

Chapter 1: Product Overview

Identify and inventory all of the included components

1 x	Lifeguard unit
1 x	Temperature Probe
1 x	pH Probe
1 x	7pH Calibration Packet
1 x	10 pH Calibration Packet
1 x	Power Adapter
1 x	5' Ethernet Cable
1 x	Quick Start Guide
1 x	3M Dual Lock Low Profile™ Mounting Kit

Familiarize yourself with Lifeguard™

Front Display

- Main Display
- Power Status
- Network Status
- Alert Status

Top Panel

- Navigation Button
- Reset Button

Bottom Panel

- Power Adapter Port
- Ethernet
- pH Port
- Temperature Port
- USB Port
- Advanced Switch Port

You will not lose any saved data by turning off the power to your Lifeguard!
You will not be able to save new graph data while Lifeguard is powered off.

Identifying the Accessories

The Lifeguard Monitoring System includes two probes. The temperature probe consists of a standard temperature probe with an RJ12 connector. The pH probe connects to Lifeguard with a metal BNC connector.

Temperature Probe

pH Probe

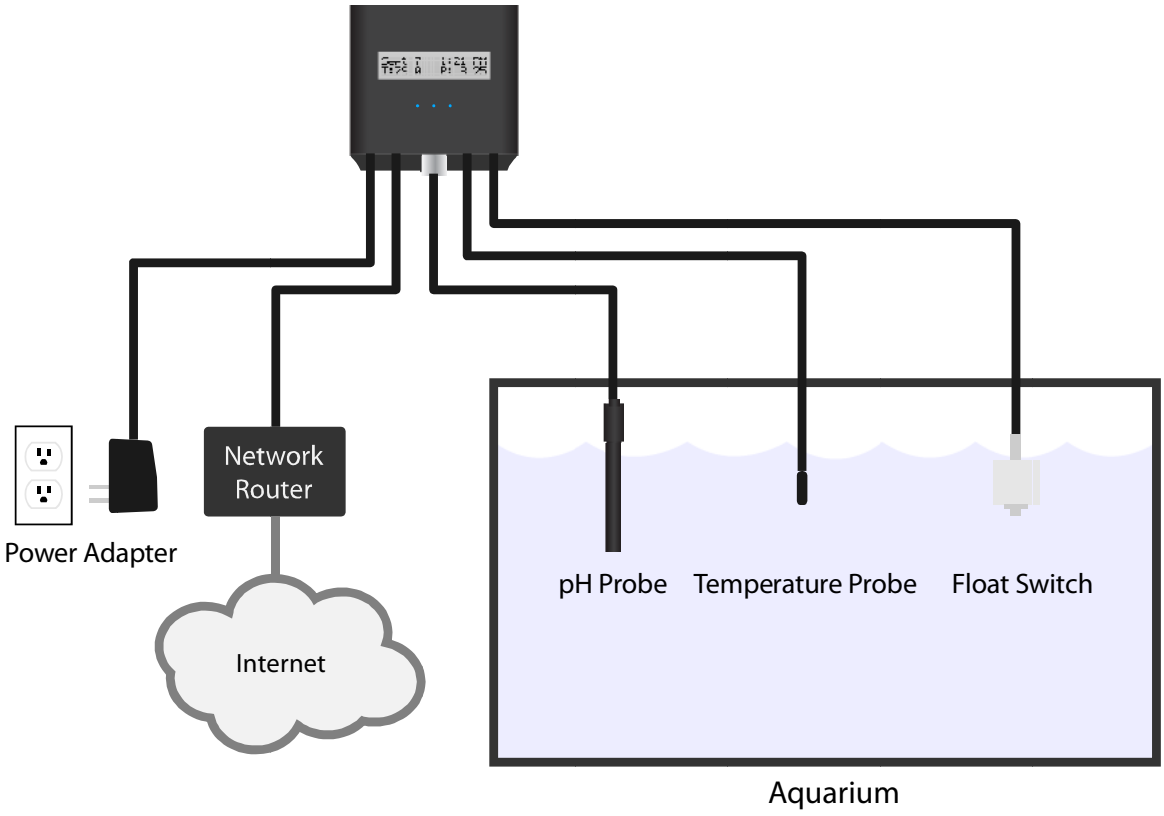
Advanced Switch Cable

The Advanced Switch cable can be connected many different devices, including float switches, leak detectors, and other water level sensors .

Chapter 2: Installation

The Lifeguard™ System

A typical Lifeguard monitoring system installation is shown in the diagram below:



Lifeguard monitoring system – typical installation

Connecting Your Lifeguard™ System

The Lifeguard monitoring system is connected by plugging each system cable into to the appropriate port on the Lifeguard unit:

Lifeguard's USB port is intended for updating Lifeguard's firmware via a USB memory device. Do not connect Lifeguard to power through the USB port or the Lifeguard unit may become damaged.

The Temperature Probe and the pH Probe should be mounted in an appropriate place in the aquarium (see "Mounting the Probes" below). The bare-wire end of the Advanced Switch Cable can be connected to one or more float switches or other switching devices (see "Connecting the Advanced Switch Cable" below). Use the supplied Ethernet cable to connect Lifeguard to your network switch or router/modem (see "Connecting Lifeguard to your Router" below).

Mounting Lifeguard™

Included with the Lifeguard package is a Dual Lock™ mounting kit. This adhesive Dual Lock™ mounting kit can be attached to the back of Lifeguard and most flat surfaces, as shown below. This allows you to pick up Lifeguard when you want to access the unit directly.

Step 1

Peel off one side of the backing of the included Dual Lock™ mounting piece.

Step 2

Attach the piece of Dual Lock™ to the back of Lifeguard.

Step 3

Peel off the remaining piece of backing from the Dual Lock™ that is attached to Lifeguard.

Step 4

Press the unit onto the surface that you would like your Lifeguard to be mounted on.

Digital Aquatics recommends mounting Lifeguard vertically. It is important that your electronic equipment never be mounted on the ground or in the bottom of a cabinet where water can pool. Lifeguard is best mounted as high above a level surface as conditions will allow.

Water damage is not covered by product warranties and is the leading cause of device failure. It is the responsibility of the user to ensure safe installation practices are followed.

The Lifeguard power adapter should never be mounted on the floor or on any surface where water can pool.

Locating Lifeguard™

Digital Aquatics recommends installing Lifeguard in a location where it can be easily accessed for daily operation.

Mounting the Probes

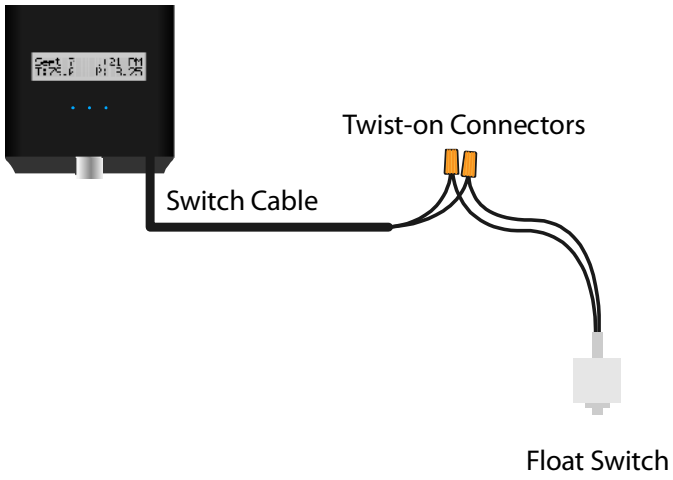
Probes should be mounted in your aquarium or sump tank where they are able to acquire reliable readings. For example, placing a temperature probe next to a heater will skew the readings. The probes are fully submersible.

The pH probe must be kept moist. Be sure to leave the pH probe in its protective cap until you are ready to calibrate and install it.

Connecting the Advanced Switch Cable

The Advanced Switch Cable can be connected to one or more float switches or other switching device. The bare wires at the end of the Advanced Switch Cable can be connected to the wires on the switched device by soldering the wires, installing a crimp connector, or attaching twist-on connectors. If the wires are soldered, Digital Aquatics recommends using a lineman splice (see diagram) and wrapping each connection with insulating electrical tape.

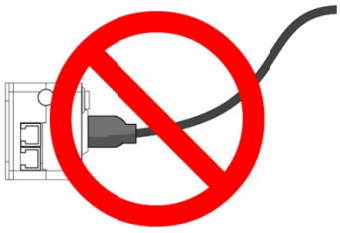
Crimp connectors and twist-on connectors typically do not require soldering and are commonly available at most auto parts and home improvement stores. The bare wires on the Advances Switch Cable are #26 AWG and the crimp or twist-on connectors should be sized accordingly.



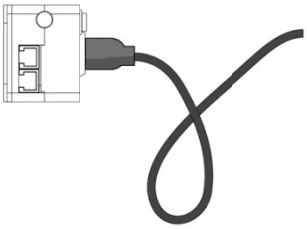
Twist-on connector Diagram

Cable Routing

It is important to make sure cables are routed in a way that will keep them safe. Make sure that they cannot get pinched or crimped. Damaging a cable can cause system wide failure! All cabling, probe wires, and power cords should be installed with proper drip loops (see diagrams below). Drip loops will help prevent water from getting in your devices and causing damage.



No drip loop



Proper drip loop

Connecting Lifeguard™ to your Router

Lifeguard is designed to connect directly to your network switch or router/modem. Once connected and configured, Lifeguard can be accessed by a standard web browser from any device with access to your network.

It may be necessary to reconfigure the network settings of third party networking equipment within the network in which Lifeguard is connected when setting it up.

In order to quickly and easily begin using Lifeguard, please make sure that DHCP has been configured and turned on in your network router. See your router's user guide for instructions about turning on DHCP.

1. Connect the provided Ethernet cable to the Ethernet port on the bottom of Lifeguard.
2. Connect the other end of the Ethernet cable to an open Ethernet port on your network switch, router or modem.

1

2

Lifeguard is not inherently wireless. You can connect Lifeguard to a Wireless Bridge or Wireless Gaming Adapter to allow Lifeguard to communicate wirelessly with your wireless router.

Chapter 3: Powering up the Lifeguard™ system

Applying Power

The Lifeguard unit does not feature a power switch. To apply power, make sure that the power adapter is plugged into an AC power outlet and then simply plug in the power adapter plug to the Power Adapter Port on Lifeguard as shown below.

Connecting Lifeguard to power

When power is applied to the Lifeguard unit, the green Power Status LED (left) will illuminate. If an active network connection is present, the blue Network LED (center) should also illuminate a few seconds after power is applied. The Network Status LED may flash.

The Lifeguard unit's LCD display (with backlight) should also illuminate upon power up. After a few seconds the LCD display will briefly show a Startup screen:

Example Startup screen

The Startup screen will be displayed for a few seconds, followed by the Home screen (described below).

Home Screen

The Home screen is the Lifeguard unit's main display screen. The Home screen gives you quick and easy access to the most important information in your Lifeguard system.

Example Home screen

When the Home screen is displayed, the date and time are displayed in the top half of the display. The date is formatted as the current month followed by the current day of the month. The time is formatted based on a 12 hour clock using the AM and PM designators. The time format can also be set to follow a 24 hour clock.

The Date and time are automatically detected by Lifeguard upon startup. Lifeguard has a real-time clock to keep time in the event that Lifeguard cannot connect to the internet.

The Home screen also displays the current temperature and pH readings on the bottom half of the display. This allows quick access to the system's parameters without having to navigate through complex menus.

Getting Around

To navigate between screens on the Lifeguard unit, just press the Navigation button on the top of the unit. The Lifeguard unit will scroll to the next screen in the order described below.

The Lifeguard unit features just three main screens:

Home screen (main display)

IP address screen
(Note: Your IP address may differ)

Info Screen

Pressing the navigation button on the screen displaying the serial number will loop back to the Home screen (main display).

Displaying Alarm Conditions

When an alarm condition occurs, Lifeguard displays the condition on Lifeguard's LCD display. Lifeguard also illuminates the red Alert Status LED when an alarm condition occurs. The alarm condition screen will look similar to the display shown below:

Example Alarm screen

When the navigation button is pressed while the alarm condition is being displayed, Lifeguard will cycle through the three principal screens (Home, IP address and Serial number) as well as the alarm condition screen. In effect, the alarm condition screen becomes a fourth screen in the Lifeguard's interface.

The alarm screen remains active as long as the alarm condition is present. If more than one alarm condition is present, Lifeguard displays the most recent alarm condition occurrence on the LCD display.

Resetting Lifeguard™

If you forget your username or password you can reset Lifeguard to its original state as shipped from the factory.

Resetting Lifeguard will clear Lifeguard's measurement data logs. Any measurement data previously saved in Lifeguard's memory will be lost.

To perform the reset, press and hold down the recessed Factory Reset button with a paperclip or a small-diameter tool, as shown below:

Resetting Lifeguard with a paperclip

When the Factory Reset button is pressed and held, the Reset screen appears:

Example Reset screen

Hold the reset button until the progress bar completes and the screen reverts to the Home screen. Your Lifeguard system has now been reset.

Chapter 4: Initial Lifeguard™ Setup

If you are setting up Lifeguard for the first time, we suggest that you read through each of the sections below to familiarize yourself with Lifeguard's web interface. After the Lifeguard system has been configured, Lifeguard's measurement dashboard will display the system's current readings, graphing information and trends.

Accessing the Lifeguard™ Web Server

Lifeguard contains its own web server software that enables you to set up the Lifeguard system and access measurement data. You can access Lifeguard's web server as you would any web site - via a browser on a PC, laptop, tablet or smartphone on your network or via the Internet.

