

ReefKeeper 2

Advanced Aquarium Monitoring System



User Guide

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Digital Aquatics

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1. INTRODUCTION

About this manual

Digital Aquatics *strongly* recommends that you read the entire manual before attempting to utilize the ReefKeeper 2 for actual aquarium control.

In the electronic (.PDF) version of this manual, clicking on any of the sections listed in the [Table of Contents](#) above will jump directly to that section.

The latest version of this guide may be downloaded from our website at www.DigitalAquatics.com.

2. PRODUCT OVERVIEW

This section gives you a brief overview of the components of your ReefKeeper 2.

Remote Display

- Eight LEDs along the bottom of the face plate correspond to the eight available channels on the power controller, indicating which channels are currently turned on. A blinking light indicates the Sure-On feature of a metal halide light; see Light Configuration on page 4-5 for more information on configuring the Sure-On feature.
- Three buttons along the right allow you to configure your ReefKeeper 2 as well as enter Standby Mode and view the night/day mode status.
- The remote display receives its power via the cable connected to the power controller. In the event of a power failure, a built-in battery allows the clock to be preserved.

Power Controller

- The power controller looks like a power strip and plugs into a 3 prong wall socket.
- Each of the eight channels can be configured to run any of the ReefKeeper 2 functions.
- Any single channel can handle no more than 6 Amps each. The entire unit can handle no more than 15 Amps total.
- Channels 1 and 5 are spaced to allow placement of large power bricks, or “wall warts.”
- Channels 4 and 8 are special purpose relays; for optimal performance, plug your highest current devices into these channels

Temperature Probe

- The temperature probe plugs into the power controller via the 6-pin connector located on the side of the power controller (the middle connector).
- Once calibrated, the probe is accurate to +/- 0.2 degrees Fahrenheit.

pH Probe

- The pH probe plugs into the power controller via the BNC connection, located on the side of the power controller.

Serial Port Cable

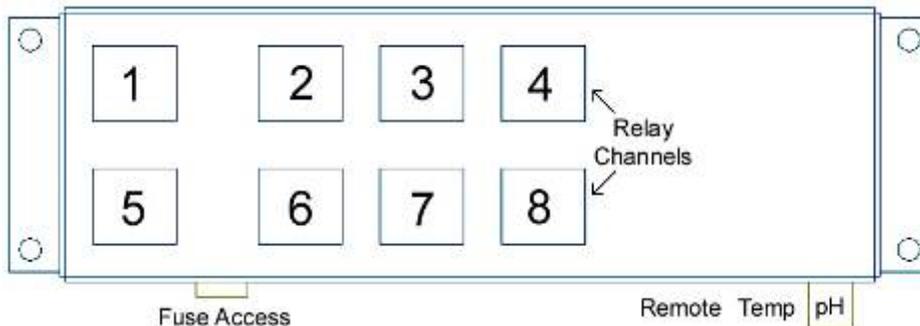
- The serial port cable is used to update the firmware in you ReefKeeper 2 and shares a connector with the temperature probe. For instructions on updating your ReefKeeper 2's firmware please refer to our website at www.DigitalAquatics.com.

3. PRODUCT INSTALLATION

Power Controller Installation

The power controller should be mounted in or around your aquarium cabinet close to a source of power. The power cable connected to the power controller is 6 feet long; plan distance from an AC wall plug accordingly. We recommend that, you do not use extension cords or splitters in your ReefKeeper 2 installation. There are four mounting holes, two on each side of the module. Use these to mount the power controller in a convenient location within 5 feet of where you would like to mount the remote display and within 6 feet of where you would like to install the water temperature probe. A coupler (available at Radio Shack) and a standard CAT5 cable can be used to increase the length between the remote display and the power controller.

