written by controller **30** to output module **203**, which performs a digital-to-analog conversion, and transmits the resulting ventilatory signals to termination panel **48** via cable **214**. The analog ventilatory data signals at terminal panel **48** may be viewed on oscilloscope **56**, which is connected to termination panel **48** via cable **216**.

Module **204** may also receive analog input signals from termination panel **48** via cable **212**. This feature is used to provide controller **30** with information from an external source such as a water treatment facility. For example, when the facility is discharging effluent water, a signal may be sent from the treatment facility control room to system **10** indicating that a discharge has occurred. This information would be provided to controller **30** via termination panel **48**, cable **212**, and input module **204**. The analog signals received by input module **204** are converted to digital form and transferred to controller **30**.

Internal carrier **200** further includes a digital output port **205** to send digital control signals to termination panel **48** via cable **217**. Digital output port **205** is used in this example embodiment to control solenoid valve **52**, water sampler **54**, and control signal **58** as described with reference to FIG. **6** below.

The internal carrier board **200** may itself be, or may be assembled from, off-the-self components. In this particular embodiment, internal carrier board **200** is a model PCI-20041C-2A. Module **202** is an analog expander/sequencer option module, model PCI-20031M-1. Output module **203** is a 12-bit analog output module, model PCI-20003M-2. And input module **204** is a 12-bit analog input module, model PCI-20002M-1, all of which are commercially available from Intelligent Instrumentation, Inc.

Turning to FIG. **6**, a schematic of a termination panel **48** is illustrated. Termination panel **48** includes signal module **210** and control module **220**. Signal module **210** receives analog input from module **203** of internal carrier **200** via cable **214**. Module **210** includes analog input terminal strip **213** and analog output terminal strip **215**. Channel **0** and **1** of output terminal **214** are used in this illustration to provide an analog voltage signal to oscilloscope **56** via cable **216**. Channel **0** of input terminal **213** receives signal **218** from an external source indicating, for example, that a wastewater or effluent discharge is taking place. Additional terminals for further input data and output functions are provided for expansion as may be desired for a particular application of the invention. More information from a water treatment facility, for example, may be provided and analyzed by controller **30** via the unused channels available on input terminal **213**. Similarly, additional output information could be provided to remote sites, monitoring stations, and the like using the unused channels of output terminal **215**.

The function of terminal panel **48** may be divided among a number of separate devices, perhaps even eliminating the need for this particular component of system **10**. It is used in this embodiment to separate power supply **222** and other component wiring from controller **30** and amplifier **26**, thus avoiding possible signal noise that could result from a clustering of components.

Termination panel **48** also includes control module **220** for controlling certain component functions based upon a digital signal from controller **30**. Control signals are received from controller **30** via digital output module **205** and cable **217**. A 120-volt AC power supply **222** is provided to module **220** for use in opening or closing water control valves, sounding alarms, and similar functions. In this embodiment, module **220** provides output control of solenoid valve controller **52**, water sampler **54**, and control signal **58**. Solenoid valve controller **52**, in response to a signal from controller **10** via termination panel **48**, provides water to sensor **40** for sensing water characteristics from either source **12** via stream **17** or control water source **27**. In this way, sensor **40** can be calibrated automatically by controller **30** using the known water characteristics of control water source **27**. Sensor **40** is a commercially available water quality analyzer such as the H**20** multiprobe available from by Hydrolab, Inc.

Control signal **58** may be used to energize a simple audible alarm and lamp to warn of a water quality problem, or it may be a previously established response procedure to automatically isolate or correct the cause of the problem. The latter is accomplished for a given application of the invention with the assistance of local facility engineers using standard equipment and procedures. For example, corrective action at a particular water treatment facility may call for additional holding time in a reaction vessel, aeration pond, or the like before the water is discharged to the environment. In the case where system **10** is used to monitor a source **12** of drinking water before it enters a potable water system, automated corrective action may call for immediate isolation of water source **12** to prevent it from entering the potable water system until the water quality problem has been resolved. As illustrated in the above discussion, system **10** provides a general-purpose automated biomonitoring system for use in monitoring the water quality of any source of water, and is readily integrated with other control systems or data monitoring devices.

The foregoing description of specific embodiments of the present invention have been presented for purposes of illustration and description. They are not intended to be exhaustive or to limit the invention to the precise forms disclosed, and many modifications and variations are possible in light of the above teaching. The embodiments illustrated and described above were chosen to best explain the principles of the invention and its practical application, thereby enabling others skilled in the art to best utilize the invention and various embodiments with various modifications as are suited to the particular use contemplated. It is intended that the scope of the invention be defined by the following Claims and their equivalents.

We claim:

1. An apparatus for monitoring and evaluating water quality using ventilatory behavior and body movement of an aquatic organism, comprising:

an exposure chamber for housing an aquatic organism;

an electrode for sensing and quantifying ventilatory behavior and body movement of said aquatic organism into data and outputting said data as a behavioral signal; and

a controller for receiving said behavioral signal and determining a plurality of ventilatory parameters for said aquatic organism based on said behavioral signal and further determining when one or more of said parameters exceed a threshold,

wherein said plurality of ventilatory parameters comprises a ventilatory parameter selected from the group consisting of ventilatory frequency average ventilatory depth, cough rate, and percent whole body movement.

2. An apparatus as recited in claim **1** including an alarm responsive to the controller for generating an alarm when the controller determines that one or more of the ventilatory parameters has exceeded a threshold.

3. An apparatus as recited in claim **1** including a water quality sensor for sensing a characteristic of water supplied to the exposure chamber, wherein the controller is respon-