Once Lifeguard is communicating with your router, the router should assign an IP address to Lifeguard. You can use this IP address to access Lifeguard's web server.

Press the Navigation button on top of Lifeguard to display the current IP address:

Note: Your IP address may be different

You can enter the IP address into the URL or address bar of your web browser to access the Lifeguard Welcome screen. *Example: http://192.168.2.4*

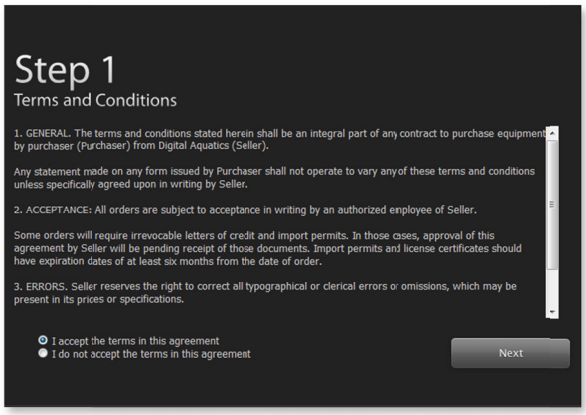
Once you've entered the IP address, Lifeguard's web server will display the Welcome screen in your browser (see below):

Setting up Lifeguard™ for the first time

The Lifeguard web server is designed to guide you through initial setup. Click 'Begin' on the Welcome screen to start.

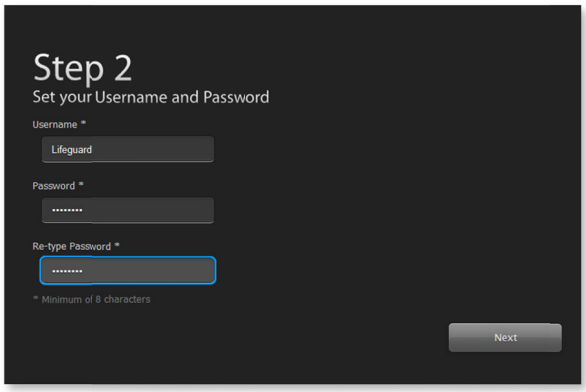
Step 1

Read through the terms and conditions. Select whether you accept the terms and then click on 'Next'.



Step 2

Enter your username and password. Your username and password must each be a minimum of eight and a maximum of 32 alphanumeric or punctuation characters (exceptions: no spaces, single quotes or double quotes). Your username and password are case-sensitive. When you have completed your entries, click on 'Next'.



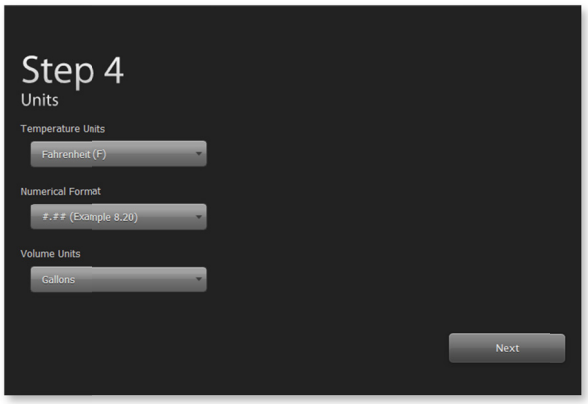
Note: Be sure to keep your username and password information handy in order to login to the Lifeguard web server.

Step 3

Select your time zone and your time and date format preferences. Press or click on each menu bar for a drop-down list of menu choices. Select the 12-hour time format if you want Lifeguard to display the time in "AM/PM" format; otherwise select the 24-hour format. If daylight savings time is currently in effect in your area, select "Yes" for the Daylight Savings setting. When you have completed your selections, press or click on 'Next'.

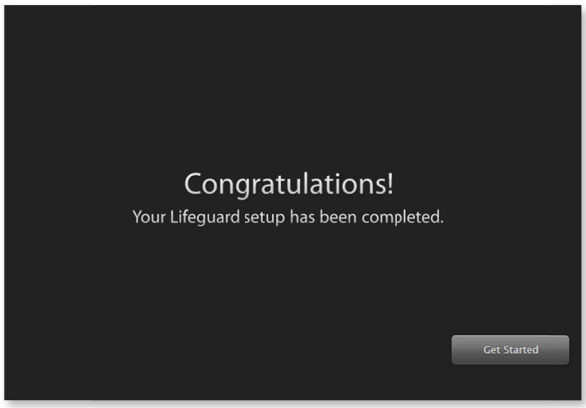
Step 4

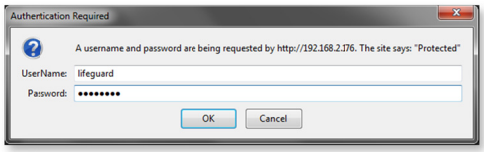
Enter your unit and numerical format preferences. By choosing temperature units, you can configure Lifeguard to display temperature in °C or °F. Press or click on each menu bar for a drop-down list of menu choices. When you have completed your selections, press or click on 'Next'.



Congratulations!

You have completed the initial setup! Press or click on 'Get Started' and enter your username and password into the Authentication dialog box (shown below) to access the Lifeguard dashboard.



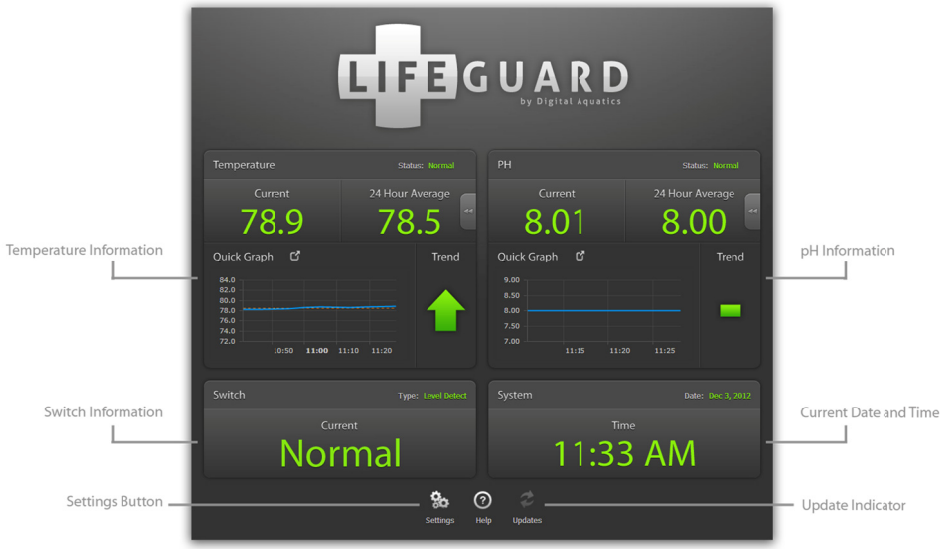


If You Forget Your Username or Password

If you forget your username or password, you can reset Lifeguard to its factory default settings by pressing and holding the recessed Factory Reset button. See "Resetting Lifeguard" in Chapter 3 (p. 16).

Welcome to the Lifeguard™ Dashboard!

When you have successfully entered your username and password, the Lifeguard web server displays the Lifeguard dashboard in your browser:



The Lifeguard web server's dashboard displays current and 24-hour average readings, graphing and trend information for both pH and temperature inputs. The dashboard also displays the switch input status as well as the current date and time. The dashboard also provides a Settings button that links to the settings menus, a Help button (which accesses this guide) and an Update indicator/button that enables access to Lifeguard firmware updates.

Chapter 5: Calibrating the Probes

Once you have completed initial setup, Digital Aquatics recommends that you calibrate your temperature probe and your pH probe to your Lifeguard unit. Lifeguard is designed to lead you through the Temperature and pH calibration process.

What you will need:

- Calibration solution packets – one each of two different pH values (7 pH and 10 pH solution packets are included with your Lifeguard system)
- An accurate thermometer.
- A body of water (e.g. your aquarium) at a stable temperature.
- RODI (reverse osmosis de-ionized) water for rinsing the probes.

General calibration tips

In order to calibrate temperature, you will need an accurate thermometer or temperature measurement device to measure the actual temperature of the water where the probe is located.

Calibration should be done whenever (a) the probes are found to be reading inaccurately, (b) you receive new probes, or (c) you receive a new Lifeguard unit.

For best results, it is recommended that you calibrate your probes as soon as your Lifeguard is set up and that you test the probes for accuracy every couple of months.

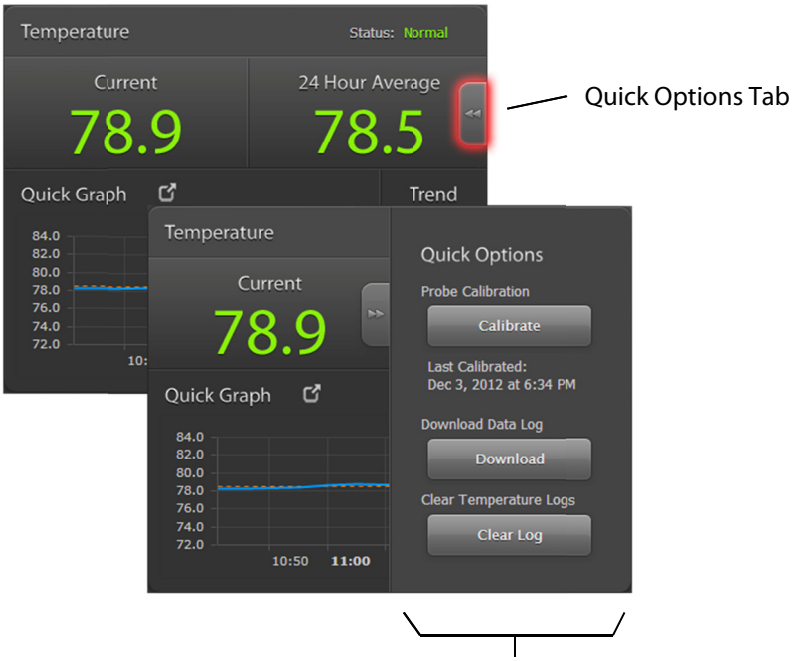
Probes have an expected lifespan 12-18 months. If your probe requires frequent re-calibration, it may be nearing the end of its useful life.

Calibrating the Temperature Probe

The temperature probe is calibrated by placing the probe in water of a known temperature, and telling Lifeguard what the known temperature is. Lifeguard's temperature probe calibration procedure guides you through these steps.

Open the Quick Options Menu

On the Lifeguard Dashboard, press or click on the Quick Options tab next to the Temperature 24 Hour Average to open the Quick Options menu.



Begin the calibration process

Press or click on the 'Calibrate' button in the quick options menu to start the calibration process. This will bring up the Temperature Calibration wizard.

The Temperature Calibration Wizard

The Temperature Calibration wizard will guide you through the steps to calibrating your Lifeguard temperature probe. Temperature probe calibration requires a second temperature measurement device, e.g. a thermometer or a digital thermometer that is known to be accurate.

Step 1

Place the secondary temperature sensor in your aquarium's water and wait for its temperature reading to stabilize.

Step 2

Place the Lifeguard temperature sensor in in your aquarium's water as close as possible to the secondary temperature sensor. This ensures that both temperature sensors read as similarly as possible.

Step 3

Enter the reading of the secondary temperature measurement device into the "target value" text box on the Temperature Probe Calibration dialog. Then press or click on the 'Start' button.

The Temperature Calibration wizard screen will report 'Stabilizing…' and display a barber pole indicator while the calibration is in progress. Calibration may take a few minutes.

When calibration is complete, the Temperature Calibration wizard screen will report "Calibration was Successful." Press on the 'Close' button to exit the calibration wizard..

Canceling Temperature Calibration

You can cancel the temperature calibration process at any time by pressing or clicking on the 'Cancel' button on the Temperature Calibration wizard dialog. When the 'Cancel' button is pressed the calibration process will be stopped. You can restart the calibration wizard by pressing or clicking on the "calibrate' button on the Quick Start menu.

If Temperature Calibration Fails

If temperature calibration fails, the Temperature Calibration wizard will display a screen that reports "Temperature Calibration Failed." Temperature calibration failure can occur if the temperature probe is not properly connected to Lifeguard, or if the temperature probe's reading fails to stabilize within 10 minutes. Failure of the probe to stabilize may result from the probe falling out of the tank (or the tank's water) during the calibration process. Be sure that the Lifeguard temperature probe is in a stable position in your aquarium's water during calibration.

Calibrating the pH Probe

The pH probe is calibrated by immersing the pH probe in two different pH calibration solutions and telling Lifeguard when the probe is in each solution. Lifeguard's pH probe calibration procedure guides you through these steps:

pH calibration tips

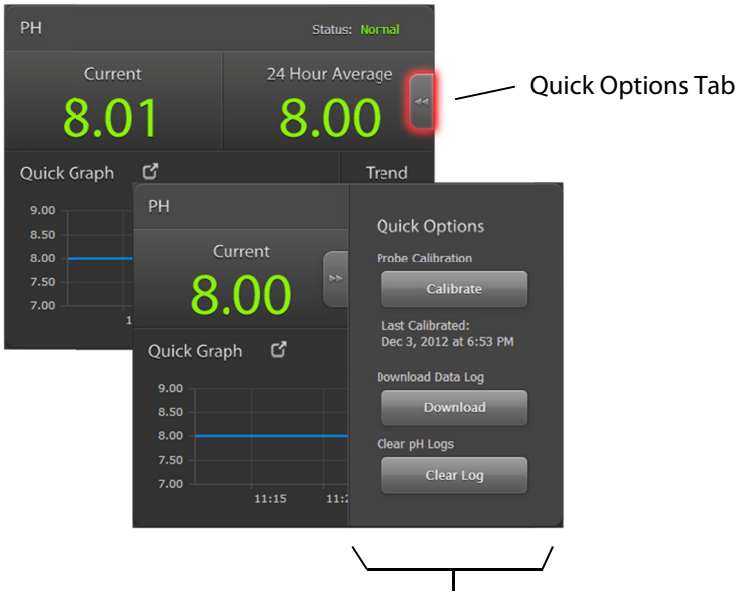
Calibration solution is designed for one-time use. Be sure to use fresh solution for each calibration. Calibration solution is also most accurate when it is near its target temperature, about 77° F (25° C).

