



- (51) **International Patent Classification:**
G01N 21/63 (2006.01) *G01R 31/26* (2014.01)
- (21) **International Application Number:**
PCT/US2014/031523
- (22) **International Filing Date:**
21 March 2014 (21.03.2014)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
61/804,696 24 March 2013 (24.03.2013) US
61/806,803 29 March 2013 (29.03.2013) US
61/838,679 24 June 2013 (24.06.2013) US
- (71) **Applicants:** DCG SYSTEMS, INC. [US/US]; 3400 W. Warren Ave, Fremont, CA 94538 (US). FREESCALE SEMICONDUCTOR, INC. [US/US]; 6501 William Cannon Drive West, Austin, TX 78735 (US).
- (72) **Inventors; and**
- (71) **Applicants :** SERRELS, Keith [GB/US]; 39600 Fremont Boulevard, Apt. 125, Fremont, CA 94538 (US). VED-AGARBHA, Praveen [US/US]; 45524 Cherokee Lane, Fremont, CA 94539 (US). LUNDQUIST, Ted [US/US]; P.O. Box 360316, Milpitas, CA 95036 (US). ERINGTON, Kent [US/US]; 6409 Via Correto Drive, Austin, TX 78749

(US). BODOH, Dan [US/US]; 7005 Via Dono Drive, Austin, TX 78749 (US).

(74) **Agent:** BACH, Joseph; Nixon Peabody LLP, P.O. Box 60610, Palo Alto, CA 94306 (US).

(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, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, 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, SM, ST, SV, SY, TH, 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, LR, LS, MW, MZ, NA, RW, SD, SL, 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).

[Continued on next page]

(54) **Title:** PULSED LADA FOR ACQUISITION OF TIMING DIAGRAMS

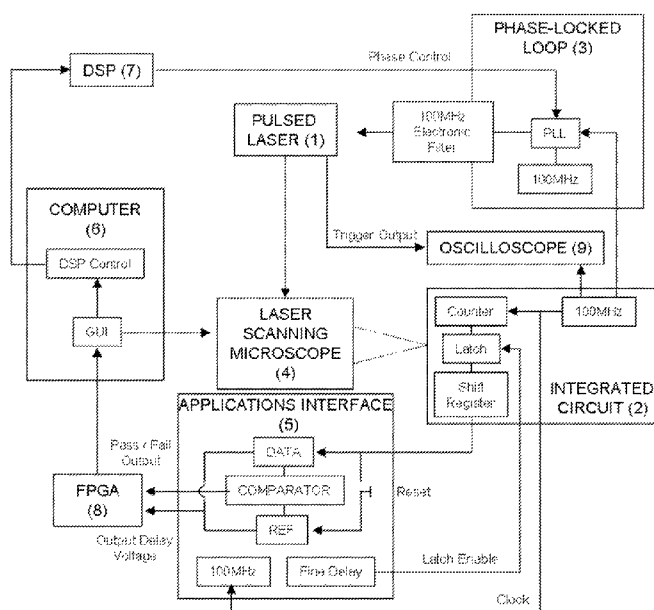


Figure 3

(57) **Abstract:** Method to extract timing diagrams from synchronized single- or two-photon pulsed LADA by spatially positioning the incident laser beam on circuit feature of interest, temporally scanning the arrival time of the laser pulse with respect to the tester clock or the loop length trigger signal, then recording the magnitude and sign of the resulting fail rate signature per laser pulse arrival time. A Single-Photon Laser-Assisted Device Alteration apparatus applies picosecond laser pulses of wavelength having photon energy equal to or greater than the silicon band-gap. A Two-Photon Laser-Assisted Device Alteration apparatus applies femto-second laser pulses of wavelength having photon energy equal to or greater than half the silicon band-gap at the area of interest. The laser pulses are synchronized with test vectors so that pass/fail ratios can be altered using either the single-photon or the two-photon absorption effect. A sequence of synthetic images with error data illustrates timing sensitive locations.



Published:

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

— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))