



# AquaController Apex Wireless Expansion Module



## Setup Guide

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## WIRELESS EXPANSION MODULE – INTRODUCTION

Congratulations on your purchase of the AquaController Apex expansion accessory. The AquaController Apex Wireless Expansion Module (WXM) provides the ability to control Ecotech Marine wireless pumps from your AquaController system. You can control them based on time of day, in response to feed timers, or any event you can think of using the powerful Apex programming language.

The AquaController Apex System delivers an expandable, professional quality aquarium controller at hobbyist prices. The AquaController Apex is the most flexible, expandable system on the market today.

## FEATURES

- Wirelessly controls any of EcoTech Marine's wireless pumps (Wireless Wave Driver or EcoSmart).
- 11 Independent channels to support 11 pumps.
- Supports Ecotech Marine's Constant, Reef Crest, Lagoon Random, Nutrient Transport\*, Tidal Swell\*, Pulse, Sync and Anti-Sync modes.
- Pump modes can be changed based on conditions and events throughout the day using powerful Apex programming commands.
- The WXM attaches to and is powered by the Apex system via AquaBus.
- Automatic Plug N Play for easy setup and configuration.
- Pumps can be dynamically added/removed from the system.
- Upgradable WXM and EcoTech Marine pump firmware upgrade through AquaBus via the Apex Base Module.
- Multi-color LED Status and Wireless Status indicators.
- 2 AquaBus ports for flexible system connections.
- Comes with a 3' AquaBus cable.
- Compatible with Apex and Apex Lite systems

\* Requires EcoSmart pump driver.

## PHYSICAL INSTALLATION



**WARNING:** Your Apex Base Module must be running firmware version 4.03 or higher to support the Wireless Expansion Module (WXM). The current firmware version can be checked from the Apex Display on the Self Test screen. If needed, please upgrade the Apex Base Module firmware to 4.03 or higher before proceeding with the installation. See the *Apex Setup and Programming Guide* for firmware upgrade instructions.

The AquaController WXM should be securely mounted as close as possible to the EcoTech Marine Wireless Wave Driver (WWD) or EcoSmart driver in a location free from moisture. Use wood screws through the mounting tabs of the expansion module case or if mounting on drywall, use drywall anchors (mounting hardware not included).

- Mount the WXM as close as possible to the EcoTech WWD or EcoSmart pump drivers to ensure reliable wireless communication.
- Mount all modules above the water line of the aquarium.
- Be sure to utilize drip loops on all power cords, AquaBus cables and probe cables.



**WARNING:** Water damage will void your warranty! Mount all modules in locations safe from moisture exposure.

## INITIAL CONNECTIONS

Plug one end of the included AquaBus cable into one of the AquaBus ports on the WXM and the other end into an available AquaBus port on your existing Apex system. It makes no difference which AquaBus port is used and you do not need to power down the system when connecting AquaBus accessories as the system is plug-and-play.



**WARNING:** NEVER plug standard USB devices into any AquaBus connector or AquaBus accessories into computer USB ports. Damage to the AquaBus accessory and/or USB device may result.

## STARTUP

As soon as the WXM is connected to an active AquaBus, the probe module will power up and begin to initialize. When first connected to an AquaController Base Module (through the AquaBus), the WXM will automatically be assigned an AquaBus address and be added to the AquaController configuration. The LED Status indicator on the WXM will flash yellow while it is being initialized. Once initialized, the LED Status indicator will be solid green. The LED Status indicator will flash yellow when the WXM is powered on and communication with the AquaController Base Module is lost.

## VERIFY THE INSTALLATION

Verify the WXM was initialized and added to the AquaController Apex configuration:

**Apex Display:** Setup – Module Setup – Modify Name – from this screen, you can see all AquaBus modules installed on the system.

**Web Interface:** Configuration – Module Setup – Verify the WXM is listed in the Apex Module List.

## UPDATE WXM FIRMWARE

A new version of firmware for the WXM and EchoTech pumps may be included with Apex Base Module firmware updates. You should check the firmware version status when the WXM is first installed and after updating the AquaController Base Module firmware. See the section titled *Updating Firmware in the AquaController Apex Setup and Programming Guide* for instructions to update AquaController Apex Base Module and WXM firmware.

To check or update an Apex module firmware:

**Apex Display:** Setup – Module Setup – Update Module – use the up/down arrows to highlight the Apex module to update, push Select to update.

**Web Interface:** Configuration – Module Setup – in the Module Configure area, in the Module: box, select the Apex module to update from the dropdown list, click the Update Firmware radio button, click the Submit Module Update button, a new browser window will open to display the update status.