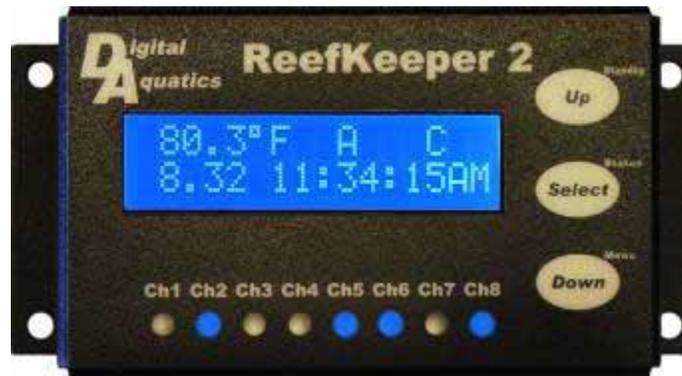
When running any wires to the ReefKeeper 2, be sure to use drip loops so that water will not damage the device.



PRODUCT INSTALLATION

Remote Display Installation

The remote display may be mounted on the face of your aquarium cabinet or other convenient location. It can also be mounted flush to a cabinet. If you would like to mount it flush, make a rectangular cutout in your cabinet, appropriately sized to allow the face of the remote display through. Place the front of the module through this hole from behind the cabinet surface. Install four wood screws to secure the device (make sure screws are the correct length so they don't go completely through the front of the cabinetry). The cable can be oriented straight out the back of the remote display to accommodate this mounting option. Route the cable to the power controller and plug it into the receptacle labeled "Remote".



Temperature Probe Installation

Plug the temperature probe into the connector labeled “Temp” on the power controller. Route the temperature probe cable through convenient locations and insert it into your tank or sump reservoir. For best results, ensure that the end of the temperature probe is at least 6 inches below the surface of the water in your tank. Be sure that you do not crimp, pinch or tie off the temperature probe, doing so can shorten the life of the probe.

pH Probe Installation

Before physically installing your pH probe complete the pH calibration described on page 4-11.

For best results, mount the pH probe in the flow of water; the sump is a common mounting location. Avoid placing your probe in still water as pH levels may not reflect the true pH value in the tank. When you have picked a location to mount the probe, clean the area where the included suction cup will be placed. With the suction cup near the top of the pH probe, press the cup to the desired location.

Once the probe is mounted, connect the cable to the BNC connection on the power strip. When routing the pH probe cable, do not crimp, pinch, or excessively manipulate it. Doing so can cause faults in your pH probe and may require you to replace your probe. Make sure you clean the surface where the suction cup is mounted before remounting it.

For best results, ensure that your pH probe is clean and that the tip of the probe never dries out. See pH Probe Care and Maintenance on page 5-2 for more information on the care of your pH probe.

4. MENU SYSTEM AND INTERACTION

This section guides you through each of main menu selections and their submenus. In addition to the main menu system, there are two hotkey menus which can be accessed when the remote display is in its normal status display.

Overview

The ReefKeeper 2's menu system is designed to provide quick access to commonly-used functions. All interaction with the device takes place via the 3 buttons at the right of the front panel of the ReefKeeper 2. When the screen is displaying the normal status display, pressing the Down button (the "Menu" hotkey) enters the menu system.

MENU SYSTEM BASICS

The following few points give you a basic understanding of the menu system.

- When in normal operation the display shows a status screen containing the temperature, pH (if enabled), time, and the currently active wavemaker cycles.
- The currently selected menu item blinks; pressing Select will act upon the blinking item.
- The menu system operates as a hierarchy. When you press Select, the ReefKeeper 2 displays the next menu down in the hierarchy.
- When changing values (setting the clock, wavemaker cycle time, etc), press and hold either the Up or Down button to change values at a faster rate, allowing you to quickly reach the desired value.
- When in the main menu or any of the submenus, if you do not press any button for 10 seconds, the display will revert back to the normal operating screen.



