



Understanding Loudness Compensation

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2.14.6 Loudness Control

A loudness control circuit compensates for the logarithmic nature of the human ear. Fletcher and Munson published curves (Figure 2.14.10) demonstrating this effect. Without loudness correction, the listening experience is characterized by a pronounced loss of bass response accompanied by a slight loss of treble response as the volume level is decreased.

Compensation consists of boosting the low and high ends of the audio frequency band as an inverse function of volume setting. One commonly used circuit appears as Figure 2.14.11 and uses a tapped volume pot (tap at 10% resistance). The switchable R-C network paralleling the pot produces the frequency response shown in Figure 2.14.12 when the wiper is positioned at the tap point (i.e. mid-position for audio taper pot). As the wiper is moved further away from the tap point (louder) the paralleling circuit has less and less effect, resulting in a volume sensitive compensation scheme.

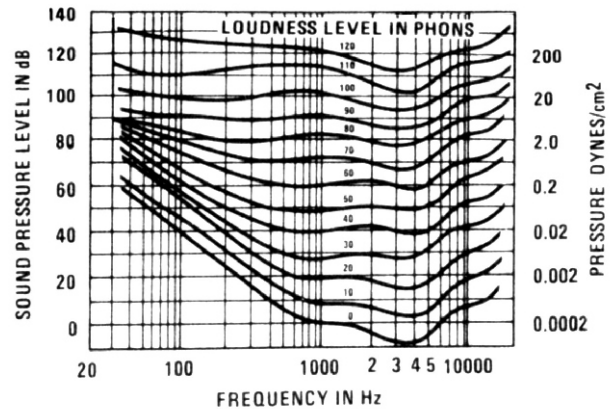


FIGURE 2.14.10 Fletcher-Munson Curves (USA). (Courtesy, Acoustical Society of America)

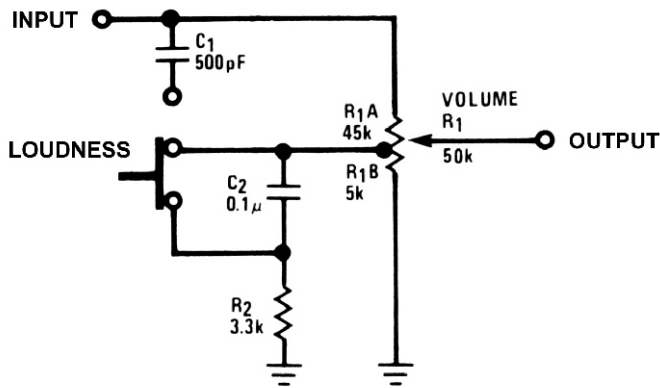


FIGURE 2.14.11 Loudness Control

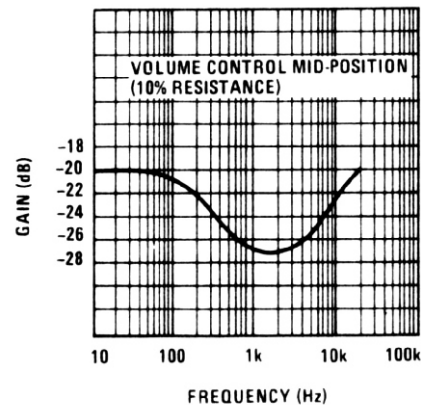


FIGURE 2.14.12 Loudness Control Response

Audio Regenesi Note:

In many cases C1 is eliminated for simplicity and cost saving since the perceived loss of bass response is much greater than the treble.