For the most accurate readings, be sure to use appropriate calibration solution. For example, if your target pH is 7-8.5 Digital Aquatics recommends using 7 pH & 10 pH calibration solution packets. If your target pH is 5-6.5, Digital Aquatics recommends 4 pH & 7 pH solution packets.

Be sure to remove the protective cap from the end of the pH probe. Keep the cap handy, in case you need to store the pH probe, or take it out of the water for extended periods of time. The tip should not be allowed to dry out.

Open the Quick Options Menu

On the Lifeguard Dashboard, press or click on the Quick Options tab next to the pH 24 Hour Average to open the Quick Options menu:

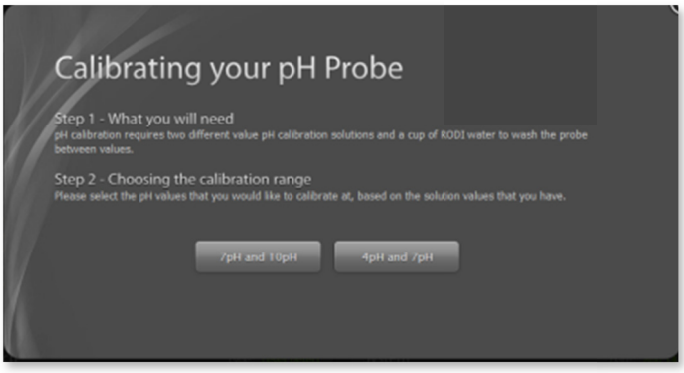


Begin the calibration process

Press or click on the 'Calibrate' button in the Quick Options menu to start the calibration process. This will bring up the pH Calibration wizard.

The pH Calibration Wizard

The pH Calibration wizard will guide you through the steps to calibrating your Lifeguard pH probe.



Step 1

What you will need: pH calibration requires two different calibration solutions and a small amount of RODI (reverse-osmosis de-ionized) water. If your target pH level for your aquarium is 7-8.5, Digital Aquatics recommends using the 7 pH and 10 pH calibration solution packets provided with your Lifeguard system. If your

target pH is 5-6.5, Digital Aquatics recommends using 4 pH and 7 pH solution packets. 4 pH calibration solution packets are available from Digital Aquatics (www.digitalaquatics.com or 425-527-0995).

Step 2

Choose the calibration range: In the pH Calibration wizard, press or click on the '7 pH and 10 pH' button if you will be using 7 pH and 10 pH calibration solution; press or click on the '4 pH and 7 pH' button if you will be using 4 pH and 7 pH calibration solution.

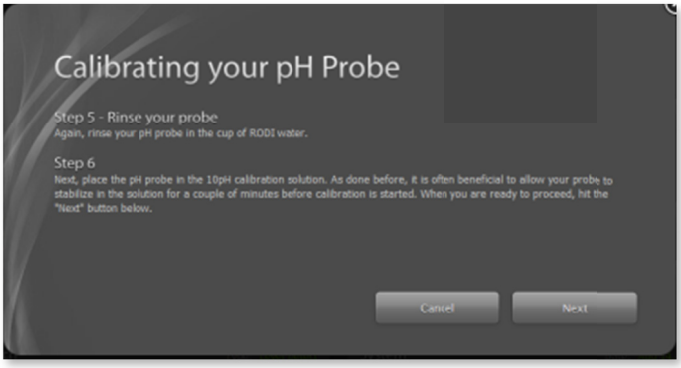
Step 3

Rinse and clean your probe: rinse your pH probe in the RODI water and make sure the tip is clear of foreign objects.

Step 4

7 & 10 pH calibration: Place the pH probe in the 7 pH calibration solution packet. 4 & 7 pH calibration: Place the pH probe in the 4 pH calibration solution packet. Make sure the probe tip is fully immersed in the solution. For best results, Digital Aquatics recommends allowing several minutes for the probe to stabilize in the solution before clicking on or pressing the 'Start' button.

When the pH probe is adequately stabilized, press or click on the 'Start' button. The pH Calibration wizard screen will report 'Stabilizing…' and display a barber pole indicator while the calibration is in progress. The calibration process may take several minutes.



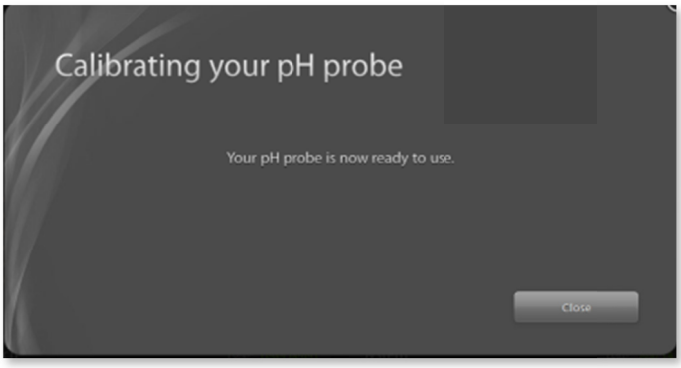
Step 5

When the screen that displays 'Step 5 – Rinse your probe" appears, remove the pH probe from the calibration solution and rinse the probe in RODI water.

Step 6

7 & 10 pH calibration: Place the pH probe in the 10 pH calibration solution packet. 4 & 7 pH calibration: Place the pH probe in the 7 pH calibration solution packet. Allow several minutes for the probe to stabilize, then press or click on the 'Start' button.

The pH Calibration wizard screen will again report 'Stabilizing…' and display the barber pole indicator while the calibration is in progress. The calibration process may take several minutes.



When the pH Calibration wizard displays 'Your pH probe is now ready to use,' remove the pH probe from the calibration solution and rinse the probe in RODI water. Then press or click on the 'Close' button in the Calibration wizard. The pH calibration process is now complete and your pH probe is ready to be installed in your tank.

Canceling pH Calibration

You can cancel the pH calibration process at any time by pressing or clicking on the 'Cancel' button on the pH Calibration wizard dialog. When the 'Cancel' button is pressed the calibration process will be stopped. You can restart the calibration wizard by pressing or clicking on the "calibrate' button on the Quick Start menu.

If pH Calibration Fails

If pH calibration fails, the pH Calibration wizard will display a screen that reports "Calibration Failed." There are several potential causes of pH calibration failure, as described in the table below.

Possible Cause	Recommended Corrective Action
pH probe was not immersed in calibration solution long enough to stabilize before calibration was started	Allow the pH probe to remain immersed in the calibration solution for a longer period of time – five minutes or more - before starting the calibration.
Calibration solution leaked out of solution packet or the probe fell out of calibration solution during calibration process	Ensure that the pH probe is fully immersed in the calibration solution. Digital Aquatics recommends placing the calibration solution packet in a cup or a similar container that will prevent the calibration solution from leaking out of the solution packet. This arrangement should also keep the probe oriented such that the probe tip remains immersed in the calibration solution.
Incorrect calibration solution was used	Remove probe from incorrect solution; rinse probe in RODI water; immerse probe in calibration solution that is the correct value per the instructions in the pH Calibration wizard.
pH probe not correctly connected to Lifeguard	Ensure that the pH probe's BNC connector is correctly turned and latched onto the BNC jack on the Lifeguard unit.

Chapter 6: Setting Up Lifeguard™ for Your Aquarium

You'll want to set up your Lifeguard system to display its readings and notify you of alarm conditions according to your preferences. Lifeguard will also need to know some things about your email system and the network that your Lifeguard system is connected to. This section will guide you through the Settings menus that help you set up Lifeguard for your installation.

Accessing the Settings Dialog

To access the Settings menus, simply click on the Settings icon on the Lifeguard dashboard: 

The Settings Dialog will appear and will initially display the General Settings menu.

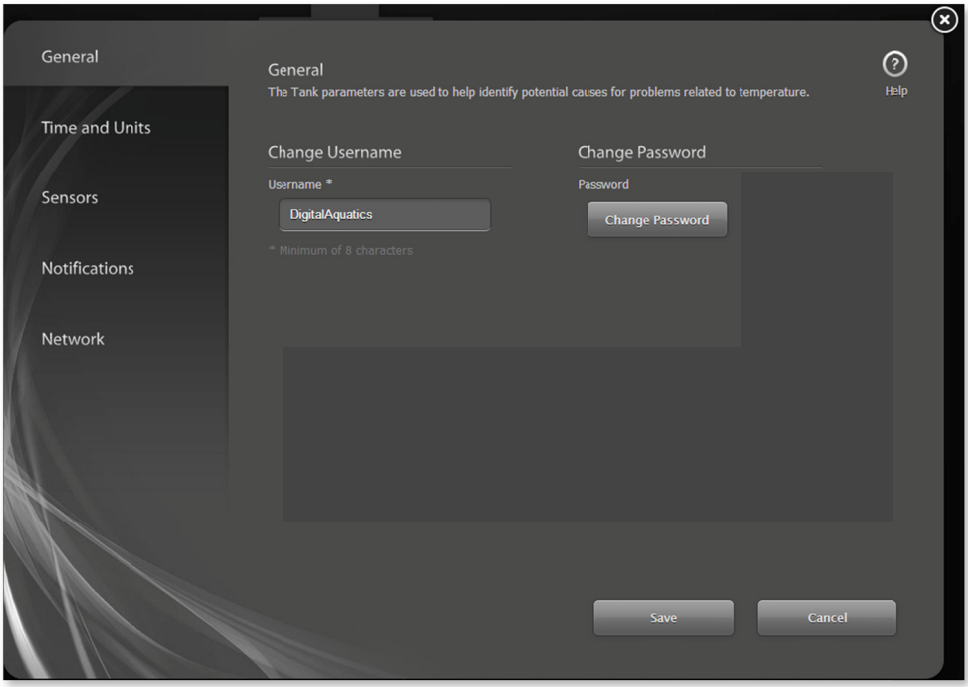
The Settings dialog features five settings menus:

- General – set username and password; tank size and heater wattage
- Time and Units – set time zone; time and date formats; numerical format; temperature and volume units
- Sensors – set high and low alarm thresholds for temperature and pH; target temp & pH; switch alarm state
- Notifications – set alert email options and recipients; outgoing email address; email server info; SSL options
- Network – set hostname; http port; DHCP options

You can save your settings any time by pressing or clicking on the 'Save' button. You can navigate between Settings menus before saving your settings (the data you entered in each Settings menu will remain in place until you save, cancel or close the settings dialog). You can exit the Settings dialog any time by pressing or clicking on the 'Cancel' button or the close button  Unless you previously saved settings you entered, any settings you entered before closing or canceling the Settings dialog will be discarded.

Changing your Username and Password (General Settings Menu)

Use the General Settings menu to change your username or password:

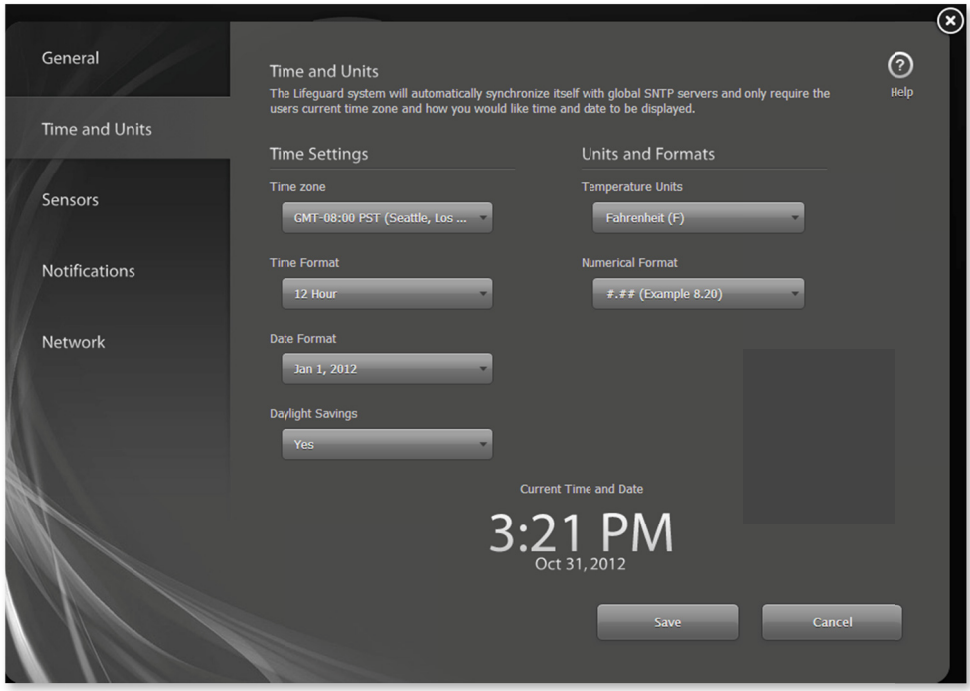


Username	If you want to change your Lifeguard username, enter a new value in this field. Your username must be a minimum of eight and a maximum of 32 alphanumeric or punctuation characters (exceptions: no spaces, single quotes or double quotes). The username is case-sensitive.
Password	If you want to change your Lifeguard password, enter a new value in this field. Passwords must be a minimum of eight and a maximum of 32 alphanumeric or punctuation characters (exceptions: no spaces, single quotes or double quotes). The password is case-sensitive.