## ECOTECH PUMP DRIVER FIRMWARE UPDATE

The WWD and EcoSmart drivers must be updated to a minimum firmware level before they can be controlled by the WXM. See *Table 1 - Minimum Firmware Versions* for minimum firmware versions.

The firmware version installed on an EcoTech Marine pump driver can be determined by counting the LED blinking sequence when the pump is initially powered on. The major revision is indicated by the number of green blinks while the minor revision by the number of blue blinks. For example, 3 green blinks followed by 1 blue blink indicates version 3.1.

Pump Type	Minimum Firmware Version
MP40W	3.1
MP10 EcoSmart	1.5
MP40 EcoSmart	1.5

**Table 1 - Minimum Firmware Versions**

If your pumps are up to date, continue configuring your WXM and EcoTech Marine pumps by following the directions in the section titled *Configuring the WXM*.

If your pump needs a firmware update, it can be upgraded through the WXM. To update WWD pumps follow the steps outlined in the section titled *WWD Firmware Update*. To update EcoSmart pumps that have not been connected or configured to connect to the WXM must be updated manually using the instructions in the section titled *EcoSmart Manual Firmware Update* section. EcoSmart pumps already connected to the WXM can be updated using the automatic mode using the instructions in the *EcoSmart Automatic Firmware Update* section.

NOTE: To downgrade EcoSmart pumps, the Automatic mode cannot be used, the manual method must be used in this case.

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## WWD FIRMWARE UPDATE

Follow these steps to update the WWD firmware. The update procedure is initiated and controlled at the Apex Display, these procedures cannot be performed from the Apex Web Interface.



**WARNING:** Place the WXM and WWD within 2 feet of each other to ensure reliable wireless communications during the entire firmware update procedure. Make sure all EcoTech pumps are powered OFF except the pump being updated. Wireless communications from other EcoTech Marine pumps can interfere with the update process.

### Apex Display: Setup – Module Setup – Config Module

- 1) If you have more than one WXM connected to the Apex, use the up and down arrows to highlight the WXM that is within 2 feet of the pump to be updated and press Select.
- 2) Use the up and down arrow keys to highlight WWD Update and press Select.  
The Apex Display will indicate:

WWD Update  
Download: XX%

- 3) Once the download has completed, the Apex Display will indicate:

WWD Update  
Download Complete  
Begin Pump  
Firmware update

Pumps Updated: X

- 4) Remove power to all EcoTech Marine wireless pumps (both WWD and EcoSmart pumps).

- 5) On the pump you wish to update, press and hold the Set and Mode buttons while you apply power to the WWD pump. Continue to hold these buttons (about 10 seconds) until the WWD LED flashes red/white. Release the buttons.

NOTE: Only the pump being updated should be powered on during the update procedure. Wireless communications from other EcoTech Marine pumps can interfere with the update process.

- 6) Press and hold the Set button (about 10 seconds) on the WWD until the LED flashes white/blue rapidly and the update process will begin. The update process can take up to 6 minutes.
- 7) Once the update has completed, the Apex Display will increment the Pumps Updated: count and the WMD LED will flash red/white.
- 8) To verify the pump's firmware version, power cycle the pump and count the LED blinking sequence when the pump is initially powered on. The major revision is indicated by the number of green blinks while the minor revision by the number of blue blinks. For example, 3 green blinks followed by 1 blue blink indicates version 3.1.
- 9) To update more WWD pumps, repeat steps 4 through 8.

**Web Interface:** This option is not available from the Web Interface.

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## ECOSMART MANUAL FIRMWARE UPDATE

Follow these steps to update the EcoSmart firmware using the manual update method. The update procedure is initiated and controlled at the Apex Display, these procedures cannot be performed from the Apex Web Interface.



**WARNING:** Place the WXM and EcoSmart within 2 feet of each other to ensure reliable wireless communications during the entire firmware update procedure. Make sure all EcoTech pumps are powered OFF except the pump being updated. Wireless communications from other EcoTech Marine pumps can interfere with the update process.

**Apex Display:** Setup – Module Setup – Config Module

- 1) If you have more than one WXM connected to the Apex, use the up and down arrows to highlight the WXM that is within 2 feet of the pump to be updated and press Select.
- 1) Use the up and down arrow keys to highlight EcoSmart Update and press Select. The Apex Display will indicate:

EcoSmart Update  
Download: XX%

- 2) Once the download has completed, the Apex Display will indicate:

EcoSmart Update  
Download Complete  
Begin Pump  
Firmware update

Pumps Updated: X

- 3) Remove power to all EcoTech Marine wireless pumps (both WWD and EcoSmart pumps).
- 4) On the pump you wish to update, press and hold the Set and Mode buttons while you apply power to the EcoSmart pump. Continue to hold these buttons (about 10 seconds) until the EcoSmart control dial LED flashes red/white. Release the buttons.

