A Networked Software Audio Mixing Console

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1 Introduction

This project describes a networked software audio mixing console (N-SAMC). Most mixing consoles for live audio are hardware-based, which ensures a high degree of stability within the system – often desirable for real-time audio processing. Software mixers are often used in conjunction with a digital audio workstation (DAW), and are characterized by their flexibility.

This project, *prima facie*, appears to take the worst of both world: the relative inflexibility of a hardware console with the instability of the software console. However, the this console is not specifically intended for live-audio work; but rather for testing and development of related systems which need a specifically-known basis. Additionally, the N-SAMC incorporates an OSC structure that is open, known, and documented. For development and testing, it is helpful to have a system that is completely known.

The N-SAMC is built in Max/MSP. While the Max/MSP ecosystem increases the computational overhead over a purpose-built system in C++, the flexibility and ease of use represented by Max/MSP yeilds a significant advantage for the N-SAMC as a development tool. Likewise, the N-SAMC has been built modularly – with each processing section developed as an abstraction. This allows for specific configurations to be quickly compiled to suite specific needs.

Unfortunately, the Max/MSP design requires

2 Signal Flow

The N-SAMC emulates the traditional mixing structure of a console mixer. The base implimentation consists of a dynamics range processor, a multiband, parametric equalizer, a low-cut filter, a stereo panner, and a fader. The mixer also includes 6 auxillary sends, which are switchable pre or post fader.

2.1 Low-Cut Filter

The low-cut filter occurs first in the signal chain. It is built from a pair of cascaded biquad filters, emulating a fourth-order IIR filter topology.

2.2 Dynamic Range Processing

The dynamics range processing section consists of two processing units. Either unit can function as either a compressor or a gate. The position of the dynamics range processor is switchable to pre or post-EQ.

The settings follow the usual *attack*, *release*, and *threshold* values. The module also includes visual meters that monitor the input gain and the gain reduction values.

2.3 Equalizer

The equalizer section consists of a bank of four filters which are settable parametrically by the user throught the usual *frequency*, *Q*, and *gain* values. The current implimentation fixes the filters as peaking filters.

2.4 Fader

The fader section includes a fader. The fader occurs pre-panner in signal-flow, despite visually ocurring below the panning controls. The fader applies a simple multiplier against the input signal.

2.5 Panner

The panning module is a simple stereo panner, operating on a sin-cos (-3dB at center) algorithm. The panner occurs post-fader. The N-SAMC is fixed to operate in two-channel stereo mode.

3 OSC

To fullfil the requirement of being networked every item within the N-SAMC is accessible through OSC. This includes all controls and outputs.

The OSC description is divided into two sections: input and output. The input section will outline how to externally control the mixer. The output section will outline how information