Be sure to keep your username and password handy. If you forget your username or password, you can reset Lifeguard to its factory default state. Without the correct username and password, you will not be able to access the Lifeguard webserver and dashboard.

Setting Time and Units (Time and Units Menu)

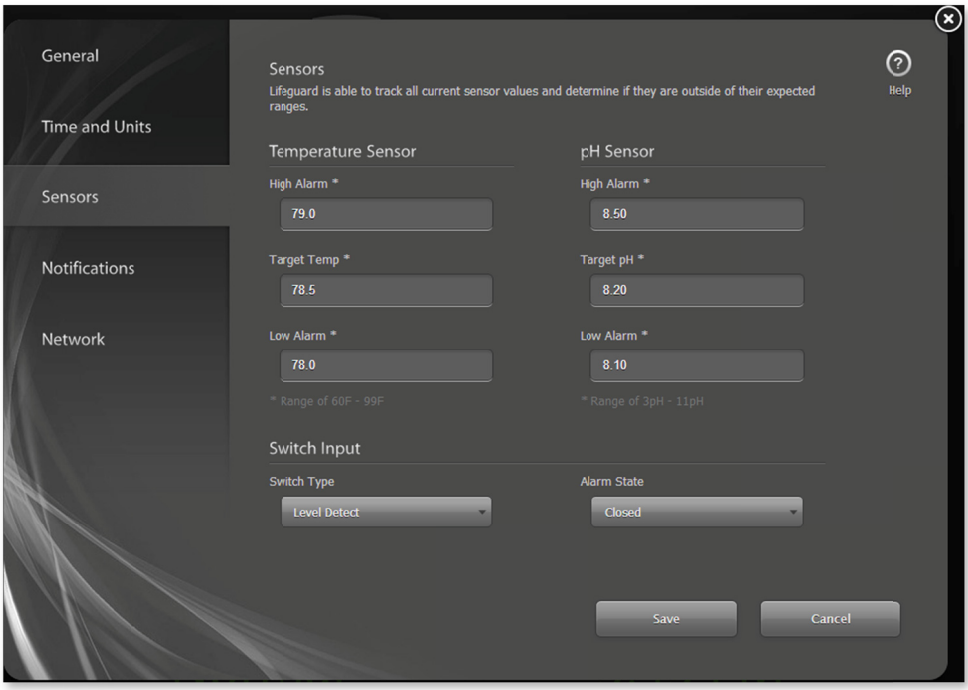
You can set the date and time via the Time and Units menu. You can also use the Time and Units menu to specify the units (e.g. °C or °F) that Lifeguard will use to report measurements. The Time and Units menu also enables you to set the time zone in which your Lifeguard will operate.



Time Zone	Click on this drop-down box to select a time zone for your area. All 24 world-wide time zones are listed in the Time zone drop-down box.
Time Format	Choose between a 12 hour clock and a 24 hour clock. The 12 hour clock displays time with "AM" or "PM", e.g. "11:32 PM." The 24 hour clock displays time in numbers only, e.g. "23:32"
Date Format	Select the date display format from this drop-down box. Available formats include "Jan 1, 2012," "1 Jan 2012" and "2012 Jan 1."
Daylight Savings	Use this drop-down box to specify if Daylight Savings is currently in effect in your area. When "Yes" is selected, Lifeguard will automatically add one hour to the displayed time for the selected time zone.
Temperature Units	Choose whether Lifeguard will display temperatures in Fahrenheit or Celsius units via this drop-down box.
Numerical Format	Choose whether decimal portions of a number are separated a period or a comma, per the custom in your area.

Setting Alarm Thresholds (Sensors Menu)

You can set alarm thresholds via the Sensors menu in the settings dialog:



High Alarm (Temp)

Set point for the high temperature alarm. When the sensor temperature exceeds this value, Lifeguard will illuminate the Alert Status LED, report the current temperature in RED on the Lifeguard dashboard, and if configured to do so, send an email alert.

Target Temp

Target temperature. When absolute value of the sensor temperature moves beyond the halfway point between this value and the high or low temperature set points, the current temperature will be displayed in YELLOW on the Lifeguard dashboard, and if configured to send alert emails, Lifeguard will send a caution email.

Low Alarm (Temp)

Set point for the low temperature alarm. When the sensor temperature falls below this value, Lifeguard will illuminate the Alert Status LED, report the current temperature in RED on the Lifeguard dashboard, and if configured to do so, send an email alert.

High Alarm (pH)

Set point for the high pH alarm. When the pH value sensed by Lifeguard's pH probe exceeds this value, Lifeguard will illuminate the Alert Status LED, report the current pH value in RED on the Lifeguard dashboard, and if configured to do so, send an email alert.

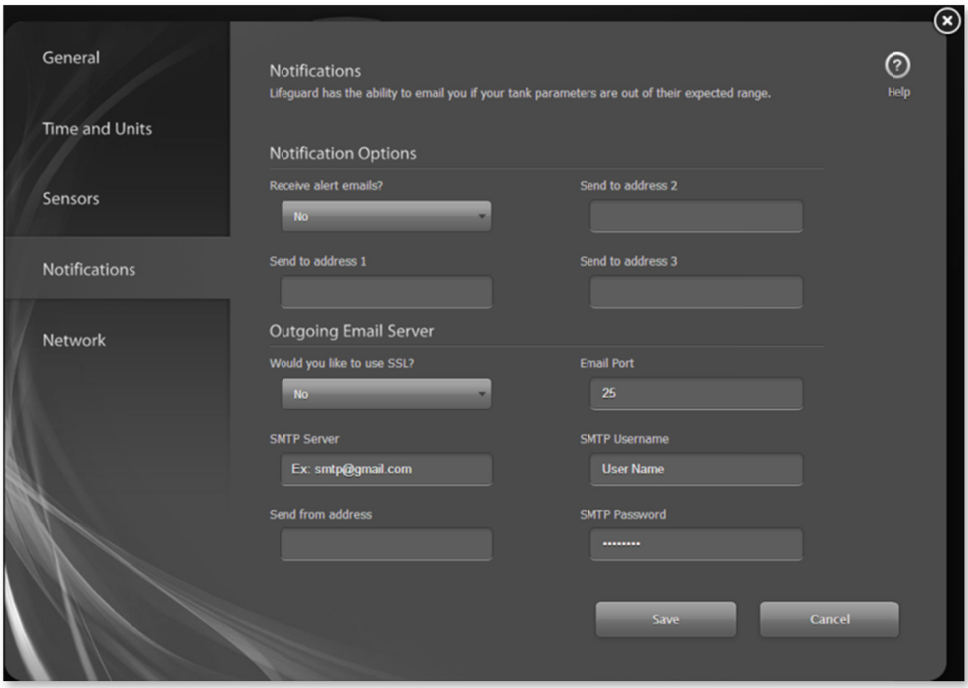
Target pH

Target pH. When the value of the pH reading moves beyond the halfway point between this value and the high or low pH set points, the current pH value will be displayed in YELLOW on the Lifeguard dashboard, and if configured to send

	alert emails, Lifeguard will send a caution email.
Low Alarm (pH)	Set point for the low pH alarm. When the pH value sensed by Lifeguard's pH probe falls below this value, Lifeguard will illuminate the Alert Status LED, report the current pH value in RED on the Lifeguard dashboard, and if configured to do so, send an email alert.
Switch Type	Select the type of switch device connected to your Advanced Switch Port: "Level Detect," "Leak Detect" or "Misc Switch." The switch type does not affect how or when Lifeguard will report switch alarms; the switch type is identified in alert emails.
Alarm State	Choose which switch position will trigger an alarm: Open or Closed. If "Closed" is selected and the switch contacts become closed, Lifeguard will illuminate the alert status LED and display TRIPPED (in RED) in the switch section of the Lifeguard dashboard. If configured to do so, Lifeguard will also send an email alert. An alarm state is also generated if "Open" is selected and the switch contacts become open.

Setting up Email Alerts (Notifications Menu)

You can configure Lifeguard to send email alerts to up to three email addresses when alarm or caution conditions occur. You can configure email alerts via the Notifications menu:



Receive alert emails?	Select "Yes" if you would like to setup and receive alert emails from Lifeguard. Select "No" if you prefer not to receive alarm emails. Note that even if "No" is selected, Lifeguard will still display alarm conditions on the Lifeguard dashboard and illuminate the Alarm Status LED under those conditions.
Send to address 1, 2, 3	You can specify up to three recipient email addresses to receive email alerts from Lifeguard. Simply enter the recipient email address in one of the "Send to address" text boxes. Example: lifeguardalerts@gmx.com
Would you like to use SSL?*	Select "Yes" if you want Lifeguard use SSL (secure socket layer) encryption to send email messages. An increasing number of email providers require SSL encryption for email communication. In a few cases SSL is not supported. Digital Aquatics recommends setting this value to "Yes" as a default. You may want to contact your email provider to determine if SSL is required for your email account or the email account you will want Lifeguard to use for sending alert emails.
SMTP Server*	The SMTP (simple mail transfer protocol) Server is the web address of the email server that Lifeguard will use to send alert emails. Most SMTP server names are in the form of mail.emailservicename.com. Example: mail.gmx.com
Send from address	Lifeguard requires a "send from" email address to generate alert emails. You can specify your own email address as the "send from" address or you can set up an email address specifically for Lifeguard through your favorite email provider. Example: lifeguardalerts@gmx.com
Email Port*	Email servers receive requests to send an email through an email port. Your email client (e.g. Outlook) sends email through this port to your email server. Lifeguard will need to know a valid email port for the "send from" email address that you want Lifeguard to use. Your email provider can provide valid email port numbers for its email servers. Common email port numbers are 465 and 587. Example: 587
SMTP Username	Lifeguard will need to log in to the email server that it will use to send alert emails. If you want Lifeguard to send emails from your email address, Lifeguard will need to know the username you specify when you log in to your email service. Example: lifeguardalerts@gmx.com
SMTP Password	Enter the password Lifeguard will need to login to the email server that Lifeguard will use to send email alerts.

***** You may need to contact your email provider to obtain SMTP server information. SMTP server information for several popular internet email providers is listed in the table below:

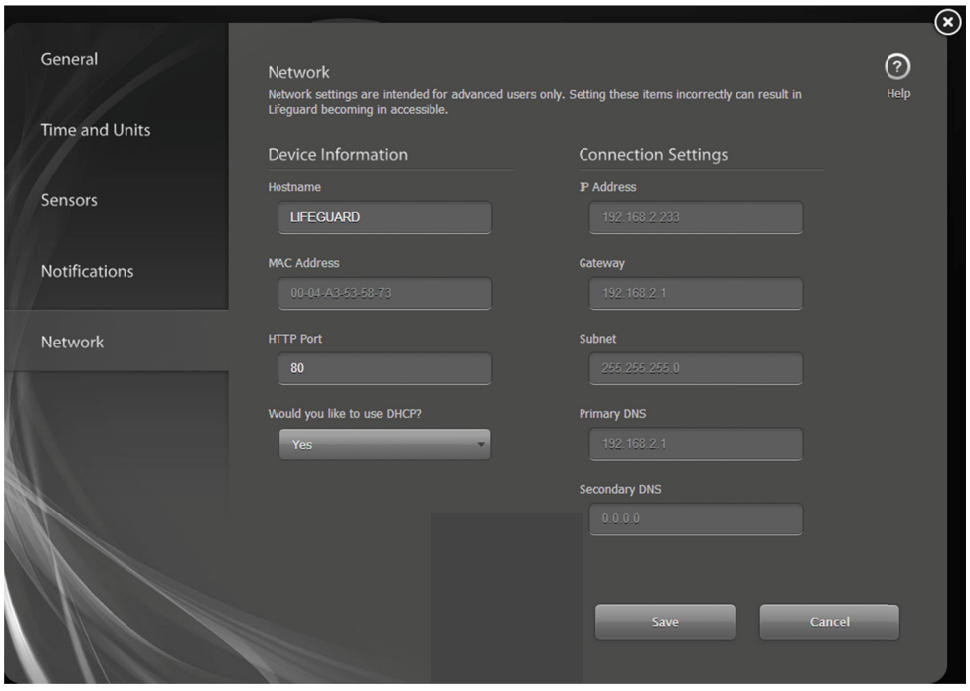
Email Provider	SMTP Server Name	SSL Required?	Available Email Port(s)
Gmail	smtp.gmail.com	Yes	465
Yahoo	smtp.mail.yahoo.com	Yes	465
Hotmail	smtp.hotmail.com	No	587
Outlook.com	smtp.live.com	Yes	25, 465, 587
Comcast.net	smtp.comcast.net	No	587

SMTP server parameters for several popular email providers

Changing Network Settings (Network Menu)

You can use the Network settings menu to enter a hostname for your Lifeguard system. You can then use the hostname to access the Lifeguard web server without having to remember your Lifeguard's IP address. You can also use the Network settings menu to change a variety of other network parameters. DigitalAquatics recommends that you avoid changing Lifeguard's network parameters unless you are very familiar with Ethernet networking and network configuration.