NOTE: Only the pump being updated should be powered on during the update procedure. Wireless communications from other EcoTech Marine pumps can interfere with the update process.

- 5) Press and hold the Set button (about 10 seconds) on the EcoSmart until the control dial LED flashes white/blue rapidly and the update process will begin. The update process can take up to 2 minutes.
- 6) Once the update has completed, the Apex Display will increment the Pumps Updated: count and the EcoSmart LED will flash red/white.
- 7) To verify the pump's firmware version, power cycle the pump and count the LED blinking sequence when the pump is initially powered on. The major revision is indicated by the number of green blinks while the minor revision by the number of blue blinks. For example, 3 green blinks followed by 1 blue blink indicates version 3.1.
- 8) To update more EcoSmart pumps, repeat steps 4 through 8.

**Web Interface:** This option is not available from the Web Interface.

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## ECOSMART AUTOMATIC FIRMWARE UPDATE

Follow these steps to update the EcoSmart firmware using the automatic update method. Pumps that are configured on the WXM can be updated using this method. The update procedure is initiated and controlled at the Apex Display, these procedures cannot be performed from the Apex Web Interface.

NOTE: Automatic update will only update an EcoSmart's firmware, it cannot downgrade firmware. If it is necessary to downgrade firmware, follow the steps in the section titled *EcoSmart Manual Firmware Update*.



**WARNING:** Place the WXM and EcoSmart within 2 feet of each other to ensure reliable wireless communications during the entire firmware update procedure. Make sure all EcoTech pumps are powered OFF except the pump being updated. Wireless communications from other EcoTech Marine pumps can interfere with the update process.

**Apex Display:** Setup – Module Setup – Config Module

- 1) If you have more than one WXM connected to the Apex, use the up and down arrows to highlight the WXM where the pump is connected and press Select.

NOTE: Only the configured/attached pumps being updated should be powered on during the update procedure. Wireless communications from other unattached/unconfigured EcoTech Marine pumps can interfere with the update process.

- 2) Use the up and down arrow keys to highlight EcoSmart Update and press Select. The Apex Display will indicate:

EcoSmart Update  
Download: XX%

- 3) Once the download has completed, the Apex Display will indicate:

EcoSmart Update  
Download Complete  
Begin Pump  
Firmware update

Pumps Updated: X

- 4) The WXM will automatically update all the EcoSmart pumps configured on the WXM.
- 5) To verify the pump's firmware version, power cycle the pump and count the LED blinking sequence when the pump is initially powered on. The major revision is indicated by the number of green blinks while the minor revision by the number of blue blinks. For example, 3 green blinks followed by 1 blue blink indicates version 3.1.

**Web Interface:** This option is not available from the Web Interface.

## CONFIGURING THE WXM

Once you have confirmed your pumps have the required firmware version, you must "attach" the pump to the WXM so they can be controlled by the Apex system.

To attach the pump to the WXM:

- 1) The pump's memory must be cleared so it can be attached to the WXM:
  - a. With the pump powered on, press and hold the Set and Mode buttons (about 3 seconds) until the pump's LED flashes red/white/blue. Release the buttons.
  - b. Press and hold the Mode button (about 3 seconds) until the pump's LED flashes purple/red. Release the button.
  - c. Press and hold the Set button (about 3 seconds) until the pump resets.
- 2) Assign the pump as a slave to the WXM:
  - a. With the pump powered on, press and hold the Set and Mode buttons (about 3 seconds) until the pump's LED flashes red/white/blue. Release the buttons.
  - b. Tap the Set button.
    - i. If the pump was successfully attached to the WXM, the pump LED will flash blue/yellow.
    - ii. If the pump flashes blue/red, the attachment failed. Retry the procedure starting at step 1.
- 3) Once the pump has been attached to the WXM, an Apex Outlet will be created to allow programming of the pump. The first pump attached will be named VorTech\_X\_1 and the second VorTech\_X\_2. The X will be replaced with the AquaBus number assigned to the WXM on which the pump was attached. The default outlet names can be changed using typical Apex programming procedures. See the Apex Setup and Programming guide for more information.

The EcoTech Marine pumps attached to a WXM can be viewed from the Apex Display by opening the Control/Status – WXM Status screen.



