

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

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
03 December 2020 (03.12.2020)



(10) International Publication Number
WO 2020/242826 A1

(51) International Patent Classification:

H01L 25/16 (2006.01) H01L 25/00 (2006.01)
H01L 23/538 (2006.01) H01L 23/498 (2006.01)
H01L 23/00 (2006.01) H01L 23/367 (2006.01)
H01L 23/64 (2006.01)

(21) International Application Number:

PCT/US2020/033592

(22) International Filing Date:

19 May 2020 (19.05.2020)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

16/422,072 24 May 2019 (24.05.2019) US

(71) Applicant: **BAE SYSTEMS INFORMATION AND
ELECTRONIC SYSTEMS INTEGRATION INC.**
[US/US]: PO Box 868, Nashua, NH 03061-0868 (US).

(72) Inventors: **DENNIS, Lori, D.**; PO Box 868, NHQ1-719,
Nashua, NH 03061-0868 (US). **BERNARD, Jamie, A.**;
PO Box 868, NHQ1-719, Nashua, NH 03061-0868 (US).
DENNIS, Alan, F.; PO Box 868, NHQ1-719, Nashua,
NH 03061-0868 (US). **GILLIAM, Jane, O.**; PO Box 868,
NHQ1-719, Nashua, NH 03061-0868 (US). **ROSS, Ja-**

son, F.; PO Box 868, NHQ1-719, Nashua, NH 03061-0868
(US). **STURCKEN, Keith, K.**; PO Box 868, NHQ1-719,
Nashua, NH 03061-0868 (US). **RICKARD, Dale, A.**; PO
Box 868, NHQ1-719, Nashua, NH 03061-0868 (US).

(74) Agent: **ASMUS, Scott, J.**; Bae Systems, PO Box 868,
NHQ1-719, Nashua, NH 03061-0868 (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, 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,

(54) Title: MULTI-CHIP MODULE HYBRID INTEGRATED CIRCUIT WITH MULTIPLE POWER ZONES THAT PROVIDE COLD SPARE SUPPORT

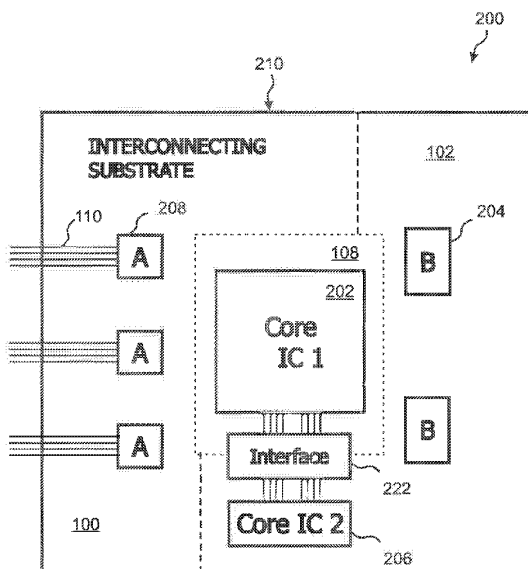


Fig. 1

(57) Abstract: A multi-chip module hybrid integrated circuit (MCM-HIC) provides cold spare support to an apparatus comprising a plurality of ICs and/or other circuits that are not cold spare compliant. At least one core IC and at least one cold spare chiplet are installed on an interconnecting substrate having a plurality of power zones to which power can be applied and withdrawn as needed. When powered, the cold spare chiplets serve as mediators and interfaces between the non cold spare compliant circuits. When the cold spare chiplets are at least partly unpowered, they protect all interconnected circuits, and ensure that interconnected circuits that remain powered are not hindered by unpowered interconnected circuits. Cold spare chiplets can extend across boundaries between power zones. External circuits can be exclusively interfaced to a subset of the power zones. Separate power circuits within a power zone can be sequenced during application and withdrawal of power.

[Continued on next page]

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))*