

Sound System Design Document, v7

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Introduction

The sound system is the interface between the low-level, platform-specific hardware and the scripting/object systems that need to play dialog, sound effects and music.

Requirements

This system must be able to play memory loaded dialog, sound effects and music, and dialog and music streamed directly from the CD. It must be able to alter the volume, pan, and pitch of any sample during playback. The system will be platform specific, using Direct Sound on the Windows platform and Sound Manager on the Mac.

There will be 2 major components of this system, the CAudio class which wraps the sound API's and the CAudioAsset class which wraps an individual sound buffer. The system will have available 1.5 megs of RAM for these tasks.

The database of sound assets used by this system will be kept by the resource system. However, the sound system will be responsible for loading and parsing the samples. All systems needing to play sound will call this system.

Dialog is included in this system. The concatenation will be done in the scripts. Reducing the amount of concatenation taking place is the goal. Multiple Long "sentences" are the preferred method of dialog, and will be streamed from the CD. Short words that are tagged on to the end of sentences, such as numbers or letters for the counting and language activities will use callback functions and/or polling to synchronize the playing of samples.

Structures/Classes

```
class CAudioAsset : CAsset {
    int/float nVolume;
    int/float nPitch;
    int/float nPan;}
```

```
class CAudio {
    int nBuffers; // # active buffers
    LinkedList BuffersPlaying;
    LinkedList BuffersPending;
```

```
bool bStereo;}
```

Functions/Methods

```
class CAudioAsset : CAsset {
    Load(szFilename)

    GetVolume();
    SetVolume();
    GetPitch();
    SetPitch();
    GetPan();
    SetPan();

    Play(Volume, Pitch, Pan); // default values for args
}

class CAudio {
    UpdateAudio(); // called each frame
    PlayEffect(szLabel, int x, int y); // will default x,y for non positional sounds
    StopEffect(szLabel);
    PollEffect(szLabel);
    PlayStream(szLabel, function* CallbackFunction);
    StopStream(szLabel);
}
```

Diagrams

Schedule Task List

System Tasks	Duration	Dependent
Design Win32 CAudioAsset class	1 Day	CAsset base class design
Design Win32 CAudio class	1 Day	Design Document
Design Mac CAudioAsset class	1 Day	CAsset base class design
Design Mac CAudio class	1 Day	Design Document
Code Win32 CAudioAsset class	2 Days	Win32 CAudioAsset class design
Code Win32 CAudio class	4 Days	Win32 CAudio class design
Test & Revise Win32 sound system	3 Days	Win32 CAudio & CAudioAsset finished
Code Mac CAudioAsset class	2 Days	Mac CAudioAsset class design
Code Mac CAudio class	5 Days	Mac CAudio class design
Test & Revise Mac sound system	4 Days	Mac CAudio & CAudioAsset finished
Rework #1 Win32 Sound System	2 Days	As Needed
Test & Revise Win32 Sound System Rework #1	1 Day	Win32 Sound System Reworked #1
Rework #1 Mac Sound System	3 Days	As Needed
Test & Revise Mac Sound System Rework #1	2 Day	Mac Sound System Reworked #1
Rework #2 Generic Sound System	2 Days	As Needed
Test & Revise Generic Sound System Rework #2	1 Day	Generic Sound System Reworked #2
Total	35 Days	

Memory

This system will use 1 meg of RAM for loaded samples and 0.5 megs for streaming buffers. The CD ROM drive will not be able to be accessed during this streaming. Each individual sound system will likely require some additional overhead to run, which is currently unknown.

Sound files will be compressed using IMA compression at a 4:1 ratio, thus reducing the amount of space necessary for them.

Risk Assessment

The Mac platform is still somewhat of an unknown. We know that it has the ability to perform all functions we require of it, but the time to figure it out or the processor hit could be large. This another area where we may need to call on the Mac consultant.

Concatenated dialog could run into synchronization difficulties, as the current plan is to start all sounds at the end of the frame, during the update. Also there could be difficulties associated knowing when the memory loaded samples are done. We may have to record more multiples of sentences, if possible, or have the voice actors put more delay in their speech to cover technical limitations.

QA & Test

If sounds are added to the scene and play correctly, this system works. If any sound is not playing, it could be in this system or the systems that call this system, (scripting/object).