## PROGRAMMING PUMPS

Once the EcoTech Marine pumps have been attached to the WXM by following the steps in the section titled *Configuring the WXM*, an outlet is added to the Apex system that is used to program the pump. Basic programming instructions are included in this manual but more detailed instructions can be found in the Apex Setup and Programming Guide in the section titled *Variable Speed Port Programming* and in the *Advanced Programming Examples Appendix*.

The VorTech outlets can be programmed using the Pump wizard built in to the Apex. Set the outlet Program Type to Pump and set the variables as described below:

Fallback – the state the pump should switch to if contact between the WXM and base module is lost (on or off).

Initial Off Time – when this pump first starts, this is the amount of time the pump should be off before proceeding to the On Time (minutes:seconds).

On Time – after the Initial Off Time expires, this is the amount of time the pump should be On before proceeding to the Off Time (minutes:seconds).

Off Time – after the On Time expires, this is the amount of time the pump should be Off before proceeding back to Initial Off Time (minutes:seconds).

Feed timer – the Feed Timer that should turn off this pump (A, B, C or D).

Feed timer delay – the time after the Feed Timer expires before starting the pump back up.

However, to get the most flexibility and control of variable speed VorTech pumps, the Advanced Program Type should be used in combination with Apex variable speed Profiles. Profiles are edited from either the Web Interface or the Apex Display. A new profile type called VorTech has been added to support the WXM module. The VorTech profile type has the following VorTech Pump Control types:

Constant – The constant type allows for to be run as constant speed from 0 to 100%.

Reef Crest – The Reef Crest Random type is used to simulate a high energy reef-crest environment. Refer to the VorTech pump owner’s manual for more information. The maximum pump intensity can be configured in this mode.

Lagoon – The Lagoon Random type is used to simulate a low energy lagoon reef environment. Refer to the VorTech pump owner’s manual for more information. The maximum pump intensity can be configured in this mode.

Pulse – The Pulse type is used to generate periodic wave pulses in the tank. The period change can be adjusted from .25 seconds to 1300 seconds. Also, the maximum pump intensity can be configured in this mode. Table 2 - Starting Pulse Widths shows the on times used to generate resonate waves in our test tanks. The values used in your tank may be slightly different but these should be a good starting point.

Tidal Swell – The Tidal Swell type is an EcoSMART only mode used to generate left to right, right to left, calm, surge flows in the tank. The maximum pump intensity can be configured in this mode.

Tank Width (feet)	ON Time
3	0.55 Seconds
4	0.8 Seconds
6	1.2 Seconds
8	1.8 Seconds

**Table 2 - Starting Pulse Widths**

Nutrient Tran – The Nutrient Transport Mode is an EcoSMART only mode used to generate resonant wave, and a surge effect in the tank. The maximum pump intensity can be configured in this mode.

Sync – The sync Type allows for one pump to be synchronized to another pump. The maximum intensity as well as the master pump to synchronize is specified in this profile type. Synchronizing a non-EcoSMART pump to an EcoSMART pump running the Tidal Swell or Nutrient Transport mode is not possible.

Anti-Sync – The Anti-Synchronizing Type allows for one pump to be opposite state of another pump. The maximum intensity as well as the master pump to Anti-Sync with is specified in this profile type. Anti-Synchronizing a non-EcoSMART pump to an EcoSMART pump running the Tidal Swell or Nutrient Transport mode is not possible.

Eco-Back – The EcoSMART Back Type allows for one pump to run the EcoSMART Back pump mode. See the EcoSMART Pump’s owner’s manual for more details. The maximum intensity as well as the master pump to be synchronized to is specified in this profile type. Eco-Back a non-EcoSMART pump to an EcoSMART pump is not possible.

## ADVANCED PROGRAM EXAMPLE

The following program assumes that there are two pumps in the Aquarium – one on the right side, and one on the left side. This example shows how each pump can be controlled independently, and its mode of operation changed multiple times throughout the day.

The following table shows how the profiles required for this program example.

Profile Name	Mode	Notes
ReefCrst	Reef Crest	Max Intensity 100%
TidalSwl	Tidal Swell	Max Intensity 80%
Nutrient	Nutrient Export	Max Intensity 90%
Pulse	Pulse	Max Intensity 100%, on time to 0.55 seconds
Night	Constant	Max Intensity 50%
Sync	Synchronize	Max Intensity 100%, sync to VorTechLeft
Anti-Sync	Anti-sync	Max Intensity 100%, anti-sync to VorTechLeft
Slow	Constant	Max Intensity 25%

**Table 3 - Profiles Defined for Program Example**

The following programs are used for each of the VorTech outlets.

