

CORRECTED VERSION

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
20 September 2007 (20.09.2007)

PCT

(10) International Publication Number
WO 2007/104504 A1

(51) International Patent Classification:

GOIT 1/00 (2006 01) **G02B 6/00** (2006 01)
GOIT 1/17 (2006 01) **H01J 37/244** (2006 01)
GOIT 1/29 (2006 01) **H01J 47/20** (2006 01)
GOIT 5/08 (2006 01)

(21) International Application Number:

PCT/EP2007/002126

(22) International Filing Date: 12 March 2007 (12 03 2007)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

06 005 163 8 14 March 2006 (14 03 2006) EP

(71) Applicant (for all designated States except US): **PAUL SCHERRER INSTITUT [CWCH]**, CH-5232 Vilhgen PSI (CH)

(72) Inventor; and

(75) Inventor/Applicant (for US only): **GERBER, Thomas** [DE/CH], Feldblumenweg 10b, CH-5330 Zurzach (CH)

(74) Agent: **FISCHER, Michael**, Siemens AG, Postfach 22 16 34, 80506 Munchen (DE)

(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, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, 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, LV, MC, MT, 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)

Declaration under Rule 4.17:

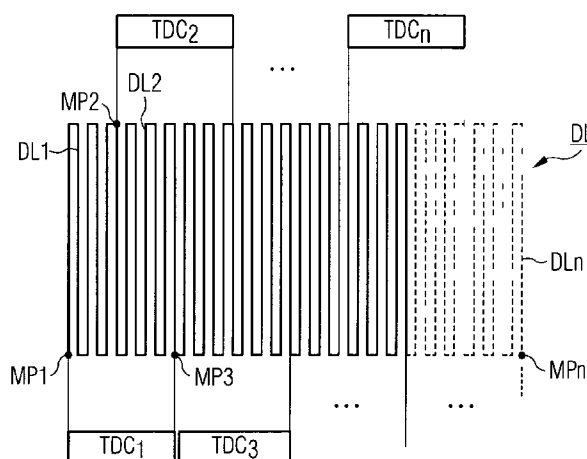
— of inventorship (Rule 4 17(v))

Published:

— with international search report

[Continued on next page]

(54) Title: SEGMENTED ELECTRICAL OR OPTICAL DELAY LINE WITH INTERLEAVED TAP FOR 3D IMAGE DEVICE READOUT



(57) Abstract: It is the aim of the present invention to provide a single-event imaging device fulfilling the specific needs in terms of high spatial and time resolution and high framing rates. This aim is achieved according to the present invention by a single event imaging device, comprising a) at least one delay line (DL) assigned to an image plane (IP), said delay line (DL) allowing two pulses to propagate in opposite directions along the delay line (DL), said two pulses being generated by the impingement of the single-event (e, hv) at an impingement position, b) a number of interleaved measurement points (MP1 to MPn) associated with said delay line (DL), said interleaved measurement points (MP1 to MPn) dividing the delay line (DL) into a number of delay line segments (DL1 to DLn), and c) a number of Time-to-Digital converters (TDC1 to TDCn) to detect the arrival time of the pulses at distinct measurement points (MP1 to MPn). Using the delay line in a segmented manner by disposing various interleaved measurement points along the delay line allows to eliminate any distortions incurred by edge effects while simultaneously obtaining the advantage of a shortened delay line in form of logically separated delay line segments allowing an excellent trade-off in terms of spatial resolution and framing rate.

WO 2007/104504 A1



(48) Date of publication of this corrected version:

6 March 2008

(15) Information about Correction:

see Notice of 6 March 2008