Smart Controller / Bell Garden Demo

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ABSTRACT

This paper will demonstrate the use of the Smart Controller workbench in the Interactive Bell Garden.

Keywords

Control Voltage, Open Sound Control, Algorithmic Composition, MIDI, Sound Installations, Programmable Logic Control, Synthesizers.

1. INTRODUCTION

The Interactive Bell Garden is an electro-mechanical / electro-acoustic installation that generates sound primarily though the percussive striking of galvanized iron caps, originally designed to protect wooden power poles from the weather. These caps have been found to function extremely well as microtonal bells, and consequently, have been composed for, performed with, and recorded [3]. The bells are arranged on metal stalks in clusters, with each stalk containing a bell, a light sensitive sensor that is used to detect that something is in close proximity to the bell, a microphone for sensing that the bell has been struck by a performer, and a solenoid mechanism whereby a voltage can be used to automatically strike a bell. The Smart Controller directs the performance in that it processes the inputs from the stalks, generating output to MIDI samplers and effects units, voltages to trigger the solenoids, and Open Sound Control [4] messages to monitoring devices based upon those inputs [2].

The performance of the work is done is phases, whereby one phase might respond to the light sensors on the stalk, another might play a MIDI sequence on the bells, another may respond to mechanical striking by performers or audience interaction. The majority of the programming of the Smart Controller can be created and tested completely through the workbench without requiring the physical hardware. This is particularly useful as I will be continuing to write patches for the instrument, which is located more than 1000km away from where I live [1]. In this demonstration, I will show a short movie that shows the Interactive Bell Garden going through three phases, which was recorded in Melbourne in January 2005; followed by a simulation of the performance in the Smart Controller Workbench.

The first phase plays Anne Norman's *Existential Funk,* the second phase is an interactive segment where the bells are automatically struck as a response to a performer moving in front of the bells, while the third phase is Anne Norman's composition, *6factorial.* The first and third phases use sequences derived from works previously composed by Anne Norman for live bells, taiko and shakuhachi. These compositions were converted to MIDI sequences, stored inside the Smart Controller, which were played back on the bells through the solenoids.

2. Smart Controller I/O mapping

The I/O of the Smart Controller was configured so that the first ten digital inputs, digital outputs, and analogue inputs were mapped to the ten bell microphones,[1] solenoids, and light sensors as ten clusters, as shown in figure 1.

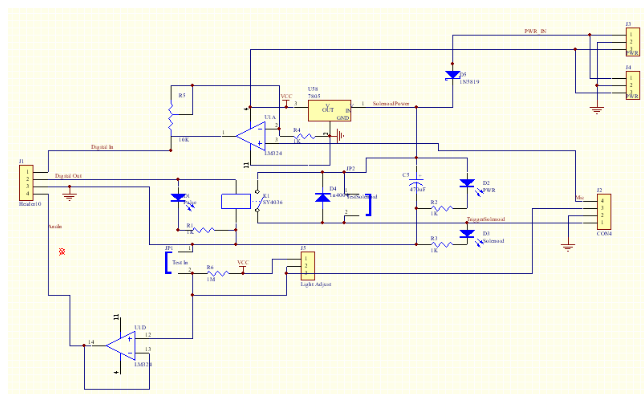

Figure 1 Single bell cluster control

Input to the Smart Controller from each bell cluster could be simulated by manipulating the simulator inputs, sliders for the analogue inputs and output to the bell cluster could be monitored through the simulator outputs. For example, simulating a person moving in front of stalk one is done by moving the slider on the simulator inputs. Output to the bell solenoids is simulated by monitoring the boxes on the simulator outputs. Digital output eleven is used to control a dual light display, while digital outputs twelve to sixteen are used to send binary coded decimal to two seven segment display units, which in this case were used to display the current phase. Figure 2 shows that the performance is in phase three, hence outputs twelve and thirteen being high.

[1] The microphones were mapped as digital and quantized though an Op Amp.

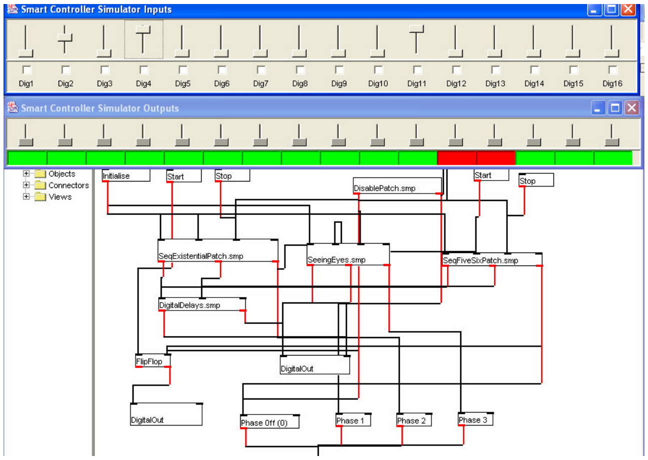

Figure 2 Simulated patch with simulator inputs and outputs

During the workbench session, it is possible to look inside any sub patches and see what values may be in the objects. Figure 3 displays how it is possible to look inside a sub patch, displaying its position with respect to the main patch inside the tree view. Additionally, an edit view of an object has been used to modify the value of an object, which is highlighted. In this instance the rate of a sampling metro was modified to make it easier to read the values that have been made at the simulator input, which is shown circled in the picture.

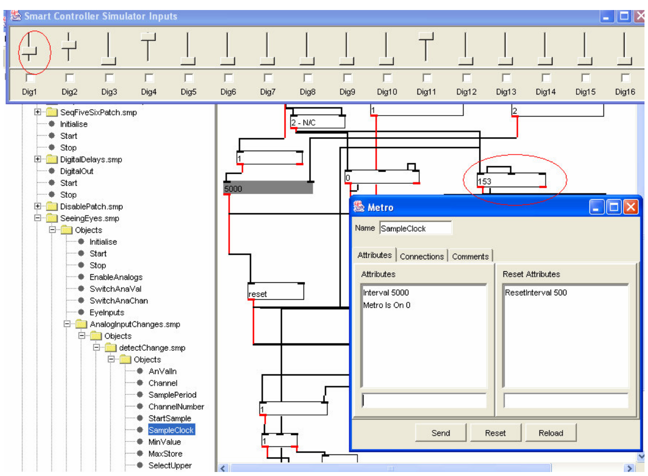

Figure 3 Monitoring and Modifying inside a sub patch

3. FUTURE DIRECTIONS

Much of Anne Norman's compositional work with the bells is done through traditional notation software on her Macintosh computer, which is used to trigger an onboard sampler, giving here the audible feedback of the bells during the composition stage. Although the Interactive Bell garden can be simulated to the point where one can see which output is going high, thus making it visible that a bell will be struck, it is possible that the patch can also be modified to generate OSC messages to an OSC capable onboard sampler, thus making it possible for Anne Norman to compose for the Interactive Bell Garden within the Smart Controller Workbench on her laptop computer while she is touring.

4. ACKNOWLEDGMENTS

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Australian Government | Australia Council for the Arts

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