Natural Materials on Stage: Custom Controllers for Aesthetic Effect

John Toenjes

University of Illinois Urbana-Champaign
907 ½ W Nevada St.
Urbana, IL 61801
jtoenjes@illinois.edu

Abstract

This article describes the implications of design and materials of computer controllers used in the context of interactive dance performance. Size, shape, and layout all influence audience perception of the performer, and materials imply context for further interpretation of the interactive performance work. It describes the construction of the "Control/Recorder" and the "VideoLyre," two custom computer control surfaces made for *Leonardo's Chimes,* a work by Toenjes, Marchant and Smith, and how these controllers contribute to theatrical aesthetic intent.

Keywords: control surface, interface, tactile, natural, organic, interactive dance.

1. Introduction

Tactility and the nature of the interface are becoming recognized again as vital compositional partners in the process of music making.[1] The materials used in constructing a controller, its size and shape, and the method used in playing it all have a bearing on the art produced, and on the audience's reception of a piece. Thus, in the conception of our performance company's computer-assisted interactive dance works, which seek to integrate dance, music, and video into one seamless whole, the design of the computer controllers that appear onstage must contribute to the desired theatrical, musical, and emotional effect, while retaining the necessary control features.

Although what actually produces the music and video is a computer running Max/MSP/Jitter and other audio and video software, one aesthetic objective is to make this "non-organic" part of the performance process disappear, so that what appears on stage is an interactive environment which seems to be a natural extension of human space, responding to human touch and movement in a physically holistic way. Additionally, we seek to integrate the roles of the dancer, musician, and VJ into one performing unit, in keeping with the nature an art which seeks as one of its

tenets to erase distinctions, such as that between movement and music (by creating a space that responds musically only when the dancer moves), between video and music (by having video respond in real-time to music parameters), between artist and scientist (through the act of programming our own custom patches), between actor and acted-upon. Therefore it is absolutely necessary in this context to "play" controllers that call upon the performer to be physically expressive so that he can be fully integrated into the *Gesamtkunstwerk*.

Furthermore, as tactility affects performance, not only the design, but also the materials of which the controller interfaces are made is important. Natural wood is a surface that humans like to touch, that looks and feels "organic," and close to a shared human experience. Yet the central focus of interactive dance, a body dancing in a magically responsive empty space where the sense of touch is ephemeral, is in conflict with this idea. Thus a provocative dissonance is created by these somewhat anachronistic wooden computer interfaces, provoking in the audience a sense of wonder, and desire to know, to feel, what is going on in this new environment.

2. The Controllers

Two such controllers are used in "Leonardo's Chimes," the first movement of our *Inventions Suite*. In it, dancer David Marchant plays an improvised music/video work by triggering hotspots on the stage, tracked from an overhead camera with Isadora software. Positioning information is sent via OSC to Max, which translates it into MIDI note commands. The "Control/Recorder" allows musician John Toenjes to select which MIDI channel the dancer is playing, and to record layers of sequences over and against which the dancer "dances a music solo." VJ Ben Smith uses the "VideoLyre" to affect the quality of the dancing/music making, by altering the feedback fed to Marchant via video projection of his body onto a screen directly behind him.

2.1 The Control/Recorder

The Control/Recorder (C/R) is comprised of three levels of sensors on separate walnut surfaces. The upper two surfaces use photocells as their electronic interface, connected to a Teleo® Intro Module and Analog I/O board which communicate via Ethernet to an offstage computer. The performer waves his left hand over the sensors, casting

shadows over photocells to send MIDI channel, and patch and sequence selection commands to Max/MSP and virtual instruments. The right hand holds a wooden wand with a magnet and IR light in its end. Sequence record/play, patch banks, and global functions such as sound system on/off, lights up/down, and stop/start all sounds are activated by the wand via magnetic switches in the base of

Figure 1. Toenjes playing the Control/Recorder.

the controller. The vertical position of the IR light is tracked by a Nintendo wii® controller camera as the performer moves the wand up and down to control MIDI channel volume. This is a change from an earlier design, pictured above, that tracks just the position of the hand. The brightness of individual LED's placed in a row above the performer's hand changes in response to MIDI volume—an illuminated virtual mixer readout.
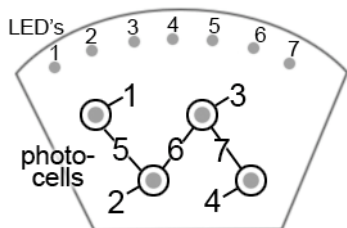

Figure 2. Control/Recorder layout, showing shadow locations for choosing corresponding MIDI channels.

This design encourages the Control/Recordist to perform his own musical hand dance, as he gracefully waves over the controller in full view of the audience. At times the two hands have to be closely coordinated to play the C/R, which requires a certain degree of skill. The physical demands of the arrangement allow the performer to engage his body to theatrical effect, thus making him more equal to the dancer in terms of his movement affecting the audience's perception of the piece.

Indeed, while playing the C/R, I have felt a sense of partnership with the dancer as I too, participate in the magical feeling of waving my hands in the air to evoke responses from the space. Audiences have compared me to a Ouija board operator, curious as to what I am doing with

this controller. The desired sense of wonder is evoked, but perhaps the interface needs a bit more transparency of effect to resonate more specifically with audiences.

While the IR volume tracking system is more accurate than tracking the hand, the wand movement is reminiscent of the control of an orchestra conductor, which puts a certain distance between the Control/Recordist and the dancer, and to the feeling of controlling the space directly with the body. This is an example of the kinds of trade-offs between functionality, and tactility, freedom and aesthetic consistency, which must be carefully considered by the interactive system designer.[2]

2.2 The VideoLyre

The VideoLyre consists of a pine and cherry box on legs with a frame above to hold strings that stretch down into the body. The strings are connected inside the box to flexible stretch sensors through which a small voltage is sent from and back to a MIDItron®. Pulling the strings stretches the sensors, causing a drop in voltage, which is mapped to video effect level. Buttons on the top of the box are used to select effects and adjustment parameters.

Figure 3. The VideoLyre.

The VideoLyre is designed to provide an intriguing interface for expressive physical performance during selection and control of video effects. A lyre shares the provocative aesthetic of the C/R—an antique design with organic materials put to the task of controlling the most modern of media. Its form blurs the distinction between musical instrument and technical video equipment, and expands the identity of the VJ from that of solely a mix artist, into one of onstage presence and hand-dancer, lending to the aesthetic of total integration of the arts.

References

[1] See A. Ness. "Uniform Diversity: The Common Myth of Tonal Progress" [Web site] 2008 Dec 10, Available: http://www.newmusicbox.org/article.nmbx?id=5808

[2] For more discussion of this, see Toenjes, J. "Composing for Interactive Dance: Paradigms for Perception," *Perspectives of New Music*, Vol. 45, No. 2, Summer 2007, 28-50.