

SUDDEN CHANGES

**A Performance of Live Interactive Computer Music and Dance
by**

**Michael McNabb
and
Liss Fain Dance**

A Proposal for ICMC 1992

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I. Artistic Description

Sudden Changes is a work for 5 dancers created in 1991 by choreographer Liss Fain for the Liss Fain Dance Company. Ms. Fain commissioned Michael McNabb to produce an original score for the work.

The dance for *Sudden Changes* consists of a series of episodes that originate in real life events, evolving from the choreographer's interest in reactions to environmental loss and diminishment. The movement idiom originates in descriptions of animal's behavior, their environments, and the effects of land development on the species; the parallel in human experiences of loss is the perception of and adjustment to altered boundaries.

In order to fully support the depth and range of the emotional and psychological content of the work, McNabb felt that a live musical performance was called for. It also was an opportunity to put into practice a new computer-based performance system he had been experimenting with. In this work, McNabb's solo instrumental performance is tremendously enlarged by a sophisticated computer music system to orchestral levels of musical expression. The system is designed to allow a wide variety of configurations of musical textures, rhythms, recorded sounds, signal processing, algorithmic accompaniment, etc., to be called up at will by a performer. However, none of the actual musical material is determined in advance. Everything is derived during the performance from the notes and gestures of the performer. Polyphonic accompaniment created in real time by the system can be based strictly or loosely on the harmonic, dynamic, and rhythmic structure of the performed material. Since the details of the music are largely improvised, McNabb and the dancers act as a single ensemble, leading to a level of interaction rare in the history of music with dance.

II. Technical Description

In the *Sudden Changes* performance, McNabb performs on a soprano saxophone equipped with a wireless microphone and an IVL pitch-to-MIDI converter. MIDI data from the converter and an array of foot controllers is routed through a Lexicon MRC MIDI Controller to a 68040 NeXT computer. The NeXT in turn controls a set of Lexicon digital signal processors and Yamaha synthesizers, synthesizes notes on its resident DSP, and plays stereo sound files directly from a hard disk, all simultaneously. The NeXT screen also displays a graphic score of the dancers' entrances and exits, and key musical phrases and cues.

The heart of the system is an object-oriented MIDI-processing software application, developed by McNabb, called *Ensemble* (see included paper). All performance data is processed by *Ensemble*. Received MIDI data is analyzed in order to maintain a knowledge of the current harmonic, rhythmic and dynamic contexts. Fractal-based algorithms are used to generate real-time accompaniment compatible with the current musical context. Other software objects generate timbre-shifting artificial overtones, create chord mappings, perform musical transformations, and playback recorded fragments of poetry which is processed into musical material under computer control. The system's entire configuration is periodically changed, and the foot controllers assigned different functions, by the software in response to program change commands.

Ensemble was completed during McNabb's tenure as Manager of the Sound and Music Group at NeXT Computer, and is shipped as a NeXT Music Kit programming example with all NeXT developer systems.

