

Animated and Musical Fountains



We receive frequent requests for dynamic water features and I thought it would be appropriate to write an open letter addressing what is available.

In our terminology an “animated” fountain is one that has water or lighting that changes state over time. A “musical” fountain builds upon this by synchronizing these effects to music through programmed choreography.

An animated fountain may use technology as simple as a “color blender” --a motorized cam switch to sequence colored lights through all their combinations. A more advanced approach uses a Programmable Logic Controller (PLC --a beige box about a third a shoe box in size) to switch the combinations to make them less predictable or to allow the user to select the sequence and rate of change. Still more advanced, the PLC can control dimmers to allow continuous flow between colors instead of simple on/off switching.

Musical fountains need tight choreography between the music and fountain resources (lights, valves, pumps, pneumatics, whatever), and it needs the ability to develop and edit the choreography in a fashion that does not drive one crazy. This requires the flexibility of a PC as the hardware and our ACCESS program as the software.

A fountain will have certain fixed costs (pool, pump, manifold) as well as variable costs (number of nozzles, valves, colored lights, electrical connections). The cost for controls is somewhat elastic in that it has a certain base level of technology (PLC or PC) that must be sized to handle the number of resources out in the fountain.

In addition to all of this there are myriad ways to perform device control. As mentioned earlier, lights can be switched or faded. Valves can also be switched or “faded” (proportional control). Such control at each point can be performed with small pilot valves (\$70) or with proportional pressure transducers (\$700), depending on the exact effect desired. You can see how the technology selected for a twenty-point system can dramatically impact its total price.

Variable speed pumps provide a desirable alternative in most systems. In many cases the pump and nozzle combination can be simply set into the pool, eliminating almost all plumbing, and providing a system that can be rearranged or upgraded at a later date without penalty. Provide us with a pool diameter, a budget number and an idea of what you want the system to accomplish for you, and we will go to work and provide you with a balanced configuration.

Regardless of the technical platform employed, we will give you value. It is all a matter of the effect you want to see, and balancing your budget with the “oohs and ahhs” you deem appropriate. We have provided miniature valves and sequencers for under \$500 for the hobbyist as well as turn-key musical fountains for over \$100k. We have this scope because of our project experience, and (lest the secret get out) because fountains are fun!

Sincerely,

Erich Altvater
President

Musical Fountains

A specialty of Atlantic Fountains is the design and implementation of animated and musical fountains. From the design of one of the first fully computer choreographed musical fountains in 1980, our experience extends from small animated residential fountains through elaborate corporate centerpieces.



Example

- Size: 30 foot diameter fiberglass pool with 80 inch diameter pedestal
- Pump: 10 Hp total, including a 3 Hp low power mode (lower right picture)
- Sprays: (1) 29', (1) 10', (6) 6' spray rings, (1) central cluster nozzle
(5) Pirouette nozzles, (5) fan nozzles, (5) leap frog nozzles
- Lighting: (50) 500 Watt fixtures, ten each of Red/Blue/Green/Amber/White
- Dimmers: (50) GFCI protected, updated 44 times per second
- Valves: (12) proportionally controlled valve channels
- Audio: CD audio, MIDI, .WAV stereo playback via 8 direct burial speakers
- Control1: PLC based autofill, dual stage wind control, photocell, closed loop pressure regulation, redundant system control and light animation
- Control2: PC based manual and scheduled control of all resources including cross fades, special effects to 0.1 second resolution



The Fountain of Living Waters

Forgive us a little nostalgia but here is an early musical fountain built in 1980.



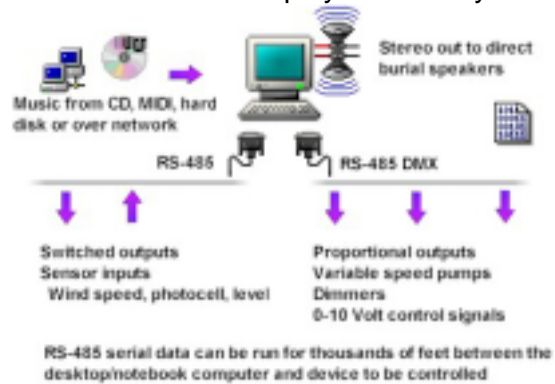
Originally built with three Apple II computers and two 6502 microprocessors, the system was updated in 1989 with version 1.0 of our PC based ACCESS software.



