The Biotope controller measures pH and ORP in up to 4 sites, and temperature at 2 sites. Using specially designed outlet strips, the controller can keep separate timers for lights and pumps. But most importantly, the biotope controller uses the data acquired from the sensors to control the appropriately connected devices to compensate for changes in temperature, pH, ORP, and water levels.

─────────────────────────── Applications

## pH / ORP / Temperature

The biotope control system can accept 4 standard pH or ORP probes. Any combination of these probes can be used, providing the user with ample measuring capacity and flexibility. For example, a common configuration would be three pH probes (water column pH, Calcium Reactor pH, and Kalkwasser pH) and one ORP probe. The controller can also monitor up to two RTD type (water proof) temp probes. Similar to the pH and ORP probes, the temperature probes can also be programmed with thresholds to control other devices. A typical configuration is to designate a probe with a low temperature threshold to turn on a heater. Besides the ability to report these parameters, the biotope controller can truly act as a "controller" to react to undesired changes. The sensor ports can be programmed to control ancillary devices, override other sensor ports, and activate switches, valves, or pumps. A popular configuration is to program the water pH sensor with a threshold of 7.9, and a calcium reactor at 6.5. If the water pH drops below the 7.9 threshold, it will shut off the calcium reactor to prevent a larger drop in pH. Another example, temperature: Temperature probe one can be configured with a sequence of thresholds of increasing temperatures. For example, the first threshold might engage a tank chiller. If it is not sufficient and the tank temperature reaches the next threshold, then metal halide lighting is turned off, and possibly fans turned on, or large submerged pumps can be turned off. Any probe can be programmed to act upon an electrical device that can be turned on and off at the programmable power outlet.

## Light & Pump Timers

The biotope controller also commands a series of specially designed outlet strips. Each outlet on the strip can be set on a timer, each with a different time if desired, adjustable within 1 minute increments. This allows for precise timing of a sequence of lighting for dusk and dawn effects, or to turn on closed loop systems at certain times, brief activation of kalkwasser reactors, or turn off pumps at the push of a button at feeding time. Additionally, certain outlets can be programmed to automatically be turned on/off based on readings from the sensors.

## Safety & Feedback Loops

Besides temperature, pH, and ORP monitors and timers, the biotope

controller also supports 4 normally-open level switches. The switches recommended for this controller are the common passive normally-closer-contact closure switches. Switch one is hardwired to be the master level control switch; this is the overflow detection switch which will override all three other switches, deactivating them. The other three switches are typically used for primary water top-off, fresh change water storage tanks, and protein skimmer auto-flush. These switches are considered safety features since they help prevent your worse hobby nightmares; floods and nasty, smelly stains.

Sunrise / Set & Seasons
With enough time and attention to the advanced setting in the setup procedure, the biotope controller is capable of incredibly accurate and elaborate simulations of weather. With the use of the proper lighting hardware, several small groups of lights can be individually controlled. This allows for a very gradual and subtle dusk to dawn effect. Moon lights can also be incorporated into the lighting scheme. But the biotope controller doesn't stop at simple sunrise and sunset. With the incorporation of LED moon lights, phases of the moon can be simulated; this can be coupled with a wave-maker and closed loop systems to simulate the tide. Storms are also programmable at random intervals, and optionally, also random intensities. Lighting can be programmed to turn off certain lights, to simulate cloud cover, and increase water flow to simulate turbulence.