Digital Aquatics does not recommend manually configuring Lifeguard's Network settings (other than the hostname) unless you are familiar with networking and network configuration. If the Network settings are not configured properly, you may lose access the Lifeguard webserver and Dashboard. Digital Aquatics also recommends leaving DHCP (dynamic host configuration protocol) enabled.

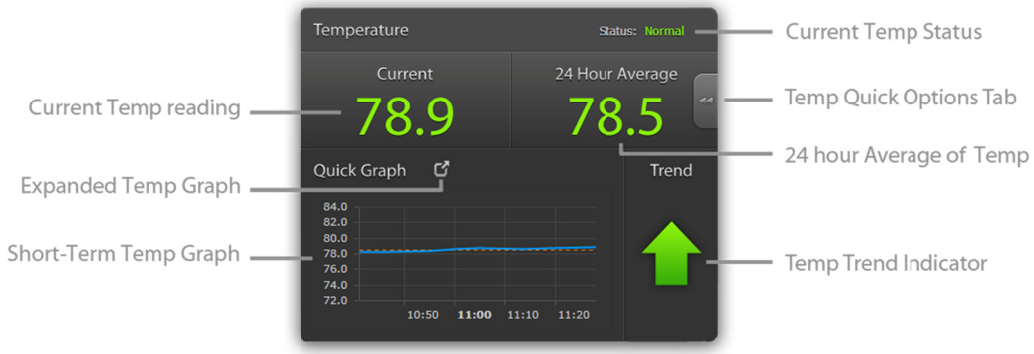


Hostname	Specify the hostname for your Lifeguard. You can use the hostname can to access the Lifeguard web server without having to remember your Lifeguard's IP address. The hostname must be between 1 and 16 alphanumeric (letters and numbers) characters. The hostname can also include one or more instances of the dash "-" character. The hostname is case sensitive. Example: If you enter a hostname of "lifeguard" (without the quotes), you would type http://lifeguard into your browser's address window to access your Lifeguard's web server.
MAC Address	This field displays the MAC assigned to your Lifeguard. The Lifeguard MAC address cannot be changed.
HTTP Port	Specify which HTTP Port you want to use. Some ISPs block port 80. You may want to use port 8181 or another available port.
Would you like to use DHCP?	(Recommended) Enabling DHCP will allow your router to assign Lifeguard its IP address and network information. You can also manually specify your IP address and network information.
IP Address	Manually specify the IP Address, if DHCP is disabled.
Gateway	Manually specify the gateway, if DHCP is disabled.
Subnet	Manually specify the subnet, if DHCP is disabled.
Primary DNS	Manually specify the primary DNS information, if DHCP is disabled.
Secondary DNS	Manually specify the secondary DNS information, if DHCP is disabled.

Chapter 7: Using Lifeguard™

Monitoring Temperature on the Lifeguard™ Dashboard

The Lifeguard Dashboard displays the current and 24-hour average temperature values as well as temperature graphing and trend information.



Current Temp Reading

This is the current temperature reading in °C or °F. The current temperature reading is updated every two seconds. The current temperature is saved into Lifeguard's measurement data log every 5 minutes.

Extended Temp Graph (Quick Graph)

This will open an extended graph of up to two weeks of temperature readings (up to 4,032 readings at 5 minute intervals).

Short-Term Temp Graph

The Short-Term Temp Graph shows up to 24 hours of temperature readings (up to 288 readings at 5 minute intervals). Graphing data is not displayed if the temp probe is un-calibrated or if the Lifeguard unit has been powered on for less than 5 minutes.

Current Temp Status

Indicates 'Normal' if the temperature reading is within 50% of the span between the target temperature and the user-defined upper and lower temp set points. Indicates 'Caution' if the temperature reading exceeds 50% of the span between the target temperature and the user-defined upper and lower temp set points. Indicates 'Alarm' if the temperature exceeds either the upper or lower user-defined temperature set points. Indicates 'Uncalibrated' if the temperature probe has not yet been calibrated.

Temp Quick Options Tab

Clicking this tab will open the Quick Options menu for temperature. Use the Quick Options menu to calibrate the temp probe or to download or clear logged temperature data.

24 hour Average of Temp

This displays the average temperature reading for the past 24 hours.

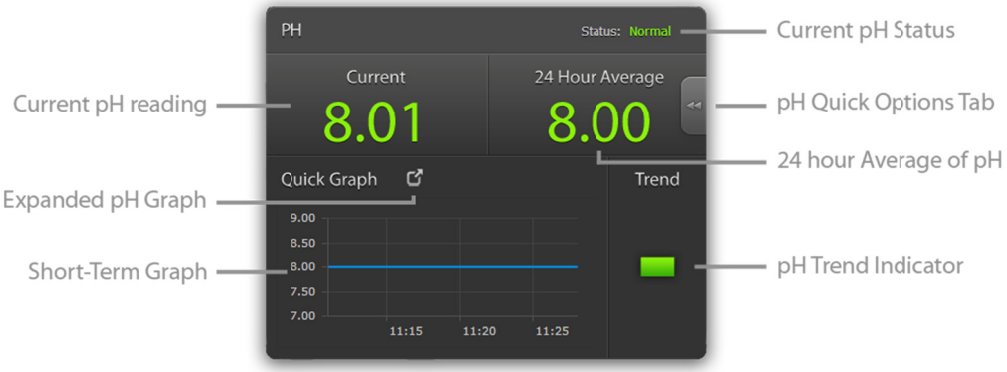
Temp Trend Indicator

The trend indicator will show how the temperature reading has been trending for the last 30 minutes.

Decreasing Increasing Stable

Monitoring pH information on the Lifeguard™ Dashboard

The Lifeguard Dashboard displays the current and 24-hour average pH values as well as pH graphing and trend information.



Current pH Reading

This is the current pH reading. The current pH reading is updated every two seconds. The current pH value is saved into Lifeguard's measurement data log every 5 minutes.

Extended pH Graph (Quick Graph)

This will open an extended graph of up to two weeks of pH readings (up to 4,032 readings at 5 minute intervals).

Short-Term pH Graph

The Short-Term pH Graph shows up to 24 hours of pH readings (up to 288 readings at 5 minute intervals). Graphing data is not displayed if the pH probe is un-calibrated or if the Lifeguard unit has been powered on for less than 5 minutes.

Current pH Status

Indicates 'Normal' if the pH reading is within 50% of the span between the target pH level and the user-defined upper and lower temp set points. Indicates 'Caution' if the pH reading exceeds 50% of the span between the target pH value and the user-defined upper and lower pH set points. Indicates 'Alarm' if the pH exceeds either the upper or lower user-defined pH set points. Indicates 'Uncalibrated' if the pH probe has not yet been calibrated.

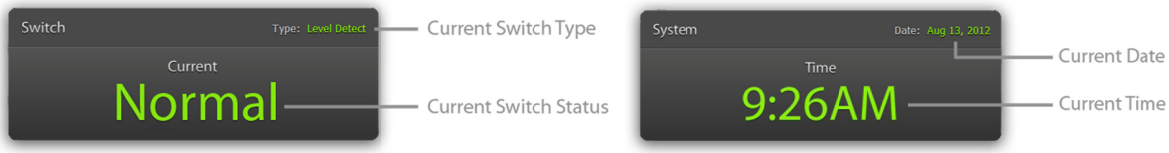
pH Quick

Clicking this tab will open the Quick Options menu for pH. Use the Quick Options

Options Tab	menu to calibrate the temp probe or to download or clear logged temperature data.
24 hour Average of pH	This displays the average temperature reading for the past 24 hours.
pH Trend Indicator	The trend indicator will show how the pH reading has been trending for the last 30 minutes.

Monitoring the Switch Input and the Date and Time

The Lifeguard dashboard displays the status of the switch input as well as the current date and time.

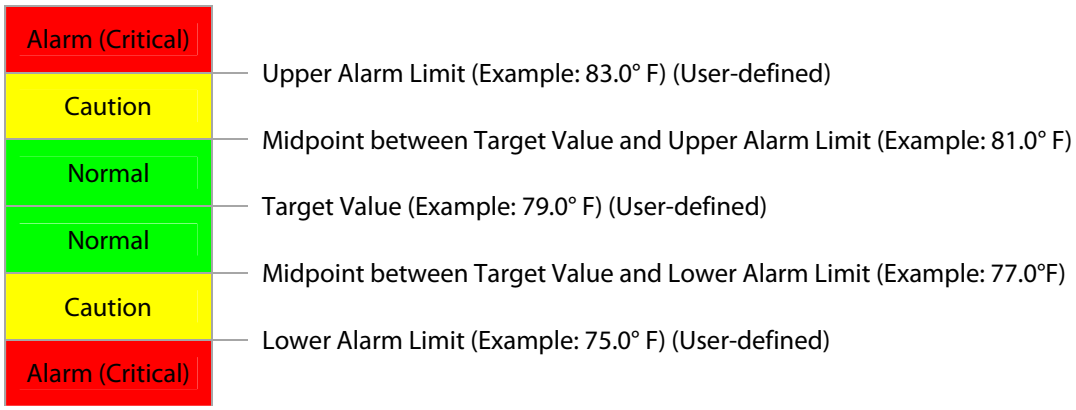


Current Switch Type	This displays which type of switch has been defined by the user (see Sensor settings). The switch type does not affect the switch status (see below).
Current Switch Status	Displays 'Normal' if the Advanced Switch Cable is plugged in to Lifeguard and if the state of the switch input is not in the alarm state as defined in the Sensors settings. Displays 'Tripped' if the Advanced Switch Cable is plugged in to Lifeguard and the switch input is in the alarm state. Displays 'None' if the Advanced Switch Cable is not properly connected to Lifeguard.
Current Date	Displays the current Date
Current Time	Displays the current time

Alarm (Critical) and Caution Conditions

When temperature, pH or switch input levels move outside user-defined limits, an Alarm or Caution condition is triggered. For pH and temperature, the target measurement value and the upper/lower alarm limits you set in the Sensors menu determine when caution and alarm conditions occur.

See the diagram below:



Caution conditions are triggered when temperature or pH values cross the midpoint between the target value and the high or low alarm value.

When the switch input moves to a state (open or closed) that you have set as the Alarm State (see Sensor settings menu), an alarm condition is triggered.

How Lifeguard responds to sensor conditions:

	Sensor Conditions			
Notification Method	Uncalibrated (ph and Temp)	Normal	Caution (ph and Temp)	Alarm (Critical)
Alert Screen on LCD	Not displayed	Not displayed	Not displayed	Displayed
Alert Status LED (red)	Off	Off	Off	On
Lifeguard Dashboard	pH and temperature values are displayed in **BLUE**	pH and temperature values are displayed in **GREEN**	pH and temperature values are displayed in **YELLOW**	pH and temperature values are displayed in **RED**
Email alert (if email alerts are enabled in the Notifications settings menu)	None	None	Caution email alerts are sent when pH or temperature measurement value crosses the mid-point between the target value and the high or low alarm limit	Alarm email alert is sent when pH or temperature measurement value crosses high or low alarm limit, or when switch input moves to user-defined "tripped" state
Data logging	Data logging does not occur when corresponding pH or temperature probe has not yet been calibrated	Data logging occurs	Data logging occurs	Data logging occurs

Notification methods for alarm vs. normal conditions

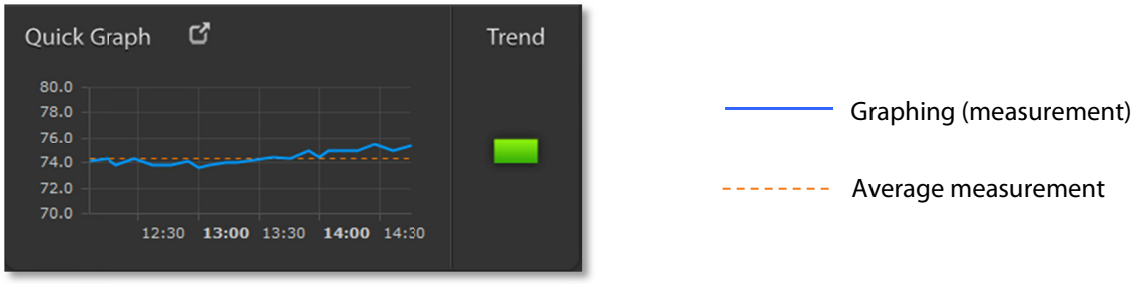
Using the Advanced Graphing Features

Lifeguard's advanced graphing features can help you spot pH and temperature trends in your aquarium system. Spotting trends can help you avoid problems before they do harm to your aquarium.

Graphs for temperature and pH are only displayed if the corresponding probe has been calibrated. When Lifeguard has been reset or started for the first time, the graphs may not appear for up to five minutes.

The Short-term Graph

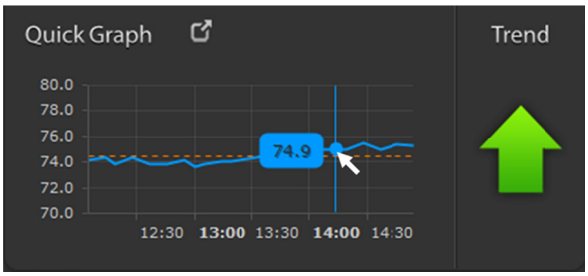
Lifeguard's Dashboard features a short-term graph for pH and temperature readings.



Short-term graph (temperature)

The short-term graph displays up to 288 (24 hours) of the most recent readings, taken every 5 minutes. The readings form a blue line across the short-term graph. The short-term graph also displays the average temperature or pH as an orange dashed line.