Animation Control and Choreography System Software (ACCESS)

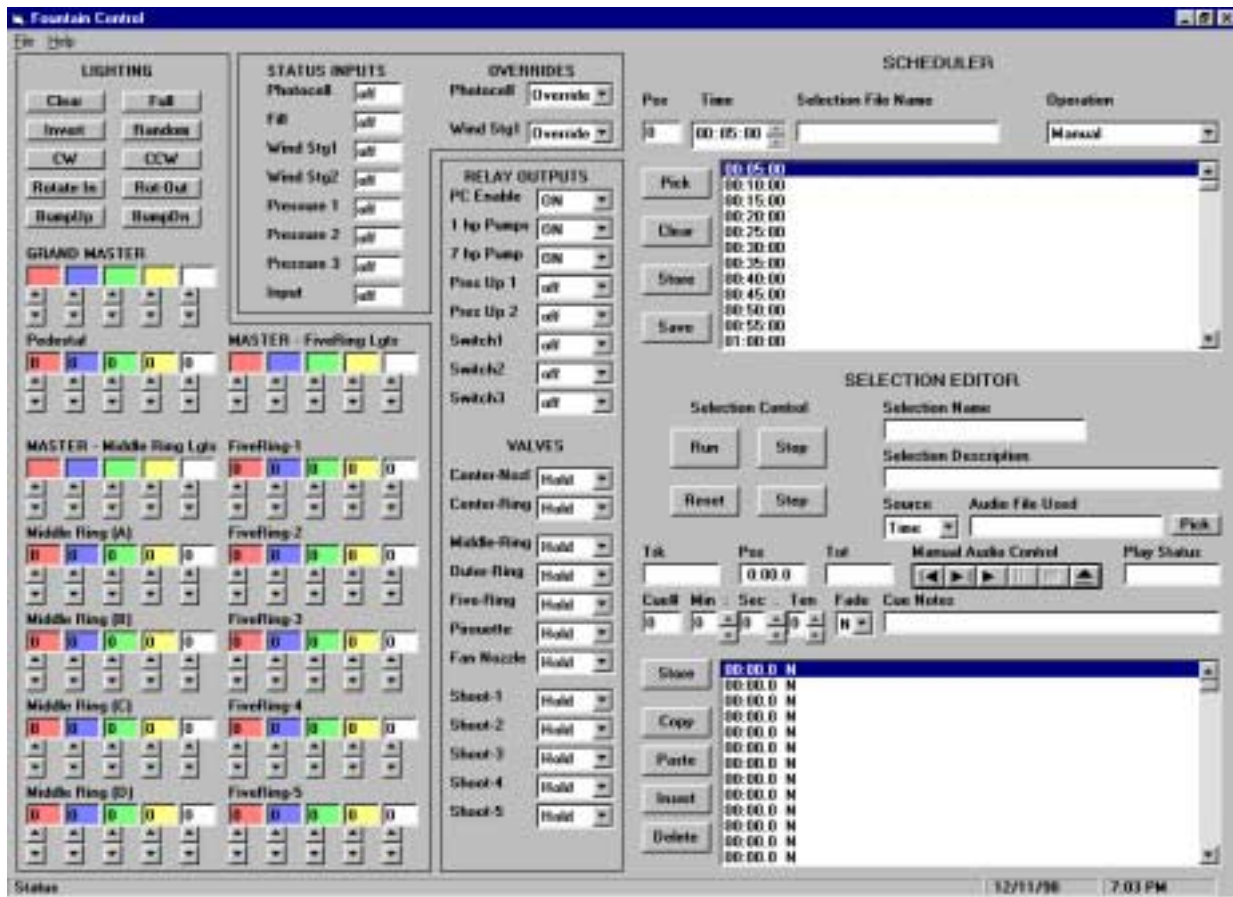
ACCESS is a 4th generation Windows based program written specifically for the control of fountains. Suitable for backyard or world-class fountains, the software can easily control hundreds of dimmers and valves to a fraction of a second and schedule playback at any hour of the day. A thin data cable sends all information to the control electronics, permitting the PC to be located hundreds of feet from the fountain.

