

2003015872 25/03/03

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



162162

(43) International Publication Date
4 April 2002 (04.04.2002)

PCT

(10) International Publication Number
WO 02/027944 A3

(51) International Patent Classification⁷: **H03M 3/04**

(21) International Application Number: PCT/US01/30056

(22) International Filing Date:
26 September 2001 (26.09.2001)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
09/676,064 29 September 2000 (29.09.2000) US

(71) Applicant: **TERADYNE, INC.** [US/US]; 321 Harrison Avenue, Boston, MA 02118 (US).

(72) Inventor: **SHEEN, Timothy, W.**; 160 Foster Street, Brighton, MA 02135 (US).

(74) Agents: **RUBENSTEIN, Bruce, D.** et al.; Teradyne, Inc., 321 Harrison Avenue, Boston, MA 02118 (US).

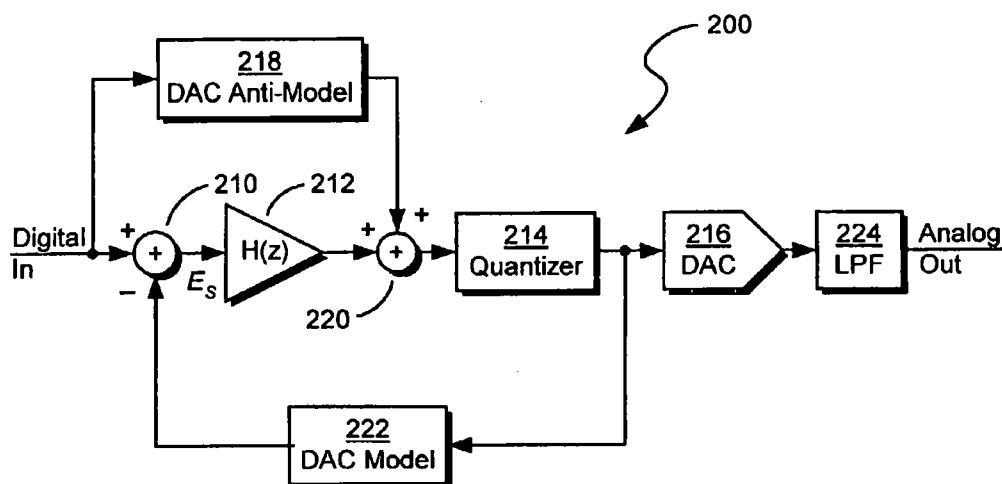
(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PH, PL, PT, RO,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

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— with international search report
— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

[Continued on next page]

(54) Title: DIGITAL TO ANALOG CONVERTER EMPLOYING SIGMA-DELTA LOOP AND FEEDBACK DAC MODEL



(57) Abstract: A circuit topology and method for converting a digital input signal to an analog output signal employs a modified sigma-delta loop and a DAC, and operates with improved accuracy over a wide frequency range. A loop filter such as a digital accumulator receives an input signal proportional to the difference between a digital input signal and a feedback signal. A quantizer quantizes the output of the loop filter, and the DAC converts the quantized signal into an analog output signal. The quantized signal is also provided to a DAC model. In response to the quantized signal and behavioral information about the DAC, the DAC model varies the feedback signal to match expected output signals from the DAC, including errors introduced by the DAC. By the operation of the sigma-delta loop, the errors of the DAC are substantially reduced.



ACTION

WO 02/027944 A3

(88) Date of publication of the international search report:
14 August 2003

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.