G9 Audio Processor

All-analog signal path with digital control

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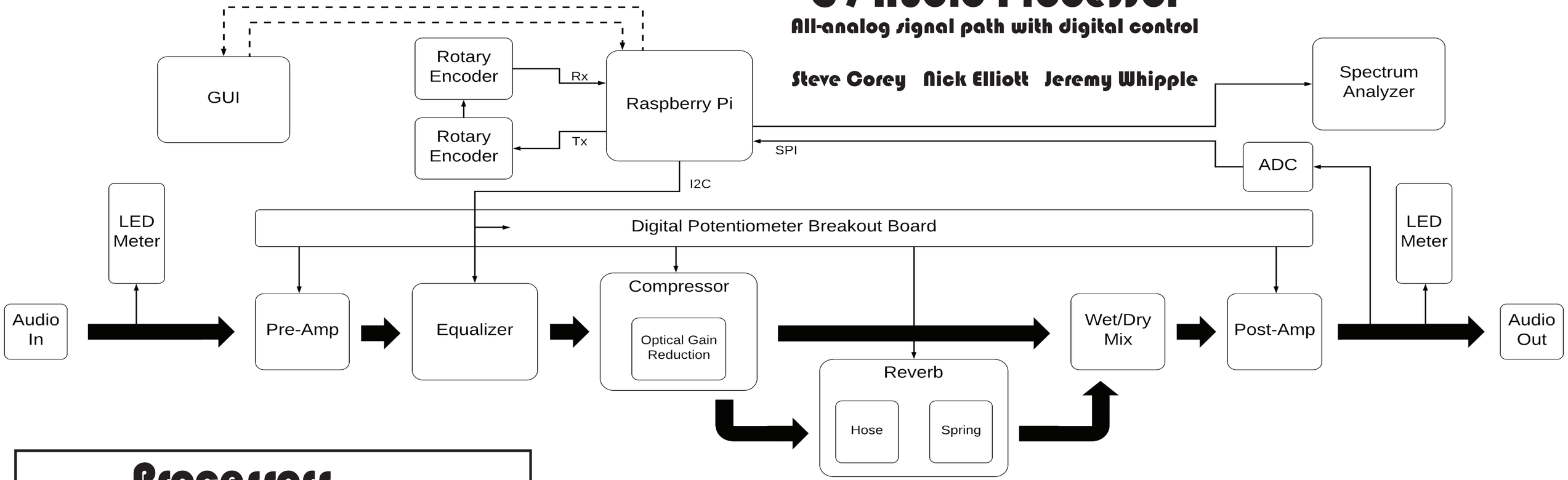

Processors

EQ

The equalizer for the G9 Processor is heavily based on Elliott Sound Product's Parametric Equaliser. It contains five NE5532 OP-amps for use in controlling its four frequency bands. We integrated the AD5144 and AD 5242 digital potentiometers to ensure we could control this component digitally. These digital potentiometers cover the 10k and 1M ohm potentiometers needed to control the selected frequency and the pass level at those frequencies.

Compressor

At first glance, the tubes in the compressor might be its most notable aspect. But don't overlook the T4 opto-attenuator cell. It's actually the T4 that gives the compressor its characteristic sound. Inside, there is an electro-luminescent panel whose brightness is controlled by the audio signal level. It shines on a photoresistor to control the gain reduction of the sound. The attack and release curves of the T4 give the sound "presence" and can tame piercing audio.

Reverb

Never before have a hose delay and a spring been combined quite like this. Spring reverbs are classic elements in many guitar amps but their reflections are dense and begin immediately. The hose rolls off the highs and lows as well as delaying the sound before hitting the spring. The result is a sound that tames the excesses of the spring while maintaining its essential character.

PCBs

Amps

As the signal flows through the G9, amp boards are used to keep the voltage at the optimal level for each stage.

Baluns

The signal coming into and out of the G9 as well as the compressor is balanced. The other processors have unbalanced I/O. Balun boards are used for these transitions.

Meters

Gain staging of the sound is critical. The input and output meters give visual feedback of the sound level so it can be adjusted to give the best results as it travels through the G9's processors.

Digipot Breakout

Digital Potentiometers are at the heart of the G9. The digipot breakout board provides easy access to 10k, 100k, and 1M Ohm potentiometers.

Software

GUI

Users interact with the G9 through its GUI which transmits control information wirelessly to the server embedded in it.

Server

The internal server runs on a Raspberry PI and takes control information from the GUI and transmits it to the processors. The server also provides feedback about the state of the processors back to the GUI.

Spectrum Analyzer

In addition to the overall signal level meters, the spectrum analyzer provides a view of the harmonic content of the processed audio.

Rotary Encoders and

ATMEGA32 microcontrollers drive the rotary encoders and meters. The embedded software can be updated to provide different meter ballistics and different touch responses for the rotary encoders.