OPERATION

When you enter the menu system by pressing the Down button, the display presents the first two lines of the menu system. The top line, Channel Setup, blinks, indicating that it is the selected item. Press the Select button to display the Channel Setup submenu. Press Up or Down to navigate through the list, Each of the 5 main submenus and the 2 hotkey menus will be dealt with below.

To reset the ReefKeeper 2 to its factory-programmed default values, press the Up and Down buttons simultaneously while the main status display is showing. A confirmation screen appears, asking if you would like to erase your changes to the channel configuration and revert to the defaults. Push the Up or Down button to select Yes or No and then press Select to make your choice.

Standby/Night Mode Hotkey

When you press the Standby Mode hotkey (the Up button, from the normal operating screen), the system enters Standby Mode. While in Standby Mode, all channels configured to control skimmers, sump pumps and some powerheads (depending on each wavemaker channel's Night Mode Status) turn off. This prevents food from being swept away during feedings which causes unnecessary bio load on your system. Standby mode is also useful when it is time to perform maintenance on your tank and you need all the water pumps to be temporarily turned off. The length of time that Standby Mode takes is configurable in the Standby Duration section. Standby duration can be set to any amount of time between 1 and 99 minutes, in 1 minute increments.

Status Hotkey

When you press the Status hotkey (the Select button, from the normal operating screen), the Status screen is displayed. It displays your ReefKeeper 2's current firmware version as well as the Day/Night Mode status.

Channel Setup

The first item in the main menu is the Channel Setup submenu. Press Select to enter the submenu and configure the 8 channels. Each channel can be configured to a desired Auto function or may be manually overridden to be on or off.

MANUAL OVERRIDE

Manual override is useful when working with your tank or if you just need to activate your lights for an unexpected visitor. This is the first option when you enter any channel's setup. Press Up or Down to select whether the channel is manually On or Off. When you manually set a channel on or off, its previous configuration is not lost. The next time you enter the Auto configuration menu for a manually overridden channel, its previous setup is recalled.

AUTO

You may configure any of the 8 channels to perform any of the following functions:

- Light (metal halide or other type)
- Skimmer/Sump Pump
- Powerhead
- Heater
- Fan/Chiller
- pH Controller
- Always on
- Always off
- Multi-timer
- On/Off Oscillate

MENU SYSTEM AND INTERACTION

By default, the channels are configured as follows. You may change any channel to be any of the available functions.

Channel	Default Function	Default Configurations
Channel 1	Heater	Cutoff temp: 78 °F
Channel 2	Powerhead	Cycle A – 6 minute cycle
Channel 3	Powerhead	Cycle B – 6 minute cycle
Channel 4	Light (Metal halide)	Turn on: 9 AM Turn off: 7 PM Temp off: 88 °F
Channel 5	Fan/Chiller	Turn on temp: 82 °F Turn off temp 80 °F
Channel 6	Sump/Skimmer	
Channel 7	Powerhead	Cycle C – 8 minute cycle
Channel 8	Light (Other)	Turn on: 8 AM Turn off: 8 PM Temp off: 88 °F

To change any given channel's configuration, enter the menu system by pressing the Menu hotkey (Down) and select "Channel Setup." Select the desired channel number (if you would like to return to the main menu, press Up or Down until "Back" is blinking; then press the Select button). Press Select to choose "Auto." Now, choose the desired function for that channel and press Select. Refer to the detailed configuration information for each of the functions on the following pages for more information.

LIGHT

If you configure the channel to control a light, select whether the light is a metal halide or other type of light. If it is a Metal Halide, the ReefKeeper 2 will ensure that it has time to cool down after a power loss before turning back on. After making your selection, set the time that you would like the light to turn on. Use the Select button to make each selection for hours and minutes. Then, set the time you would like to have the light turn off.

Next, select a safety cutoff temperature. If the temperature in your tank rises above this temperature, the ReefKeeper 2 will turn off the selected light. It will keep the light off until the temperature drops to 2 °F below the safety cutoff temperature. Pressing Select will return you to the main channel selection menu.

