EROShambo Studio System
10/30/2000

The system we have created for the EROShambo project consists of three main pieces:
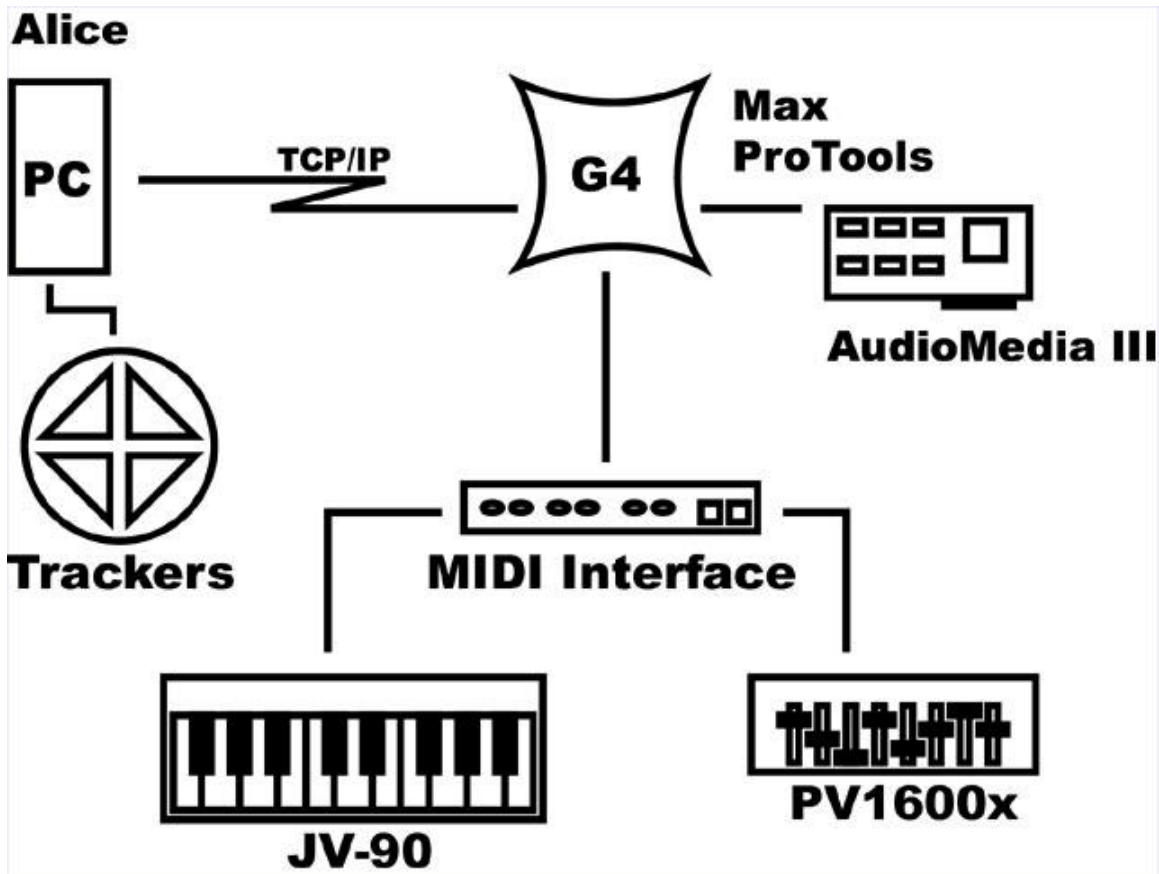
1. Alice running the Messenger and MotionRecorder systems
2. A Macintosh running Max and ProTools
3. A MIDI interface and MIDI input devices

This system was designed to allow the easy creation and animation of MVPs (MIDI Virtual Puppets) individually and to allow multiple MVPs to be controlled simultaneously within a virtual space.

The three parts serve three separate purposes. The Alice system is used as the virtual space and animation engine in which the MVPs perform. The Macintosh is used as the MIDI control system and the sequencing system. The MIDI devices are used as inputs to animate the MVPs and to trigger events in the virtual space.

The three components, when combined into a full studio, allows incredible flexibility in the creation of live virtual performance, recorded animation, and interactive virtual environments. The end result is a combination virtual animatronics studio and show control system.