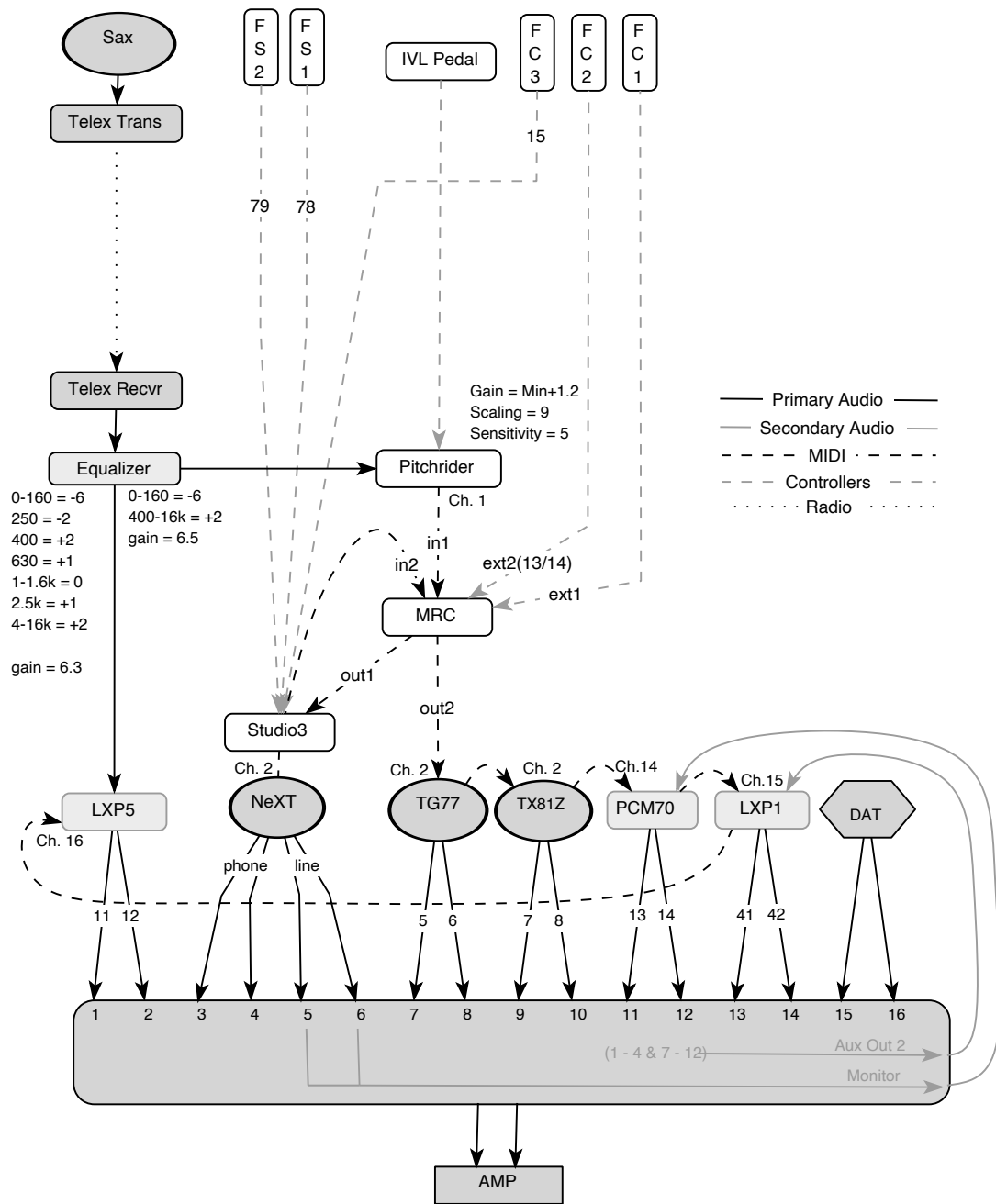


Figure 1. Block diagram of the *Sudden Changes* music performance system.

III. Technical Requirements

Sudden Changes requires a sprung wood or marley stage with a minimum area of 25 by 35 feet. Hidden wings are not required.

The musical performance requires a high-quality stereophonic sound system of sufficient power to sonically fill the space and cover the entire audience area without creating noticeable distortion, especially in the low-frequency range. If the house speaker system is located stage front, separate stereo monitor speakers must be provided on stage for both the dancers and the musician. Since the sound mix and levels are controlled directly by the musician, and the dancers' level of interaction is high, good monitoring is essential to the quality of the performance.

IV. Performance History

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|---------------------|---|
| May 9, 10, 11, 1991 | New Performance Gallery, San Francisco, CA |
| July 12, 1991 | Pt. Reyes Station, CA |
| Sept. 21, 1991 | Cinnebar Theatre, Petaluma, CA |
| Sept. 28, 1991 | Mountain View Center for the Performing Arts, Mountain View, CA |
| March 5, 6, 7, 1992 | New Performance Gallery, San Francisco, CA |

V. Proposed Budget for ICMC 1992

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|------------------------------------|-------------|------------------|
| Dance Artists' Fees | (5 x \$165) | \$ 825 |
| Choreographer | | waived |
| Musician's Fee | | ICMC admission |
| Technical Director / Stage Manager | | provided by ICMC |
| Lighting Designer | | \$ 300 |
| Transportation / Miscellaneous | | waived |
| TOTAL | | \$1125 |