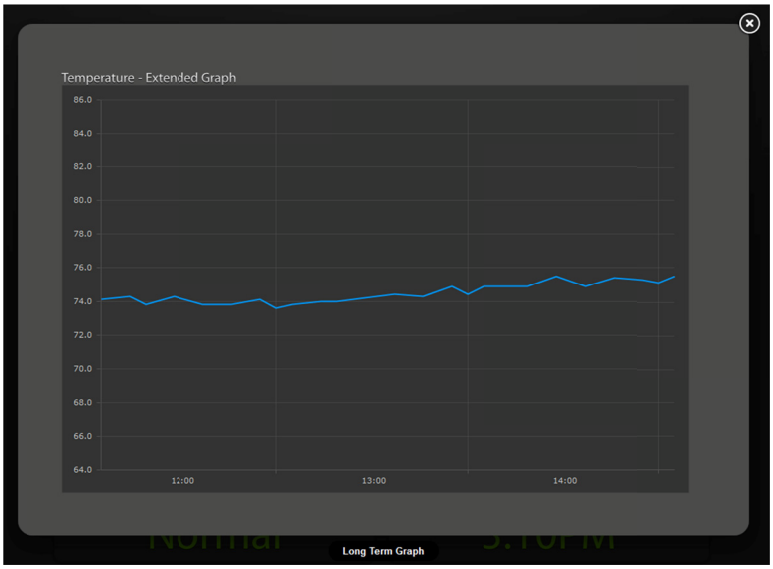
You can see individual measurement values on the short-term graph by placing your mouse pointer over the blue graphing line. When the mouse pointer is on the blue line, a vertical blue line and an enumerated measurement value appear:



Moving your mouse across the blue graphing line will reveal the measurement values of each measurement point on the graph.

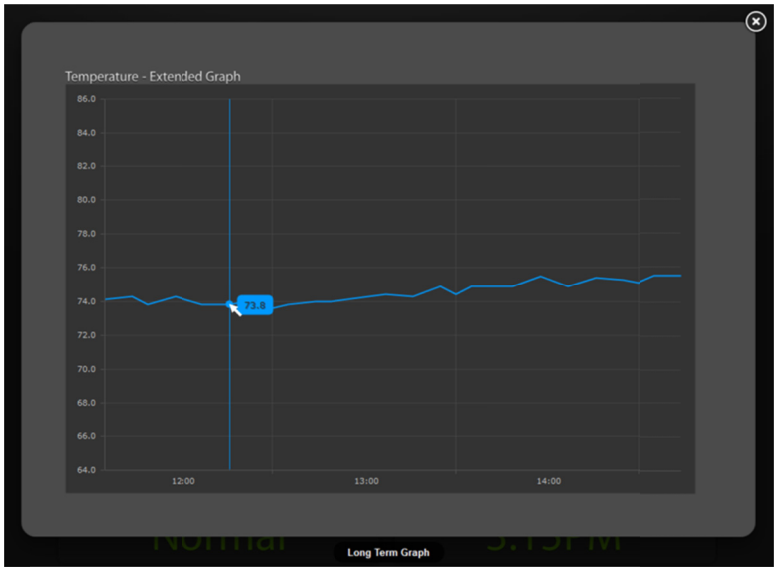
The Extended Graph

Lifeguard's extended graph can show up to 4,032 measurements – two weeks of continuous measurements sampled every 5 minutes. To display the extended graph, press or click on the Quick Graph button above the short-term graph. The extended graph will appear:



Extended graph (Temperature)

As with the short-term graph, you can see individual measurement values on the extended graph by placing your mouse pointer over the blue graphing line. When the mouse pointer is on the blue line, a vertical blue line and an enumerated measurement value appears:

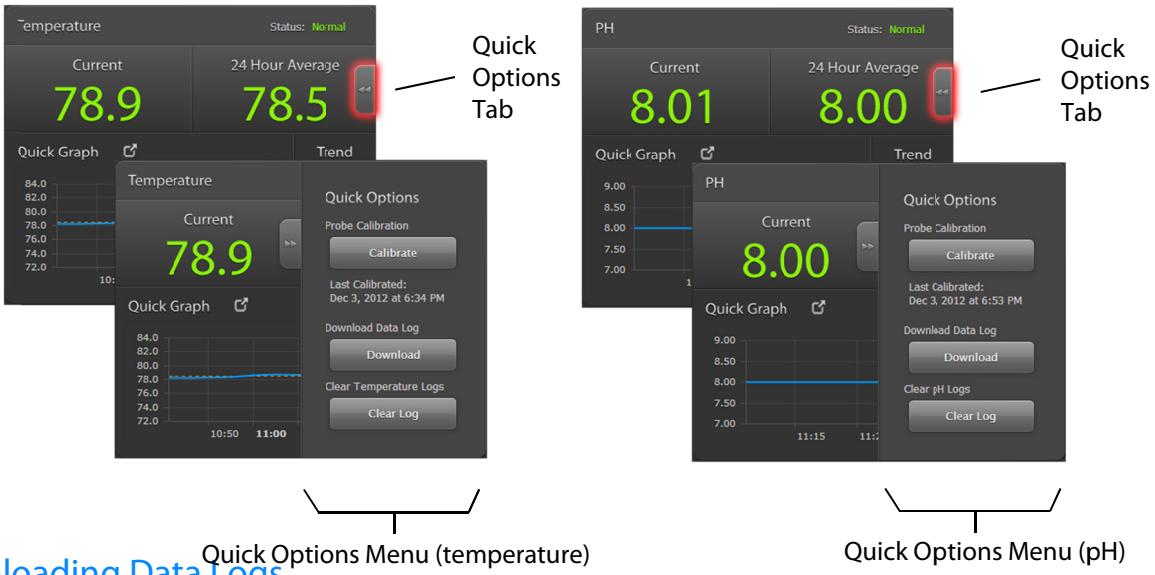


To close the extended graph, press or click on the close button at the upper right corner of the extended graph window.

Accessing Data Logs

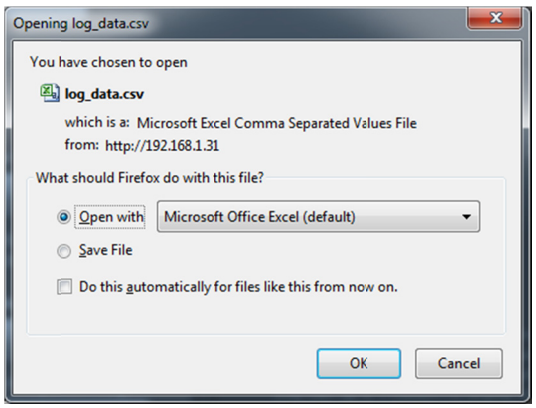
Lifeguard stores up to 4,032 measurements each of temperature and pH data. Lifeguard allows you to download its measurement data logs for pH and temperature to a .CVS or spreadsheet file on your computer. You can access the Data Log Download feature from the Quick Options menu for both temperature and pH.

To open the Quick Access menu, simply click on the tabs, located next to the 24 Hour Average areas.

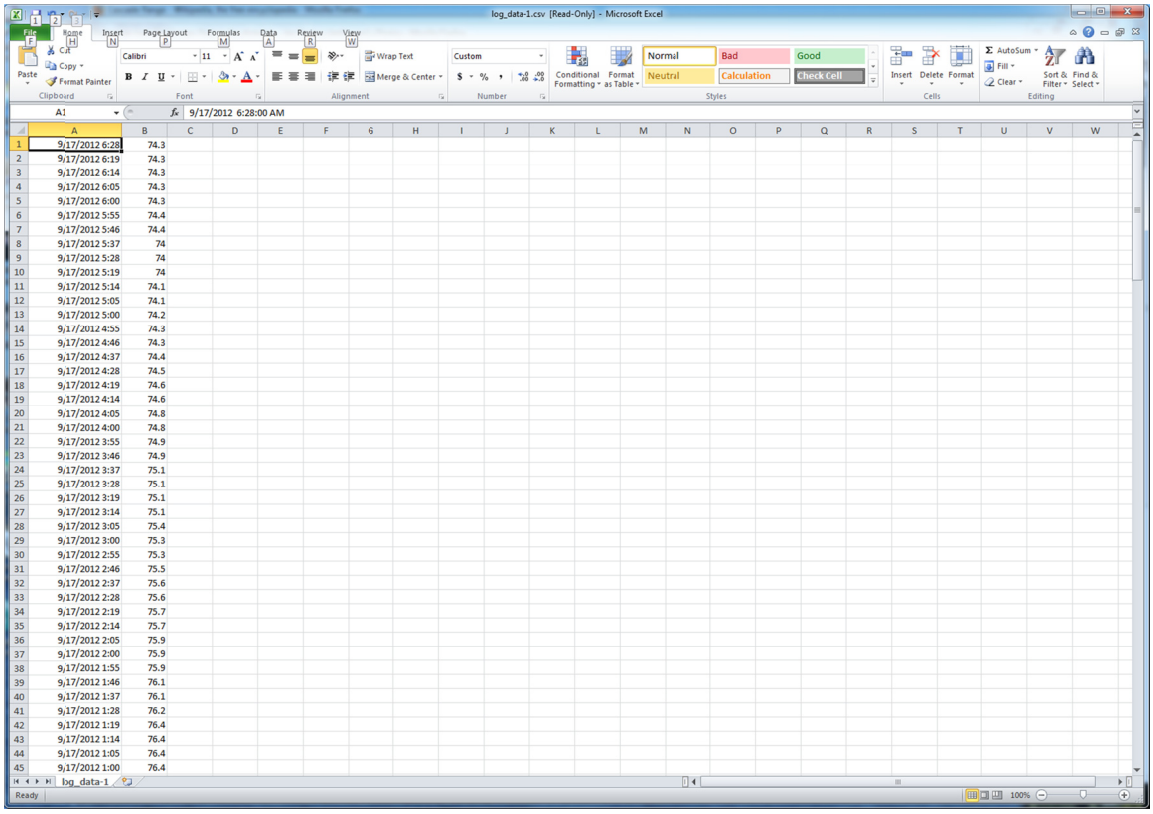


Downloading Data Logs

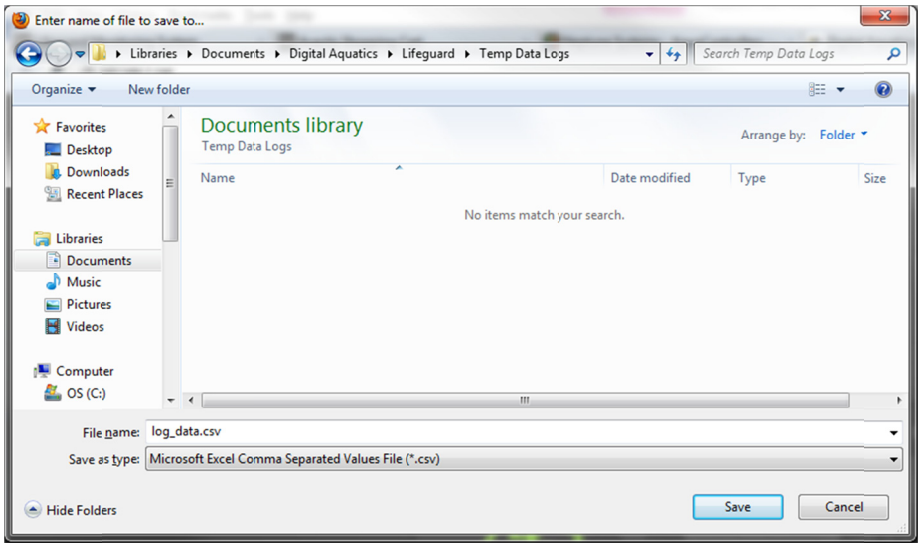
To download a data log, press or click on the "Download" button in the appropriate Quick Options menu. In Windows 7 with the Lifeguard web server running in a Firefox browser, this dialog will appear:



Select "Open with" if you want the data log to be saved in an application file such as a Microsoft Excel spreadsheet. Selecting "Open with" Microsoft Office Excel results in the data log being placed in a new Microsoft Excel spreadsheet:



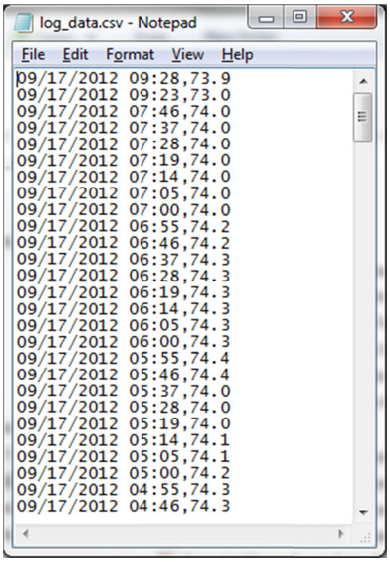
If you select 'Save file' you will see a "save in" dialog as shown below (Windows 7/Firefox):



Name the file according to your preferences, locate the folder you want to save the file in and press or click on 'Save' to save the file. The new file will be stored on your computer or device.

Lifeguard saves data logs in .CSV format, which is a comma-delineated text file format. Files in the .CSV format can be read by any standard text editor and by most spreadsheet applications.