Note that if the ReefKeeper 2 has been power cycled within the last 15 minutes, any metal halide channel will be off until a full 15 minutes have passed. The LEDs blink during this time to indicate that they will be turned on after the 15 minutes has passed.

SKIMMER/SUMP PUMP

If you set the channel to control a skimmer or sump pump, the ReefKeeper 2 will automatically turn the device off during Standby Mode. There is no configuration needed for a skimmer or sump pump channel.

WAVEMAKER

If you set the channel to control a powerhead, choose which wavemaker cycle you would like the powerhead to be a part of. For more information, see the Wavemaker Setup section on page 4-9. After making your wavemaker cycle selection, specify whether you want that particular pump to be on or off during Night Mode and then on or off during Standby Mode.

HEATER

If you set the channel to control a heater, you will need to specify the temperature at which you would like to have the heater be turned off. When using the heater function, set the thermostat on your heater to no more than two degrees above the threshold temperature on the ReefKeeper 2. This provides redundant protection.

FAN/CHILLER

If you set the channel to control a fan or chiller, you will need to specify the temperatures at which you would like to have the fan/chiller turn on and turn off. In this way, the fan/chiller function allows you to set your desired hysteresis. When the water heats up to the turn-on temperature, the fan/chiller turns on. As the water then cools down, the fan/chiller turns off at the turn-off temperature. It will then not turn on again until it reaches the upper turn-on temperature. This prevents the fan or chiller from cycling rapidly when the water is hovering around the set point. You may, however set the turn-on and turn-off temperatures to be equal if you desire. When using a chiller that has a built in thermostat set it no more than three degrees below the fan/chiller turn-off temperature on the ReefKeeper 2. This provides redundant protection. Also, if you are using a chiller that draws more then 6 amps you will need to use an expansion socket that is available on our online store.

PH CONTROL

If you set the channel to control a pH manipulation device, it will raise or lower pH based on your tank's current pH level. You must have a pH probe installed and have performed the calibration steps as described in the pH Setup section on page 4-11. All common pH probes are supported and easy calibration steps will ensure an accurate reading. Be sure to read the pH Probe Care and Maintenance section on page 5-2 before setting up pH control.

Set the pH levels at which you would like your device to be turned on and off.

If you set the Turn On pH higher than the Turn Off pH, it is assumed you have connected a device that lowers the pH. When the pH rises to the Turn On pH value, the channel is turned on. It remains on until the pH drops below the Turn Off pH. The channel will not turn on again until it rises to the Turn On pH value again.

Likewise, if you set the Turn Off pH higher than the Turn On pH, it is assumed you have connected a device that raises the pH. When the pH falls to the Turn On pH value, the channel is turned on. It remains on until the pH rises above the Turn Off pH. The channel will not turn on again until it falls to the Turn On pH value again.

You may not set the Turn On and the Turn Off values to be equal.

MULTI-TIMER

If you set the channel to be a multi-timer, you may select up to 3 different on/off cycles. For each cycle, select an On Time and then Duration. If you select 0 minutes for a duration, "Off" is displayed and the following timers are disabled. Multi-Timer is useful for multiple light on/off times, feeders, top-off devices or anything else that you might want to turn on/off multiple times in a day.

ON/OFF OSCILLATE

If you set the channel to oscillate, you must configure both the On time and Off time. The channel will then oscillate between these 2 cycles. It will be on for the configured on-time and off for the configured off-time. The channel begins cycling the moment you finish the configuration. This cycle repeats constantly.

ALWAYS ON

If a channel is set to be always on, it will act as regular power outlet, with no switching.

ALWAYS OFF

If you set the channel to be always off, there will be no power to that channel. Digital Aquatics recommends that you set all unused channels to this setting.

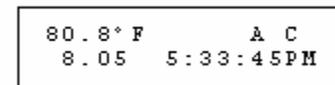
Wavemaker Setup

Every channel that is set to be a wavemaker is associated with one cycle: A, B, or C. A and B cycles alternate at the set interval. The C cycle turns on and off at the set interval but is independent of the A and B cycles.

