System Level Diagram

User Inputs:
- Impedance

Power Rating

Input Signal

Signal Processor

Small Signal Gain Control

High Signal Step Down

Power Amp
Software Flow Chart

User-defined inputs (impedance, power of speakers)

Calculate maximum signal level speakers could handle safely

Signal from amplifier output (after stepped down)

D/A conversion

Is signal from amplifier within 25% of its maximum level?

No

Do nothing

Yes

Is signal within 10% of max level? Beyond the max?

Within 25% only

Tune digital pot for light proportional compression

Within 10%

Tune digital pot for heavy proportional compression

Beyond the max

Implement emergency algorithm to quickly attenuate signal to safe region
Small Signal Gain Control

\[ V_{\text{Ref}} = \frac{V_{\text{CC}}}{2} = 2.5 \text{ V} \]

\[ R_\text{f} = R_\text{i} \]

Guitar

Input Signal

Small Signal Gain Control

\[ V_{\text{Ref}} = \frac{V_{\text{CC}}}{2} = 2.5 \text{ V} \]
Small Signal Gain Control
High Signal Step Down

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Power Amp

10k

Speaker

TLC2272

500Ω

Analog Out

Armega32
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