Here is a diagram of the layout of the system:

The diagram shows: Alice PC connected via TCP/IP to G4 (Max, ProTools). G4 connects to AudioMedia III. PC connects to Trackers. G4 connects to MIDI Interface, which connects to JV-90 and PV1600x.

I: Alice

Alice is the base for the virtual puppeteering system. Alice allows extremely easy and fast development of a fully 3D world and its inhabitants, and with the addition of the Messenger and MotionRecorder extensions, Alice becomes a platform for animation and show control.

The Messenger system is a powerful network messaging system that uses TCP/IP to transfer messages between either multiple copies of Alice or between copies of Alice and other programs that communicate via TCP/IP, in this case Max.

Messenger was designed to be extremely easy to use and nearly transparent to an Alice program. The data transferred over a Messenger connection can be used directly in a

running Alice world to animate or control the events in a performance.

MotionRecorder is the animation and playback system that we developed to allow the recording of animatronic-like animations. The MotionRecorder records the movement of any set of objects in an Alice world and can then save, reload and play back the recorded animations. The most powerful ability, however, is the MotionRecorder's ability to record separate tracks for different objects, and layer recorded tracks on top of other, previously recorded tracks to form composite animations. This allows, for example, the animator to animate the facial expressions of a puppet, then animate the upper body movements, then the lower body and so on, until the complete animation is finished.

Together these two additions to the Alice toolkit create a general record and playback engine and a general communication system that allows much more complex and sophisticated virtual environments and interactive virtual performance pieces to be created.

II: Max, ProTools and MIDI

Max is a visual programming environment for MIDI. It allows non-programmers to relatively easily create control systems for interactive MIDI devices (keyboards, control boards and any of the other thousands of available MIDI devices).

ProTools is a professional level sound editing, sequencing and playback system that, in this case, is used to synchronize music and action. A MIDI track is laid down alongside the digital audio, on this track are single notes which act as triggers to tell Max when to send messages to Alice. For example, a Max patch can be set up to send Alice one message when it hears a C4 note (from ProTools or a keyboard) but a different one when it hears F#4.

In the EROShambo Studio, we created an extension to Max that allows it, just as Messenger allows Alice, to talk to other programs via TCP/IP.

This allows Max to send control messages to Alice and thereby change things in the virtual environment, and it allows Alice to send control messages back to Max and control the external environment through Max's MIDI capabilities.

The full system is set up to allow ProTools to send sequenced MIDI notes to Max as it plays prerecorded music; Max to send data to or receive data from Alice, ProTools, or external MIDI devices, and other forms of interaction; Alice to receive and process messages from Max, and to send messages back to Max.

III: Show Control

Through this arrangement, we are able to offer a show control package that combines the virtual environment capabilities of Alice, the sequencing and sound-playback capabilities of ProTools and the MIDI interface of Max (with supporting MIDI interfaces and input devices).

The system was designed to be easy to use, and to allow fast creation of individual animations and complete shows. In our project, a 3-minute synched animation of four characters and a camera, we divided up the longest animations into smaller sections. These sections would be triggered in order using ProTools. Since recording the animations with the Motion Recorder using the MIDI console and trackers is essesntially a live motion capture session, multiple takes are often needed to achieve the desired animation. The multi-tracking capabilities of this system allow an animator to selectively edit any portion of the animation while it is running. For example: The animator records the gross body movements of the character, then

goes back and records head and facial movements. As they are recording the head and facial movements, the previously recorded body movements play back underneath.

These tools are by no means complete, there are a nearly infinite number of possible additions, improvements and future directions for the EROShambo Studio System, since the underlying technologies are both industry standard (MIDI, TCP/IP) and extremely powerful.

IV: Other Documentation

For more documentation of the EROShambo system see the following sources:

1. Documentation of the Alice setup is in the "EROShambo Alice Docs" document

2. Documentation of the Messenger object is in the "Messenger Docs" document

3. Documentation of the MotionRecorder object is in the "MotionRecorder Docs" document

4. Documentation of the MaxShambo extension to MAX is in the "MaxShambo Docs" document

5. Documentation of the ProTools/MAX/OMS setup on the Macintosh is in the "EROShambo ProTools Docs" document

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