In the Wavemaker Setup menu, you must first select if you want to enable the wavemaker (enabled by default). When disabled, the A, B, C display is removed from the main screen. If you select “enabled” you will be then be taken to the set Cycle A/B time, this is the amount of time that cycle A will be on while cycle B is off and vice versa. You may set this time to any value between 20 seconds and 2 hours. Once you have made your selection, you must set the Cycle C time. This is the amount of time that cycle C will be on and off for in succession. You may set this time to any value between 20 seconds and 2 hours. The ReefKeeper 2 allows you to select if a wavemaker is on/off during Night Mode and on/off during Standby Mode; this is done on a per channel basis in the Channel Setup menus.

During Night Mode, the powerheads that are configured to be off turn off, and A/B and C cycle times double.

The currently active (on) wavemaker cycles are displayed on screen, as shown with the ‘A’ and ‘C’.



80.8°F A C
8.05 5:33:45PM

Temperature Setup

In the Temp Setup menu you have the choice of displaying temperature in either Fahrenheit or Celsius. Press Select to make your selection. The next section, Calibrate Temp, displays the temperature that the probe is currently reading. You may calibrate the temperature displayed to increase the accuracy of the ReefKeeper 2 by pressing Up or Down. Make your selection and you will be returned to the main menu.

Standby Duration

In this menu, you may specify the length of time Standby Mode will last. This value may be set to a value between 1 minute and 99 minutes. Make your selection and you will be returned to the main menu.

Set Time

When in this submenu, simply adjust the hours and minutes to correspond to the current time. When you exit this menu, the seconds are reset to 0.

Night Mode Setup

The ReefKeeper 2's Night Mode functionality allows you to define a different set of behavior for your pumps to simulate the calming of the ocean during the night hours. When in Night Mode, all wavemaker cycle times double. Also, you may configure some or all of your wavemaker channels to be turned off during Night Mode.

If you wish to turn the ReefKeeper's Night Mode functionality on, press Up or Down so the display reads "Enable Night Mode? Yes". Next, configure the start time by first selecting the start hour and then the start minute. Then, configure the end time.

Lights are independent from Night Mode and will continue in their configured schedules. This allows you to configure certain lights to be moonlights

pH Setup

If you will be using the ReefKeeper to monitor pH and have purchased the optional pH probe, configure the ReefKeeper to pH Enabled. If you do not plan to utilize the pH display and control functions, configure the ReefKeeper to pH Disabled. When disabled, the pH value does not appear on the main status display.

Please refer to pH Probe Care and Maintenance on page 5-2 before performing this calibration. Failing to follow important care instructions can permanently damage your probe and/or cause faulty readings.

To calibrate the pH probe you will need to have two buffered solutions. We suggest using pH buffered solutions with values of 7 and 10. If you purchased your pH probe from Digital Aquatics, you will have received one packet each of 7 and 10 pH buffer solution. The ReefKeeper 2 also supports pH calibration values of 4 and 7 when used in fresh water applications. Remove the plastic cap from the probe before calibrating. *Once the cap is removed, do not allow the tip of the probe to dry out.*

1. With your probe connected and your unit in calibration mode, place the pH probe into the lower valued solution.
2. Select the low value (4 or 7 depending upon the buffer solution used) and press Select.
3. Wait until the device reads a stable value; this can take up to two minutes. The time required for the value to stabilize will vary depending on the age and condition of the probe. For best results, ensure that the value is stable for at least 15 seconds before proceeding.
4. Once a stable value is reached, press Select. The ReefKeeper 2 will prompt you to place the probe in the high buffer solution. Before doing this rinse the probe with tap water and gently shake off any drops that are on the electrode. This prevents contamination of the high pH buffer solution.
5. Place the probe in the higher valued solution, and press Select. Again, wait as long as necessary to observe a stable reading. Once the reading stabilizes, press Select to complete the calibration and exit the menu.