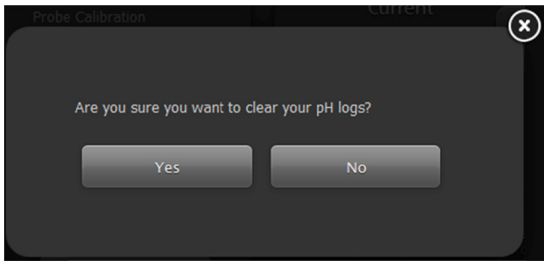
In a text editor (Windows Notepad in this example), a Lifeguard temperature log file in .CSV format appears as follows:



Note that the most recent data point is listed at the top of the .CSV log file.

Clearing Data Logs

Press or click on the 'Clear Log' button on the Quick Options menu to erase log data for either temperature or pH.



Clear Logs dialog

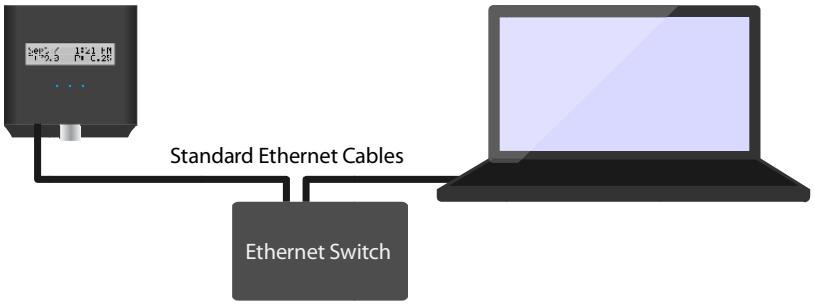
Press or click on 'Yes' to clear the data log. Press or click on 'No' or close  to cancel the clear log operation. When the data log has been cleared, Lifeguard will start a new log and the next data point to be logged will become the first data point in the new log.

Accessing Lifeguard™ from the Internet

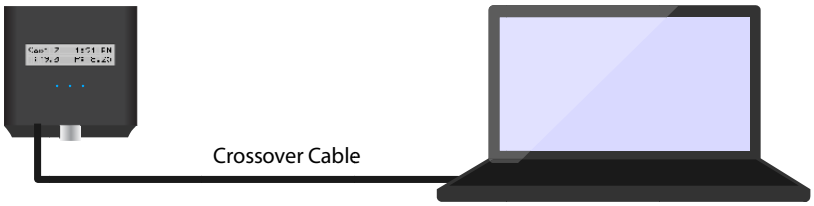
You can access the Lifeguard web server, including the Lifeguard Dashboard and measurement logs from the Internet, outside of your home and office network. Accessing Lifeguard from the Internet requires that you set up your router/modem to enable *port forwarding*, also known as *port mapping*. See Appendix B for instructions on how to enable port forwarding.

Using Lifeguard™ without an Internet Connection

You can use Lifeguard to monitor your aquarium without an Internet connection, though this method of operation is not recommended. You can set up Lifeguard's web server and communicate with Lifeguard via a browser on a PC, laptop, or other computing device that is connected to the Lifeguard unit via an Ethernet switch or an Ethernet crossover cable.



Connection diagram via Ethernet switch



Connection diagram via Ethernet crossover cable

Without an Internet connection, Lifeguard cannot send email alerts or support remote monitoring via the Internet. Timekeeping may also be less accurate without an Internet connection.

Using Lifeguard™ as a Standalone Device

Once setup has been completed, Lifeguard can be operated in "standalone" mode (i.e. with no computer or network connection); however this method of operation is not recommended. In "standalone" mode, Lifeguard cannot send alert emails or support remote monitoring. Lifeguard's webserver and dashboard are not visible to the user, and timekeeping may be inaccurate.

Updating Lifeguard™ Firmware

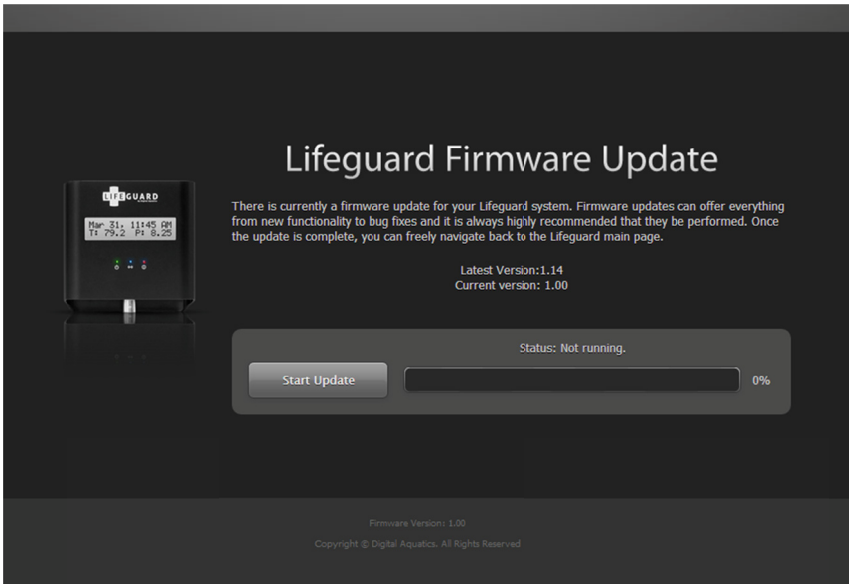
When a Lifeguard firmware update is available, the update icon on the Lifeguard Dashboard illuminates.

Un-illuminated Updates Icon

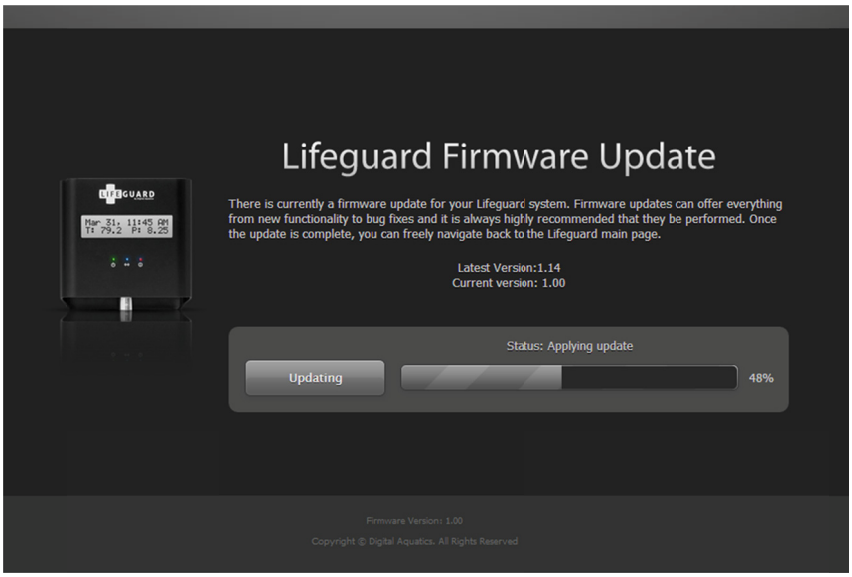
Illuminated Updates Icon

Lifeguard firmware is updated via the Internet and the Lifeguard web server. Follow these steps to update the firmware.

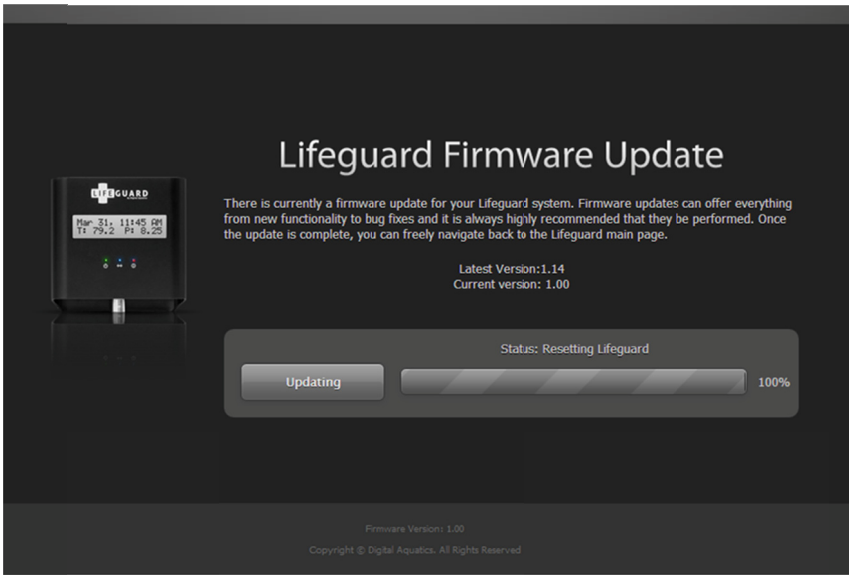
Click on the Update Icon to open the Firmware Update page:



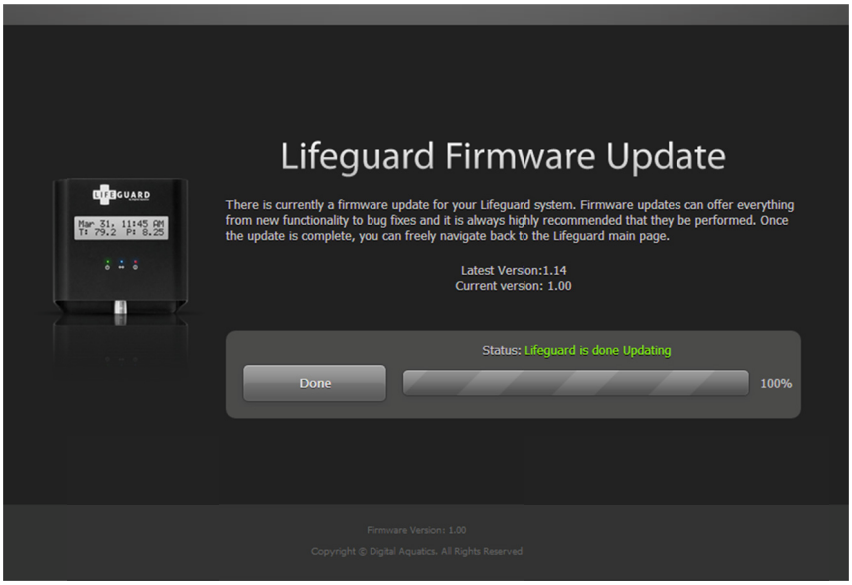
Press or click on the 'Start Update' button and the update process will begin:



When the update download is complete, Lifeguard the firmware update application will reset Lifeguard:



When the restart is complete, the update screen will show "Lifeguard is done Updating:"



Lifeguard is ready to use. To access the Lifeguard webserver and Dashboard, you will need to redirect your browser to Lifeguard's IP address or hostname.

Updating Firmware with a USB Drive

To update Lifeguard firmware with a USB drive, you'll need a USB drive with the correct firmware file located in the root directory of the drive.

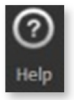
1. Unplug the power adapter from Lifeguard
2. Insert a USB drive, loaded with the firmware data, into the USB port on Lifeguard
3. Press and hold the recessed Factory Reset button with a paperclip or other small tool
4. Reconnect the power adapter to Lifeguard while pressing and holding the Factory Reset button

   The firmware update process will begin. Lifeguard will display the update's progress.
5. Once the update process has started, you can release the Factory Reset button
6. The update will complete and Lifeguard will restart.
7. Remove the USB drive
8. Lifeguard is ready to use

Do not connect Lifeguard to power through the USB port (Lifeguard may become damaged).

Getting Help

From any page in the Lifeguard web server, clicking the Help icon will open this document.



Help icon

You can also access this document from any Internet browser at:
http://www.digitalaquatics.com/lifeguard/userguide

Chapter 8: Specifications

Size and Weight

- Height: 3.55 in. (89 mm)
- Width: 3.60 in. (90 mm)
- Depth: 1.00 in. (25 mm)
- Weight: 6.1 ounces (173 g)

Display

- 16x2 Alphanumeric screen with white backlight and black characters
- High-contrast for improved readability

Data Calculations and Graphing

- Two week data logs for temperature
- Two week data logs for pH
- 5 minute logging interval
- Calculated min, max, average and current trend

Inputs

- Temperature port:
  - Precision: 0.1 °F
  - Accuracy* +/- 1.0 °F
  - Range: 60 °F to 100°F
- pH port:
  - Precision: 0.01 pH
  - Accuracy* +/- 0.1 pH
  - Range: 3.00 pH to 11.00 pH
- Advanced switch port
- USB
- Ethernet
- Power adapter

Networking

- Built-in 10/100 Base-T Ethernet
- Built-in dedicated web server
- SSL email support for secure alert transmission

Performance

- 80 MHz, 32 bit, 1.56 DMIPS/MHz embedded processor
- 4 MB, 86 MHz flash memory

Power

- 6 VDC power adapter
- Internal battery for clock retention
- Less than 2.4 W of power consumption

Website Technology

- Utilizes HTML5 and jQuery for a superior intuitive interface
- SSL support
- Smartphone compatible graphs
- SNTP support for Internet time synchronization

Chapter 9: Troubleshooting and Support

Troubleshooting

Please see Appendix A for a guide to troubleshooting your Lifeguard system.

Digital Aquatics Support

If you need assistance or have technical questions, the Digital Aquatics support team is happy to help. The Digital Aquatics Support Team can be reached in three ways: phone, e-mail and through our forum:

Hours: 8:30AM – 4:30PM (PST) Monday-Friday
E-mail: support@digitalaquatics.com
Phone: 425-527-0995
Online Forums: http://www.forum.digitalaquatics.com/

If you are in need of assistance outside of normal business hours, we recommend visiting our online forum. With over 10,000 members, there is lively conversation and community. You can post questions, comments, or even pictures of your tank on the Digital Aquatics forum. The resident rock-stars on our forum are the members of Team DA. These are members who have demonstrated that they are extremely knowledgeable; Team DA members are generally very helpful in resolving issues.