<VorTechLeft>

Set Pulse

If Time 8:00 to 10:00 Then ReefCrst

If Time 12:00 to 14:00 Then TidalSwl  
 If Time 16:00 to 20:00 Then Nutrient  
 If Time 22:00 to 06:00 Then Night  
 If FeedA 000 Then Slow  
 If FeedD 000 Then Off

<VorTechRight>

Set antiSync  
 If Time 8:00 to 9:00 Then Sync  
 If Time 12:00 to 13:00 Then Sync  
 If Time 16:00 to 21:00 Then Sync  
 If Time 22:00 to 06:00 Then Night  
 If FeedA 000 Then Slow  
 If FeedD 000 Then Off

Table 4 - Pump States lists the various states of the pump at times throughout the day. If FeedA cycle is initiated both pumps will run in a constant speed of 25%. If the FeedD cycle is started, both pumps will be shut off for duration of the feed or maintenance cycle.

Time	VorTechLeft Status	VorTechRight Status
06:00 to 08:00	Pulse	Pulse (anti-sync to left pump)
08:00 to 09:00	Reef Crest	Reef Crest (sync to left pump)
09:00 to 10:00	Reef Crest	Reef Crest (anti-sync to left pump)
10:00 to 12:00	Pulse	Pulse (anti-sync to left pump)
12:00 to 13:00	Tidal Swell	Tidal Swell (sync to left pump)
13:00 to 14:00	Tidal Swell	Tidal Swell (anti-sync to left pump)
14:00 to 16:00	Pulse	Pulse (anti-sync to left pump)
16:00 to 20:00	Nutrient Transport	Nutrient Transport (sync to left pump)
20:00 to 21:00	Pulse	Pulse (sync to left pump)
21:00 to 22:00	Pulse	Pulse (anti-sync to left pump)
22:00 to 06:00	Constant (50%)	Constant (50%)

**Table 4 - Pump States**

## NEPTUNE SYSTEMS LIMITED WARRANTY

Neptune Systems warrants this product to be free from defects in material and workmanship for a period of 1 year from the date of purchase. Probes carry a 90-day warranty. If repair or adjustment is necessary and has not been the result of abuse, misuse, or accidental damage, within the 1-year period, please return the product with proof of purchase, and correction of the defect will be made without charge.

For your protection, items being returned must be carefully packed to prevent damage in shipment and insured against possible damage or loss. Neptune Systems will not be responsible for damage resulting from careless or insufficient packaging. Before returning please obtain a return authorization (RMA) number from Neptune Systems at (408) 578-3022. Returned merchandise will not be accepted without a RMA number.

Except for the warranty set forth above, Neptune Systems is not responsible for any damages including, but not limited to, consequential damage occurring out of or in connection with the delivery, use or performance of Neptune Systems' products. Buyer's remedies for breach of warranty shall be limited to repair, or replacement and full or partial adjustment to purchase price.

Information in this manual is subject to change without notice. Please see [www.neptunesys.com](http://www.neptunesys.com) for the latest product information and product updates.

**RF Module Important Information:**

The product you have purchased contains the EcoTech Marine RF Module, part number 10169. This module gives your product the ability to communicate wirelessly to other EcoTech Marine products as well as certain other manufacturer’s products that were designed in compliance with the specifications of the EcoTech Marine’s RF Module. Use of this module in products not consented by EcoTech Marine and Neptune Systems is prohibited. This product is for indoor usage only.

**FCC Compliance Statement**

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received including interference that may cause undesired operation. Any changes or modifications not expressly approved by EcoTech Marine could void the user’s authority to operate the RF module, and/or the product that incorporates the RF Module. The user is cautioned to maintain a 20cm (8 inch) spacing from the product to ensure compliance with FCC regulations.

**CE Declaration of Conformity**

The equipment complies with the RF exposure Requirement 1999/5/EEC, Council Recommendation on the limitation of exposure of the general public to electromagnetic fields (0-300 GHz). This equipment meets the following conformance standards: EN 300 328, EN 301 489-17


For France:

Francais: Cet équipement est prévu uniquement pour un usage à l'intérieur des bâtiments.


English: This device is intended for indoor use only.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received including interference that may cause undesired operation.


This device contains:  
 EcoTech Marine’s RF module  
 Part Number: 10169  
 FCC ID: VKB271829  
 IC: 7349A-271829



WXM can be used in the following countries:



AT	BG	BE	CY	CZ	DK
EE	FI	FR	DE	GR	HU
IE	IT	LV	LT	LU	MT
NL	PL	PT	RO	SK	SL
ES	SE	GB	IS	LI	NO
CH					



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