Brightness

You may set the brightness of the ReefKeeper 2 display to 25%, 50%, 75% & 100% as desired. Press Select to make your choice and return to the main menu.

5. APPENDIX

Firmware Updates

To update the firmware in the ReefKeeper 2, disconnect the temperature probe and connect the PC serial cable in the same port. To download the latest firmware and for instructions, refer to our website at www.DigitalAquatics.com

Troubleshooting

Problem	Solution
The display reads “Temp Removed”	Ensure that your temperature probe is securely plugged into the power controller. If it is plugged in securely, and the message is still displayed, the probe may be faulty. Contact Digital Aquatics technical support at support@digitalaquatics.com .
The temperature is inaccurate by a small amount.	Enter the “Temp Setup” menu. In the “Calibrate Temp” section, adjust the temperature up or down until it displays the correct water temperature.
Unit does not power up	Check the fuse; replace if blown. Use a 1 ¼” x ¼” 15A slow blow, or 20A fast blow. These fuses are readily available at Radio Shack.
pH reading jumps or is inaccurate	Ensure pH probe is clean and free of damage/recalibrate your probe. Refer to pH Probe Care and Maintenance on page 5-2.

pH Probe Care and Maintenance

RECALIBRATION

The value produced by a pH probe will drift over long amounts of time. We recommend that you compare your pH probe's value against another device or chemical measurement on a monthly basis. If you notice a large difference, recalibrate your probe using the method described in the pH Setup section on page 4-11. If recalibration does not correct the discrepancy, it is possible that your probe has reached the end of its life.

CLEANING/CARE

Never allow the tip of the pH probe to dry out. Doing so can permanently damage the probe and cause faulty readings. To clean the probe, rinse it under warm tap water. From time to time you may need to use a mild dish soap followed by a thorough rinse. *Never* use a brush or rag while cleaning the probe as this may cause damage. Once the probe is clean, rinse it with de-ionized water.

It is a good idea to clean your probe each time you calibrate. By doing so you can ensure more accurate/faster readings with fewer faults. You may find you need to clean your probe due to build up that occurs between normal calibrations.

Caring for your probe is extremely important for proper function and longer life. *Never* let your probe tip go dry. If you remove your probe tip from your tank for extended periods of time (*not during calibration/cleaning*), you must fill the protective cap with electrolyte solution and place the cap on probe tip. Do not leave your probe connected to your system for long periods of time when the system is not in use. Remember that pH probes have a limited shelf life. Do not use a pH probe that has been stored for extended periods of time, (*over 8-12 months.*)

SPENT PROBE

pH probes eventually wear out over time. Several symptoms can indicate a spent probe such as drift, and extreme fluctuation of the pH display. A spent probe must be replaced. If you fail to take action when the pH probe is spent you run the risk endangering your eco-system.

PH TROUBLESHOOTING

Many pH probe problems can be traced back to a few common issues: a dirty probe, measurement drift, and probe location in the tank. If you are experiencing any problems with your pH probe readings, first ensure that the probe is clean and located in a high-flow area in your tank. If that does not resolve the issue, try recalibrating the probe with your ReefKeeper 2, following the instructions on page 4-11. If you still have problems, refer to the following table.

Problem	Solutions
pH has no reading	-Probe may not be connected -Probe may be spent
pH reads unusually high/low	-Probe may need to be relocated in a higher flow area
pH value fluctuates	-Probe electrode may be broken or there may be a break in the line. -Variations may be caused by stray voltages in the tank, make sure all devices are properly grounded.
pH reading remains constant even after attempting to calibrate	-May indicate a short/shunt in the line, value often reads about 7 pH -Ensure your probe is securely connected to the BNC connector.
pH value drifts	-This may also indicate that your probe is at the end of its life. As the problem gets worse you will be unable to reliably recalibrate