

* Q u a t t r o - D B TM

Algae and Biofilm Control System
Product of

HYDRO BIOSCIENCE TM
Eco Driven Solutions TM

Marketed by:

AlgaeControl **US LLC**

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The *Quattro-DB™ is a state of the art device by Hydro BioScience™ for algae and biofilm control. The Quattro (4 Directional) – DB (Dual Bandwidth) offers features not found before in these types of devices. A radial sound output is achieved with two piezo sound emitters that can operate in two different bandwidths for better control of green algae and diatoms in the lower bandwidth and blue-green algae in the higher bandwidth, all accomplished with one device.

The device works in harmony with aquatic wildlife (fish and animals), aquatic plants, bio-solids and planktonic organisms other than algae. Since the device can control biofilm formation on cleaned surfaces, you may notice surfaces near the device remain clean for long periods after being initially cleaned. This is due to inhibiting anaerobic bacterial colonization due to their sensing the ultrasonic signature as water turbulence. Fungi (eg. Pythium) and bacteria with gas vesicles will also be controlled by the device by causing them to lose buoyancy.

The device creates ultrasonic frequencies that cover two important bandwidth areas where algae can be controlled via critical structural resonance similar to the way a crystal glass can be broken by the right sound pitch. Ultrasound works as the force to cause these internal vibrations in algae cells or in organelles inside the algae cells that disable them.

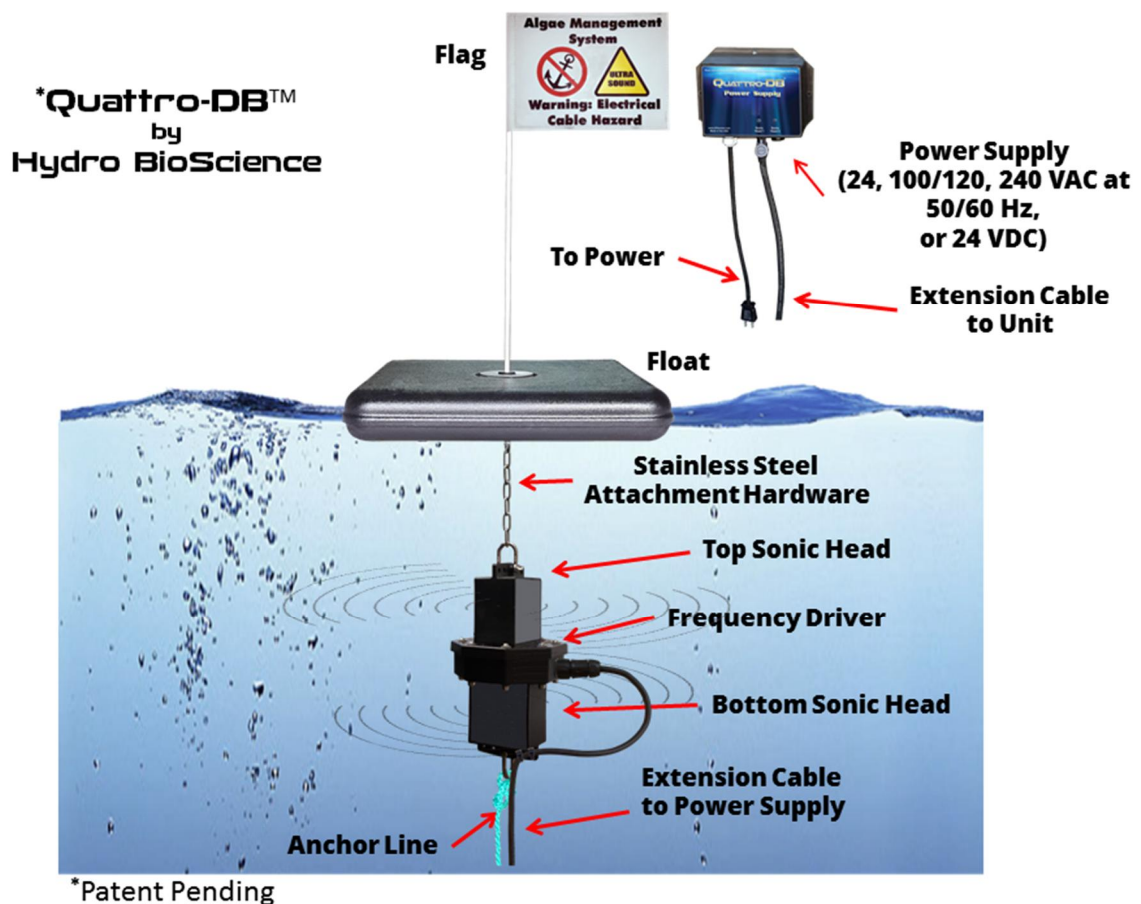
The system is powered via the power module that is available for use with many types of power input

- 1) Power Module: This can be AC or DC electrical input. AC inputs include 24, 100/120 and 240 volt service at 50 or 60 Hz. DC input is 24 volts via solar or AC charged batteries (typically two 12 volt batteries in series.) The power module converts the input power to the 40 volt DC line voltage needed to power the sonic head.

- 2) Connecting Cable: This connects the power module with the sonic head. This provides power and communications to and from the sonic head. The standard cable length is 150 meters (about 500 feet) but lengths up to 500 meters (about 1640 feet) are possible. Other devices of this type are typically limited to cables lengths of 75 meters due to cable voltage drop reduces the driving voltage for the circuit and the sound output level drops proportionately. The *Quattro-DB™ has compensating circuitry in the sonic head that boosts the incoming voltage to the 40 volts needed by the circuitry and is a unique and patent pending feature of the device.
- 3) Sonic Head: This contains the frequency driver and the sonic emitters that produce the ultrasonic output signal. The top and bottom sections house the piezo sonic emitters. They are offset by 90° so that the sound is projected radially away in 4 directions. The two way output and the two piezo mounts are unique in the industry.



- 4) Float: This provides buoyancy for the sonic head and cable. The placement of the device is normally away from the bank so that there is a line of sight from the device to as much of the shoreline as possible. A flag on the float warns boaters not to anchor there due to the cable below. The user supplies an anchor to which the unit is tethered. The cable runs back to shore to a power supply run on AC or DC power.



- 5) Attachment Hardware: All stainless steel shackles and hardware are provided to connect the float to the sonic head. All cables are plug and play. AC power inlet plugs can be provided in common configurations by country or can be provided as flying leads for wiring into power supply terminals.

6) Optional Solar Power Supplies:

1. Land Based Systems available in 60 and 180 watt capability. Solar panels are modular at 20 watts each. The 60 watt system has 3 and the 180 watt system has 9. They are shown below.



2. Floating Solar Systems have 180 watt panels but sit flat on dock floats. The *Quattro-DB™ unit hangs under the floating array.



3. The following pictures show the solar float system back and side views while the panels are in the maintenance position that allows access to the battery box shown between the float



Floating Solar Power Supply Solar Panels are shown in the maintenance position. Panels are normally flat.

*Quattro-DB™ Design Capability:

Green Algae and Diatom Algae Control Range: 150 meters radially from the device or about 7 hectare or 17.5 acres.

Blue-green Algae with gas vesicles Control Range: 400 meters radially from the device or about 50 hectare or 124 acres.

Frequency ranges: Bandwidth 1: Low ultrasonic range 34 kHz

 Bandwidth 2: High ultrasonic range 10 kHz

Total Frequencies per cycle: 2024

Time per cycle: about 34 minutes

Power consumed: 11.2 watts average on 120 volts AC (about \$15 per year at \$0.15/kwh)

Peak instantaneous power - 50 watts.