

2003012119 12/03/03

(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)

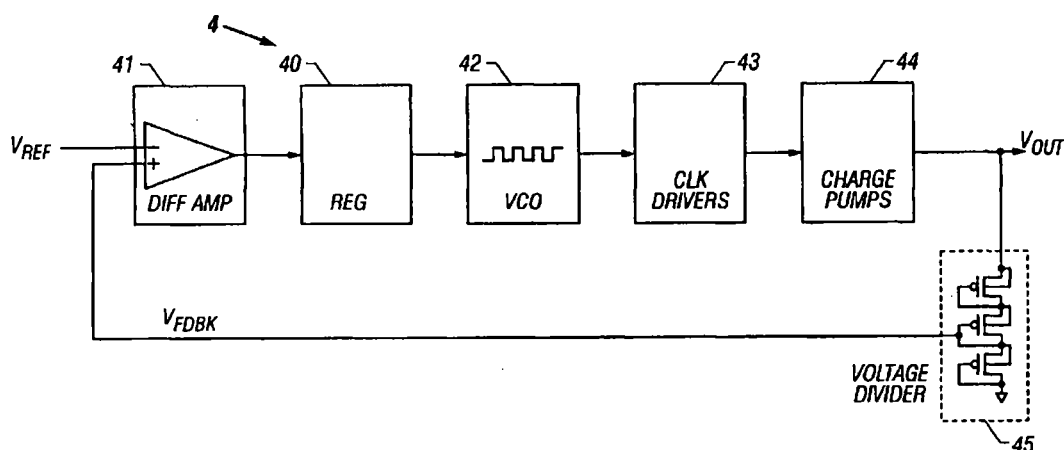
PCT

(10) International Publication Number
WO 02/027903 A3

- (51) International Patent Classification⁷: **H02M 3/07**
- (21) International Application Number: PCT/US01/30156
- (22) International Filing Date:
25 September 2001 (25.09.2001)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
09/670,850 27 September 2000 (27.09.2000) US
- (71) Applicant (for all designated States except US): **INTEL CORPORATION** [US/US]; 2200 Mission College Boulevard, Santa Clara, CA 95052 (US).
- (72) Inventors; and
(75) Inventors/Applicants (for US only): **BAINS, Rupinder** [US/US]; 8033 Red Fern Court, Antelope, CA 95843 (US). **NGO, Binh** [US/US]; 202 Red Oak Court, Folsom, CA 95630 (US). **ELMHURST, Daniel** [US/US]; 2926 Thrasher Court, Cameron Park, CA 95682 (US).
- (74) Agents: **MALLIE, Michael, J.** et al.; Blakely Sokoloff Taylor & Zafman, 7th floor, 12400 Wilshire Boulevard, Los Angeles, CA 90025 (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, US, 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
- (88) Date of publication of the international search report:
29 August 2002

[Continued on next page]

(54) Title: DEGENERATIVE LOAD TEMPERATURE CORRECTION FOR CHARGE PUMPS



(57) Abstract: A regulator circuit to control the output of a charge pump circuit, to reduce the effects of operating temperature and process variations on available output current from the charge pump circuit. A predetermined fraction of the output voltage of the charge pump circuit is fed back to the input of a differential amplifier, which compares it to a reference voltage. The output of the differential amplifier feeds a voltage controlled oscillator (VCO), which in turn generates a clock signal that is used to drive the charge pump circuit. The normal temperature characteristics of this configuration cause the output of the charge pump circuit to degrade with temperature changes. The regulator circuit can be placed between the differential amplifier and the VCO to adjust the voltage driving the VCO comprising a biasing resistor with a negative temperature coefficient or multiple such resistor selectable with programmable logic.

WO 02/027903 A3



ACTION

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.