

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
6 July 2006 (06.07.2006)

PCT

(10) International Publication Number
WO 2006/071197 A1

(51) International Patent Classification:
H03K 3/02 (2006.01) *H03F 1/42* (2006.01)
H03K 7/00 (2006.01)

(21) International Application Number:
PCT/SG2004/000429

(22) International Filing Date:
30 December 2004 (30.12.2004)

(25) Filing Language: English

(26) Publication Language: English

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(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, SM, SY,
TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU,
ZA, ZM, ZW.

(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, IS, IT, LT, 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:

— with international search report

*For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.*

(54) Title: FULLY INTEGRATED ULTRA WIDEBAND TRANSMITTER CIRCUITS AND SYSTEMS

(57) Abstract: Disclosed is a novel design of a fully integrated UWB transmitter. The transmitter includes a pulse generator, a pulse modulator, and an ultra-wideband drive amplifier. A new low voltage low power pulse generator circuit is disclosed which can be fully integrated in CMOS or BiCMOS process. This circuit includes a squaring stage, an exponential stage, and a second-order derivative stage. Based on this, PPM, BPSK and PAM pulse modulator circuits and system are disclosed. The modulated pulse is symmetrical second-order derivative Gaussian pulses with a bandwidth up to 5 GHz and having sufficient swing for UWB applications. An ultra-wideband driver amplifier is proposed to amplify the modulator output and drive the antenna. For the driver amplifier, common source resistor and inductor shunt feedback with current reuse technique is employed to achieve the ultra-wideband bandwidth, high gain, and providing matching for the antenna simultaneously.

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