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Michael McNabb - *Sudden Changes*

Equipment

Provided by the composer:

68040 NeXT computer, hard disk, optical drive
Opcode Studio 3
Lexicon PCM70, LXP1, LXP5, MRC
Yamaha TG77, TX81Z
IVL Pitchrider with foot controller
Rane ME15 2/3 octave graphic equalizer
16-channel audio Mixer
Telex wireless microphone system
3 continuous foot controllers, 2 foot switches

Provided by ICMC:

stereo performance sound system
minimum 25' by 35' sprung wood or marley stage for dancers
conventional stage lighting equipment

Program Notes:

Sudden Changes is a work for 5 dancers created in 1991 by choreographer Liss Fain for the Liss Fain Dance Company. Ms. Fain commissioned Michael McNabb to produce an original score for the work.

The dance for *Sudden Changes* consists of a series of episodes that originate in real life events, evolving from the choreographer's interest in reactions to environmental loss and diminishment. The movement idiom originates in descriptions of animal's behavior, their environments, and the effects of land development on the species; the parallel in human experiences of loss is the perception of and adjustment to altered boundaries.

In the musical performance, McNabb performs on a soprano saxophone equipped with a wireless microphone and an IVL pitch-to-MIDI converter. MIDI data from the converter and an array of foot controllers is routed through a Lexicon MRC MIDI Controller to a 68040 NeXT computer. The NeXT, running a version of *Ensemble*, in turn controls a set of Lexicon digital signal processors and Yamaha synthesizers, synthesizes notes on its resident DSP, and plays stereo sound files directly from a hard disk. The NeXT screen also displays a graphic score of the dancers' entrances and exits, and key musical phrases and cues.

None of the actual musical material is determined in advance. Everything is derived during the performance from the notes and gestures of the performer.

Polyphonic accompaniment created in real time by the system can be based strictly or loosely on the harmonic, dynamic, and rhythmic structure of the performed material. Since the details and phrasings of the music are largely improvised, McNabb and the dancers act as a single ensemble, leading to a much higher level of interaction than is usual in the history of music with dance.

Composer's Biography

MICHAEL MCNABB has specialized in computer applications to composition and performance for over 15 years. He holds a doctorate in Music Composition from Stanford University, where he studied with John Chowning and Leland Smith. He has received awards from the Prix Ars Electronica, the National Endowment for the Arts, the Bourges Electroacoustic Music Festival, and the League of Composers / ISCM. Two CD releases are available, "Computer Music" (Mobile Fidelity Sound Labs MFCD-818), and "Invisible Cities" (Wergo 2015-50). The latter work was a collaboration with the ODC/ San Francisco dance company. His latest project was an interactive computer-controlled 8-channel sound installation, part of a collaboration with filmmaker Lynn Kirby at Intersection for the Arts in San Francisco. He also performed live in 1990 at the Second International Symposium on Electronic Art, in Holland. Michael McNabb was formerly Manager of Sound and Music Software at NeXT Computer, and is currently a consultant specializing in application design and development on the NeXT.

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Michael McNabb - *Sudden Changes*

Choreographer's Biography

LISS FAIN'S energetic choreographic style has been seen by audiences on both the East and West Coasts for the last nine years. Her company, based in Boston before her relocation to the Bay area, has presented works throughout the Northeast, including: the Downtown Dance Festival, N.Y.; the ArtCulture Resource Center, Toronto; the University of Massachusetts; The Dance Umbrella, Boston; Harvard University; and The Center For Advanced Visual Studies, M.I.T. In 1989 she moved to the Bay Area, premiering *Edging Towards Saturn* in her Spring 1990 concert. She is currently creating a series of work (the Alternative Space Project) designed to function in both intimate and non-intimate situations. The project -- which continues her tradition of collaborating with composers, videographers, high-tech magicians and photographers -- probes the way perceptions of a piece change according to the space in which it is performed; *Sudden Changes* is the first piece in this project. Works from the Alternative Space Project will be performed in a variety of venues in the Bay Area using commissioned scores from Bay Area composers.