

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

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
06 January 2022 (06.01.2022)



(10) International Publication Number
WO 2022/003438 A1

- (51) **International Patent Classification:**
G06F 30/392 (2020.01) *G06F 111/04* (2020.01)
- (21) **International Application Number:**
PCT/IB2021/054294
- (22) **International Filing Date:**
19 May 2021 (19.05.2021)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
16/919,127 02 July 2020 (02.07.2020) US
- (71) **Applicant:** **INTERNATIONAL BUSINESS MACHINES CORPORATION** [US/US]; New Orchard Road, Armonk, New York 10504 (US).
- (71) **Applicants (for MG only):** **IBM (CHINA) INVESTMENT COMPANY LTD.** [CN/CN]; 25/F, Pangu Plaza, No. 27, Central North 4th Ring Road, Chaoyang District, Beijing 100101 (CN). **IBM DEUTSCHLAND GMBH** [DE/DE]; IBM-Allee 1, 71139 Ehningen (DE).
- (72) **Inventors:** **DAELLENBACH, Lukas**; c/o IBM Deutschland Research & Development GmbH, Schoenaicher Strasse 220, 71032 Boeblingen (DE). **RICHTER, Ralf**; c/o IBM Deutschland Research & Development GmbH, Schoenaicher Strasse 220, 71032 Boeblingen (DE).
- (74) **Agent:** **DOEHLER, Denis**; c/o IBM Deutschland GmbH, Patentwesen und Urheberrecht, IBM-Allee 1, 71139 Ehningen (DE).
- (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, IT, 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,

(54) **Title:** SEMICONDUCTOR CIRCUIT DESIGN AND UNIT PIN PLACEMENT

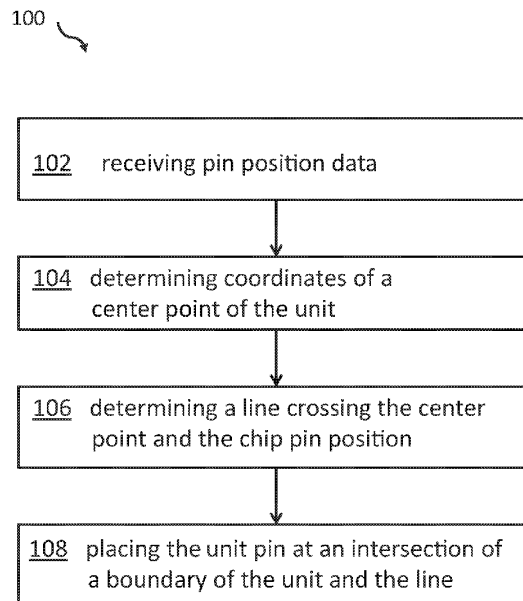


FIG. 1

(57) **Abstract:** A semiconductor circuit design method, system and computer program product for placing a unit pin on a boundary of a unit of a semiconductor circuit to be designed may be provided. Pin position data is received, wherein the pin position data comprises a chip pin position of a chip pin within the chip area and outside of the unit of a semiconductor circuit, to which the unit pin is to be electrically connected. The coordinates of a center point of the unit are determined, as well as a line crossing the center point and the chip pin position. The unit pin is placed on an intersection of the boundary of the unit and the line crossing the center point.

[Continued on next page]

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))*
- *in black and white; the international application as filed contained color or greyscale and is available for download from PATENTSCOPE*