ACCESS was developed from twenty years of experience in fountains, control systems, A/V equipment setup and PC user training. In adhering to the best trade practice of these areas, it offers power, speed and compatibility, while maintaining ease of use. The display is customized for the devices in your fountain.



The software provides complete manual and automatic control of the fountain, permitting switched or proportional control, fine adjustment of all lighting and valve resources, and response to fountain state information such as the photocell and wind speed.

The main display shows the current state of each device in the fountain.



Lighting Controls

Up/Down controls -All fountain lights are arranged in groups for each corresponding nozzle. Each component has a color text window that matches the color of its light fixture and an up/down scroll bar to alter its value. You may also type a value from 0 to 100 into the colored text box. Any change in a control is instantly reflected in the fountain lighting state, making operation intuitive.

Masters -To adjust groups of lights easier, masters are provided. A master can bring a group of lights to a desired intensity, with individual controls used to finesse the final setting.

Fades -Instead of laboring with start/end values and rates, fades are extremely easy to perform.

Simply set the fountain lighting to how you would like it to appear after the fade and select fade for that lighting cue. The program does all the computation to fade the fountain lighting to the new state at the point in time you specify. Complex cross fades with hundreds of devices are now easy and precise.

Effects -At the top of the lighting section are effect command buttons. These buttons are used to produce sweeping changes in the lighting configuration that would be tedious to perform by setting individual lights. Lighting (or valve) groups may be set or cleared, bumped or cut, randomized or inverted in intensity, or shifted in position along with their neighboring devices in clockwise or linear directions.

Status Inputs

The PC interrogates the equipment control panel. Information received is displayed in these text boxes. The program responds to wind lighting and other system conditions automatically, or overrides may be used for manual control.

Relay Outputs / Valves

The program supports switched, semi, or fully proportional devices.

Selection Editor

All of the above controls are manual in nature. They are used to set up the fountain to a predefined state. The selection editor allows a series of these states to be stored as “cues” and played back automatically.

A selection needs timing information so that it knows when to execute a cue. This “time base” can be provided by the program’s internal timer, or from position information from CD audio, or Windows audio or MIDI file. These form the basis for choreography, where changes can be synchronized to a musical source.

The editor allows an execute time to be programmed for each cue. The program permits the “release” of a cue down to the tenth of a second. These are sequential, beginning with 00:00.0 ranging through the end of the selection. A total of 200 such cues may be entered for each selection. (Because each individual cue can alter hundreds of devices this is hardly a limitation. A 100 device fountain could have 20,000 device changes spaced three seconds apart over a ten minute waltz!)

The program includes pull down menus as well as on screen menus to permit easy editing of your selection. Cut and paste operations are available to allow the rapid development of new material.

Because the choreography and digital audio are fully linked together, you may start, stop, single step, or jump to an entirely new place without having to re-cue the audio.

Scheduler

Once a selection has been built and saved, it may be scheduled for playback. The scheduler releases your selections at the time appointed throughout the day.

Choreography with audio

The best equipment is still pencil and paper. Listen to the audio selection several times to get a feel for it, and where the major lulls and crescendos exist. Then write down the time position information for these off the screen. Make notes on what effects might be nice. Finally, enter the cues and your notes and test your rough draft, then revise and adjust until done.

The Run and Step buttons make life easy on longer selections. The Run button will instantly "sync" the audio and fountain to the time entry for the cue. This allows you to work on any part of a ten minute waltz without starting over from the beginning of the piece each time!

Content Development / System Administration (...an important feature!)

The program runs on a Windows PC with a CD-ROM and sound card. Once familiarity is gained with the program and fountain together, it is soon possible to develop rough material on an off-site PC without a fountain attached! This permits multiple authors to develop 90% of their material **without** disrupting the main system. Keeping all data in digital form means that digital audio files and choreography may be transferred by Zip disk, modem/Internet or by local area network into the system. System backups may be made according to standard practice.

With ACCESS you are not tied to a big stainless console with buttons. As hardware improves your choreography investment moves with it. Windows-based device independence means that a faster PC or better MIDI card are already supported. Why go back? Twenty years ago this took five computers, \$1,800 tape decks and massive data cables to do. Been there, done that.

Conclusion

ACCESS combines proven cost-effective technologies selected from its water feature, A/V, controls engineering and user interface heritage. It has presented shows to thousands or can be set to run unattended for months. It offers the state of the art in fountain control today.

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