The MIDI Time Clip: A Performer/Machine Synchronization System for Live Performance

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Abstract

The MIDI Time Clip (MTC) was developed at McGill University to provide an economical means of communicating to a performer the state of a computer-controlled accompaniment [Pennycook and Johnstone, 1992]. The MIDI Time Clip provides a performer with tempo, section numbers, and time display. This information is inserted into an accompaniment using the MTC software. The MTC software allows the device to be easily integrated into any MIDI program including MIDI sequencers, MAX, etc. The MTC is able to synchronize performers with audio accompaniments played from hard disks, CD-ROM, compact disks, DAT and tape machines. The MTC also accepts input from several foot switches and pedals, allowing the performer to communicate with the computer-controlled accompaniment. The MTC and its accompanying software allows the composer or performer to create a synchronization system for any electroacoustic composition.

1 Introduction

One of the most frustrating and time-consuming tasks for musicians performing with MIDI or audio accompaniment is the synchronization of their performance with the accompaniment. Many hours of rehearsal can be spent locating cue points, matching tempos, estimating durations, etc. Current solutions to this problem include the use of a stopwatch or click-track to help synchronize the musicians with the score. However, these solutions often require clumsy and intrusive technical requirements (multi-channel tapes, SMPTE DAT machines, etc.). Many of these solutions are also prohibitively expensive for musicians and concert presenters. These factors may discourage performers from performing such works.

2 The MIDI Time Clip Hardware

The MIDI Time Clip is a unique electronic/digital device invented by Bruce Pennycook for the purpose of simplifying communications between performers on stage and computer-controlled accompaniment [Pennycook and Johnstone, 1992]. The MIDI Time Clip is a small (4''x5''x3'') unit which attaches to a microphone stand and communicates with a computer via MIDI. It includes six, 14-segment LED's for alphanumeric character display, one large red LED for flashing tempo cues, plus a pedal input attachment for volume, sustain, and trigger pedals. The performer in a studio or on-stage receives visual messages from the computer during performance to assist with setting tempi, indicating rehearsal numbers, and to provide visual feedback to the player for actions which may have no audible result such as triggering new program changes or upcoming events. The MIDI Time Clip is currently being used in interactive compositions in the following capacities:

- provide alphanumeric cues during the piece (e.g. rehearsal numbers)
- provide tempo cues (like a conductor)
- show exact time locations (including SMPTE/MTC, bars and beats, etc.)
- send foot switch and continuous controller data to the computer to trigger MIDI sequences and tracks of digital audio and control their playback volume
3 The MIDI Time Clip Software

At present, all of the MTC software has been implemented as a series of external objects in MAX, a graphical programming environment from Opcode. We are currently in the process of creating a stand-alone MTC application for the Macintosh computer. The MTC software allows the composer or performer to create a list of messages that will be sent to the MTC at appropriate positions in the score. The position of each message is easily specified in a MTC playlist. When the computer accompaniment reaches a specified position in the piece, the appropriate message is sent to the MIDI Time Clip. This system allows a composer to quickly add visual cues for the performer. If, during a rehearsal of the work, the performer decides that an extra cue, or a different type of cue is required, the new cue may be immediately added to the playlist. The MTC software allows the performer to start from any marked rehearsal position in the score. The computer accompaniment will also start playback at the correct position.

A highly portable performance system may be designed around the MIDI Time Clip. For example, the required equipment for a composition that includes a performer and a digital audio accompaniment would be any Macintosh computer, a CD-ROM player, the MIDI Time Clip, a footswitch and a volume pedal. Using the MTC software, the composer prepares the MTC playlist by dropping MTC message markers into a graphic display of the audio waveform (see figure 1). During playback, the MTC software monitors the current playback position of the CD audio. When the current playback position arrives at a MTC marker position, the correct MTC message is sent to the MIDI Time Clip. The MTC software also allows the performer to start and stop the CD audio using the footswitch and control the playback volume with the foot pedal.

From this basic design, extremely complex performance systems may be developed. For example, in his composition PRÆÆCÍÓ¬, Bruce Pennycook uses the MTC software to enable a solo pianist to trigger digital audio from 2 CD-ROMs and a sampler, and also start and stop playback of Standard MIDI Files. During the performance of the work, the MIDI Time Clip provides the performer with tempo, position and timing information. This system allows the performer to control a complex system with a minimum of rehearsal.

Summary

The MIDI Time Clip and its accompanying software provides an economical solution for performer-system synchronization by eliminating clumsy headset "click tracks" and obtrusive computer monitors. It is our hope that the MTC will also help to increase interest in the performance of present and historical electroacoustic works by reducing the rehearsal difficulties that currently confront performers.

Reference


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