Thank you again for choosing Digital Aquatics!

Appendix A: Troubleshooting

Frequently Asked Questions

Q. My web browser displays an error about digital signing, what do I do?

A. Digital Aquatics makes the HTTPS certificate, because of the way some browsers work, this may generate an error. It is safe to continue on to access Lifeguard's web server.

Q. What do I do if Lifeguard gets wet?

A. The first thing that you should do is turn the power off to Lifeguard. Make sure that any electronic device that gets wet is dry and any connections are clean before connecting it back into the system. Note that damage caused as a result of water exposure is not covered under the warranty. If the system is non-functional, send an e-mail to support@digitalaquatics.com for information on our non-warranty replacement program.

Q. I am receiving a "Test Failed: Error 32769" error when testing my Email settings. What does this mean?

A. The error message "32769" is shown when the Lifeguard cannot connect to the configured mail server using the set Email port. Please verify with your email service provider that you have entered the correct port.

Q. I am receiving a "Test Failed: Error 32768" error when testing my Email settings. What does this mean?

A. The error message "32768" is shown when Lifeguard cannot connect to the configured mail server using the SMTP Server address. Please verify with your email service provider that you have entered the correct SMTP server address.

Q. I am receiving a "Test Failed: Error ###" error when testing my Email settings. What does this mean?

A. A three digit error code, represented about by ### above, is generated by your email service provider. This indicates that Lifeguard was successfully able to communicate with your SMTP server but was unable to send the test email. There are a number of items that may cause these types of failures and consequently there are a large number of error codes to identify each type. Below is a list of the most common error codes that are received by your SMTP server. If the code you are receiving is not listed, please do a web search in the format "SMTP error ###" with the code you are receiving for more information.

- 535 - Incorrect password or account name.
  Please verify that the correct user name and password have been entered.

- 554 - Transaction failed.
  This error code is a fairly generic error that occurs due to multiple possible issues. Most commonly this error occurs when your SMTP server requires authentication and the feature has not been checked.

Q. I'd like to be able to connect my Lifeguard to my network wirelessly. How can I do this?

A. The Lifeguard does not have any inherent wireless capability, but can be made wireless by using a wireless gaming adapter or a wireless bridge.

Q. I'd like to be able to view my Lifeguard system outside of my home network, how can I do this?

A. We have created a guide for port forwarding and DDNS that can be found in Appendix B.

Appendix B: Accessing Lifeguard™ from the Internet

Getting Started

This guide is intended to help you access the monitoring functions of your Lifeguard system from the Internet by following these basic steps:

1	Connect Lifeguard to your network
2	Set up your network equipment to allow Internet access to Lifeguard (enable port forwarding)
3	Set up a domain name for your Lifeguard system (optional)
4	Access Lifeguard from the Internet via a web browser

The following sections provide some helpful background information and explain how to complete each of these steps.

Glossary of Terms

Here is a list of terms and their meanings that may appear in this guide or in in the user documentation for your router and modem:

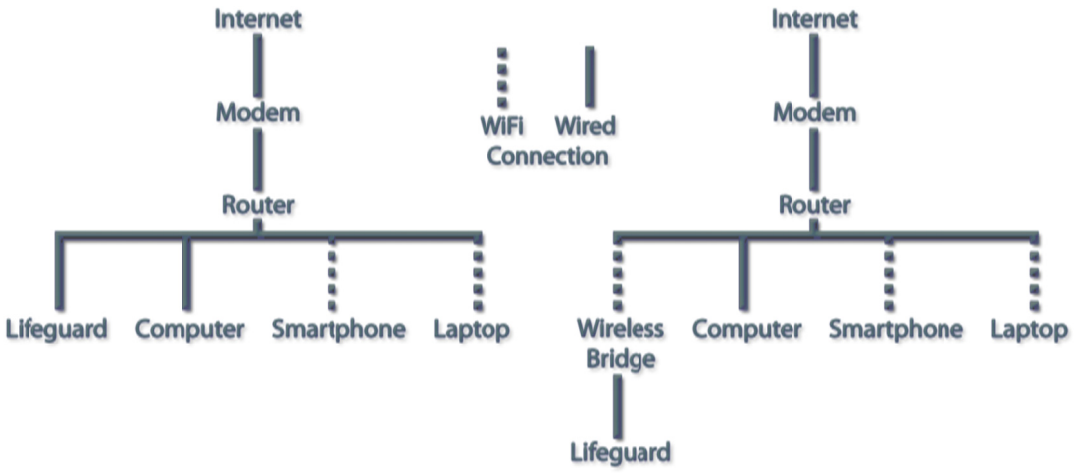
Router	This device manages network data between two networks. In home networks, the router typically routes traffic between the internet (from your ISP) and your home network. Part of the router's job is to keep unauthorized users from accessing your network devices from outside of your network.
ISP	ISP Stands for Internet Service Provider. This is the company which provides your internet access.
Modem	The Modem is the device which will access and login to your ISP's network.
Ethernet /CAT-5	CAT-5 or Ethernet is a type of cable used for network connections.
Network or LAN	LAN stands for Local Area Network. A network is a group of devices which are connected and can communicate. LAN will typically refer to network within your home.
IP Address	This is a numerical address assigned to network devices, which allows the different devices to identify themselves and each other. Example: 192.168.2.4 There are two kinds of IP addresses, Static and Dynamic. Static IP addresses will not change, unless they are manually re-assigned. Dynamic IP addresses are automatically assigned and can change any time the device is restarted.

Hostname	The Hostname is a plain text name used to identify network devices to make it easier for people to remember and access network devices. Your Lifeguard's default hostname is 'LIFEGUARD', it will also have an IP address.
DHCP	DHCP stands for Dynamic Host Configuration Protocol. This is the service that automatically assigns and manages IP addresses on your network. This is typically done by the router.
DNS	DNS stands for Domain Name Service. This is the service which matches domain names with the appropriate IP address. Domains typically have a static IP address.
DDNS	DDNS stands for Dynamic Domain Name Service. This service allows you to match a domain name with dynamic IP addresses. There are several websites which can perform this service for you, such as www.no-ip.com.
SMTP Server	SMTP stands for Simple Mail Transfer Protocol. This is the server which sends email.
Network Ports	Network traffic is broken up into ports, which are sort of like lanes on a freeway. Breaking the data into different ports helps your router and network devices know how to process and route network data.
Domain Name	Domain Names are how websites get their names. www.digitalaquatics.com is our domain name. Using a domain name makes it easier for people to access our webpage, rather than having to use (and remember) our IP address.

Networks, Routers and Modems

Your home or office network likely includes one or more third-party devices that connect computers and devices in your network to the Internet. These devices typically include a *router* and a *modem*. A router is a device that sends data packets between computers and devices in your home or office network and your modem. The modem translates signals between your network and the internet. In many home networks, a router is included in a DSL (telephone network) or cable modem. In office networks, routers and modems are often separate devices.

The pictures below show examples of how computers, routers and modems might be connected in common networks:



Routers are designed to stop unauthorized access from over the Internet. To access Lifeguard from the Internet, you'll need to configure your router to enable *port forwarding,* also known as *port mapping*. Port forwarding allows an external, internet-connected computer or device to communicate with computers or devices (such as Lifeguard) in your home or office network.

Follow these steps to enable port forwarding on your router/modem:

Step 1: Connect Lifeguard™ to your Network

To enable communication between Lifeguard and the Internet, you'll first need to connect Lifeguard unit to your network. A CAT-5 Ethernet cable is provided with each Lifeguard system. Lifeguard should be connected to your DHCP-enabled router. Lifeguard can be connected to a wireless bridge or wireless gaming adapter to communicate wirelessly with a wireless router.

Step 2: Set Up your Router for Internet Access to Lifeguard™ (Enable Port Forwarding)

In order to setup port forwarding on your router, you will need to access your router's configuration area. The configuration area is typically accessed through a web browser on any PC or web-enabled device on your network. Your router's user documentation should provide an IP address that you can enter into your browser's address window.

Follow the *port forwarding* or *port mapping* instructions in your router's user documentation; see examples of how to enable port forwarding for certain popular routers in the "Example Router Configurations" section after these steps.

Digital Aquatics is unable to provide direct support for third-party devices, such as routers and wireless bridges. If you have questions about your third-party devices, please contact the manufacturer of the device. For questions regarding your email or internet account, you may need to contact you email or internet service provider. Digital Aquatics is unable to provide direct support for third-party services.

Your router automatically blocks unauthorized access. When configuring your router to allow access from over the internet, care must be taken to ensure the security of your network.

Some ISPs block port 80. You may want to use port 8181 or another available port.

Step 3: Set up a Domain Name (optional)

You may want to set up a domain name to make it easy to remember how to access your Lifeguard from a web browser.

Here's an example that uses the free service no-ip.com:

1. Go to http://www.no-ip.com and sign up for a free account.
2. Once you register and activate your account via the email they send you can then create you new host name.
3. While logged in, click on the "Your No-IP" link at the top right of the screen on the home page,
4. Click on the tab that says "Hosts/Redirects".
5. Click the button that says "Add Host"
6. Type the first part of the host name and then choose the rest from the drop down under the "No-IP Free Domains" list.

   You can set the port 80 redirect if you want. It will just send you to your IP/port and show those in the address bar rather than your URL but that is personal preference.

   Do not worry about the IP since the updater will take care of that.
8. On the left hand side click the link that says "Download Client"
9. Choose your OS, download it then install the client application
10. Open the client from the start menu and enter your email and password then choose the host name you want forwarded

    To make sure the client runs each time your system reboots you should copy the shortcut from the "No-IP DUC" folder and paste it in your "startup" folder in the start menu

    If you have not done so already, go through the steps for your specific router brand.

Step 4: Access Lifeguard™ from the Internet

When you've completed steps 1-3, just type your Lifeguard domain name or IP address into the address box of your favorite web browser on any Internet-connected computer. If you've completed initial Lifeguard setup, the Dashboard of your Lifeguard system should appear. When accessing your Lifeguard from outside of your local network, you will use the domain name you create below with the new port number. For example: http://newname.no-ip.org:8181/.

If accessing from inside your house use http://192.168.1.25:8181 (use the IP you or your router assigned to Lifeguard.)

Example Router Configurations

We've provided port forwarding instructions for three popular router models below. We've done our best to make sure this information is accurate, though router manufacturers may possibly update or make changes to their devices. Always refer to your router's manufacturer and/or documentation for the most up to date information.

If you don't have access to printed instructions you should be able to find them on your router manufacturer's web site.

D-Link (Model: DIR-655)

Port Forwarding (Virtual Server)

1. *Go to "Advanced" then "Virtual Server" (the first thing in the Advanced tab).*
2. *Put in a name like "Lifeguard 1" followed by the IP address of your Lifeguard unit.*
3. *Put the port numbers in to the right. The public and private ports are the same.*
4. *For Protocol just choose "Both".*
5. *Put a check on the left to enable this rule and hit "Save Settings" at the top.*

DDNS

Now to set up your router so you only have to remember your domain name.

1. Go to "Tools" on the top menu then on the left select "Dynamic DNS".
2. Once there, select the Server Address you used such as no-ip.org and then the domain name you created, followed by your username and password.

Now just type your domain name in the address box of your browser and the Lifeguard start page should appear.

Linksys (Model: E2100L)

Single Port Forwarding

On most Linksys the first 5 entries are preset, just use the first one that has a blank name. For each entry, complete the following:

1. Enter the appropriate application name such as "NET Module".

2. Enter the external and internal port number used by the application; they will be the same number.
3. Select the protocol(s) used for this application, we recommend you choose "Both".
4. Enter the IP address of the computer that should receive the requests.
5. Select Enabled to enable port forwarding.
6. Click "Save Settings".

DDNS

This is under "Setup">"DDNS".

1. Enter your no-ip.com username, password and host name.
2. Choose "Dynamic" (this should be the default).
3. Select "Update to instantly update your IP address with the server.
4. Click "Save Settings".

Netgear (Model: WGR614v9)

Port Forwarding

1. Select Port Forwarding/Port Triggering under Advanced in the main menu.
2. Click Add Custom Service.
3. In the Service Name field, enter a descriptive name like "RKM-NET".
4. In the Service Type field, select the protocol, I recommend choosing both TCP and UDP.
5. In the Starting and Ending Port fields, enter the port number (they will be the same).
6. In the Server IP Address field, enter the IP address of your local computer that will provide this service.
7. Click Apply.
8. The service appears in the list in the Port Forwarding/Port Triggering screen.

9 (You may or may not have to do this next part. If it shows in the port forwarding list then you do not.) Select Port Forwarding/Port Triggering under Advanced in the main menu.

10 From the Service Name list, select the service that you will host on your network (the one you created from above).

11 In the corresponding Server IP Address box, enter the last digit of the IP address of your local computer that will provide this service.

12 Click Add. The service appears in the list in the screen.

DDNS

Next lets set up your router so you only have to remember your domain name.

1 From the main menu of the browser interface, under Advanced, select Dynamic DNS to display the Dynamic DNS screen.

2 Select the "Use a Dynamic DNS Service" check box.

3 Select the name of your Dynamic DNS service provider.

4 Type the host name (or domain name) that your Dynamic DNS service provider gave you.

5 Type the user name for your Dynamic DNS account. This is the name that you use to log in to your account, not your host name.

6 Type the password (or key) for your Dynamic DNS account.

7 Click Apply to save your configuration.