

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
23 December 2004 (23.12.2004)

PCT

(10) International Publication Number
WO 2004/111994 A2

- (51) International Patent Classification⁷: **G10L**
- (21) International Application Number:
PCT/US2004/016964
- (22) International Filing Date: 27 May 2004 (27.05.2004)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
60/474,077 28 May 2003 (28.05.2003) US
- (71) Applicant (for all designated States except US): **DOLBY LABORATORIES LICENSING CORPORATION** [US/US]; 100 Potrero Avenue, San Francisco, CA 94103 (US).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **SEEFELDT, Alan,**

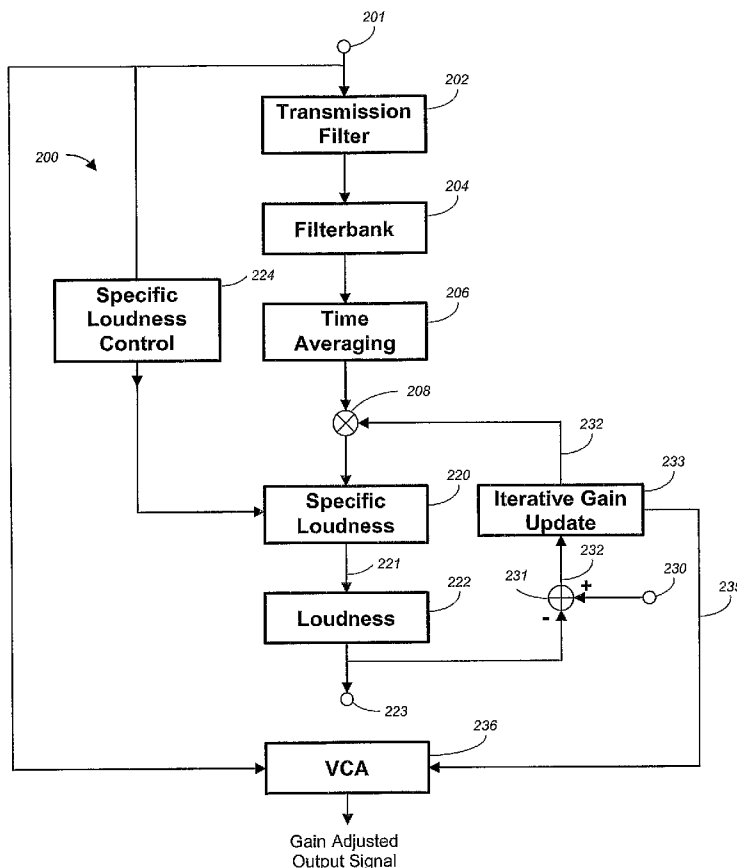
Jeffrey [US/US]; 100 Potrero Avenue, San Francisco, CA 94103 (US). **SMITHERS, Michael, J.** [AU/US]; 100 Potrero Avenue, San Francisco, CA 94103 (US). **CROCKETT, Brett, Graham** [US/US]; 100 Potrero Avenue, San Francisco, CA 94103 (US).

(74) Agents: **GALLAGHER, Thomas, A.** et al.; Gallagher & Lathrop, Suite 1111, 601 California Street, San Francisco, CA 94108-2805 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

[Continued on next page]

(54) Title: METHOD, APPARATUS AND COMPUTER PROGRAM FOR CALCULATING AND ADJUSTING THE PERCEIVED LOUDNESS OF AN AUDIO SIGNAL



(57) Abstract: One or a combination of two or more specific loudness model functions selected from a group of two or more of such functions are employed in calculating the perceptual loudness of an audio signal. The function or functions may be selected, for example, by a measure of the degree to which the audio signal is narrowband or wideband. Alternatively or with such a selection from a group of functions, a gain value $G[t]$ is calculated, which gain, when applied to the audio signal, results in a perceived loudness substantially the same as a reference loudness. The gain calculating employs an iterative processing loop that includes the perceptual loudness calculation.

WO 2004/111994 A2



(84) **Designated States** (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— *without international search report and to be republished upon receipt of that report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.