

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

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
24 September 2020 (24.09.2020)



(10) International Publication Number
WO 2020/186333 A1

(51) International Patent Classification:

H02M 1/00 (2007.01) *H03H 11/00* (2006.01)
H02M 3/00 (2006.01) *H03K 17/687* (2006.01)
H03F 3/04 (2006.01) *H04B 1/40* (2015.01)
H03F 3/45 (2006.01) *H04W 52/02* (2009.01)

(21) International Application Number:

PCT/CA2020/000030

(22) International Filing Date:

18 March 2020 (18.03.2020)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

62/819,847 18 March 2019 (18.03.2019)

US

(72) Inventors; and

(71) Applicants: **NABKI, Frederic** [CA/CA]; c/o SPARK MICROSYSTEMS INC., C-2150, 400 Rue Montfort, Montreal, Quebec H3C 4J9 (CA). **DESLANDES, Dominic** [CA/CA]; c/o SPARK MICROSYSTEMS INC., C-2150, 400 Rue Montfort, Montreal, Quebec H3C 4J9 (CA). **SOER, Michiel** [CA/CA]; c/o SPARK MICROSYSTEMS INC., C-2150, 400 Rue Montfort, Montreal, Quebec H3C 4J9 (CA). **MORIN-LAPORTE, Gabriel** [CA/CA]; c/o SPARK MICROSYSTEMS INC., C-2150, 400 Rue Montfort, Montreal, Quebec H3C 4J9 (CA). **TAHERZADEH-SANI, Mohammad** [CA/CA]; c/o SPARK MICROSYSTEMS INC., C-2150, 400 Rue Montfort, Montreal, Quebec H3C 4J9 (CA).

(74) Agent: **PERLEY-ROBERTSON, HILL & MCDOUGALL LLP/SRL**; 1400 - 340 Albert Street, Ottawa, Ontario K1R 0A5 (CA).

(54) Title: ULTRA WIDEBAND (UWB) TRANSMITTER AND RECEIVER CIRCUITS

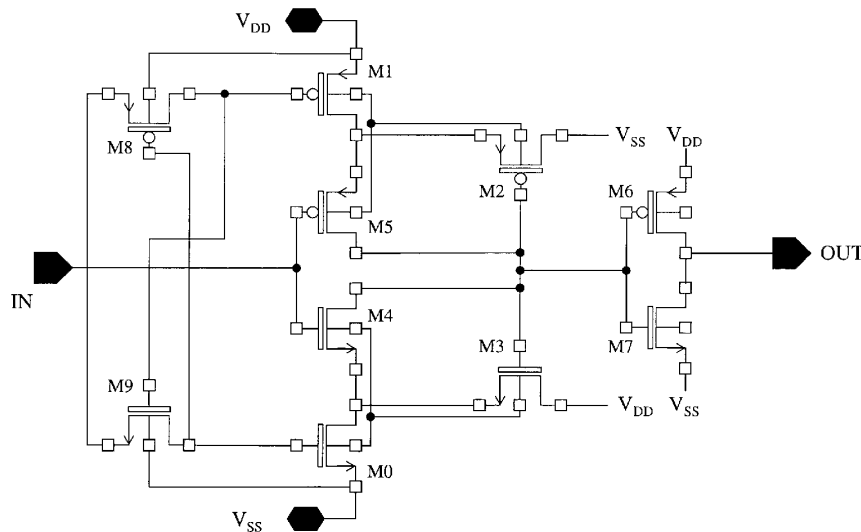


Figure 8

(57) **Abstract:** Ultra-Wideband (UWB) wireless technology transmits digital data as modulated coded impulses over a very wide frequency spectrum with very low power over a short distance. To support extended operation, particularly with battery power sources, the inventors have established UWB devices which support wake-up from deep sleep modes when these devices exploit low frequency clock sources for ultra-low power consumption. Further, power consumption may be reduced by exploiting transistors or so-called compounded MOSFET structures whose effective gain and output resistance exceeds any single transistor irrespective of length or by employing biasless low power differential (exponential) transconductance stages within operational transconductance amplifiers in order to provide very high gain low power amplification stages. Further, the inventors have established voltage reference sources that consume very low current, a few nA, and ultra-low power low dropout regulators.

[Continued on next page]

WO 2020/186333 A1

(81) Designated States (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

— with international search report (Art. 21(3))