



Pin Information for HardCopy® II HC230 / Stratix® II EP2S180  
 F1020 Companion Devices  
 Version 1.1

| Bank Number | VREF Group | Pin Name/Function | Optional Function(s)/DQ Group for DQS x4 Mode | Configuration Function for Stratix II Only (Note 1) | F1020 | DQ Group for DQS x8/x9 Mode | DQ Group for DQS x16/x18 Mode | DQ Group for DQS x32/x36 Mode |
|-------------|------------|-------------------|---|---|-------|-----------------------------|-------------------------------|-------------------------------|
|             |            | VCCD_PLL7         |   |   | H25   |                             |                               |                               |
|             |            | VCCA_PLL7         |   |   | H26   |                             |                               |                               |
|             |            | GND_A_PLL7        |   |   | F26   |                             |                               |                               |
|             |            | GND_B_PLL7        |   |   | G26   |                             |                               |                               |
| B2          |            | FPLL7CLKp         | INPUT   |   | D30   |                             |                               |                               |
| B2          |            | FPLL7CLKn         | INPUT   |   | D29   |                             |                               |                               |
|             |            | NC (Note 3)       |   |   | F28   |                             |                               |                               |
|             |            | NC (Note 3)       |   |   | J28   |                             |                               |                               |
|             |            | NC (Note 3)       |   |   | L27   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_RX64p                                  |   | G28   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_RX64n                                  |   | G27   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_TX64p                                  |   | H28   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_TX64n                                  |   | H27   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_RX63p                                  |   | E30   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_RX63n                                  |   | E29   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_TX63p                                  |   | K27   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_TX63n                                  |   | K26   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_RX62p                                  |   | D32   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_RX62n                                  |   | D31   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_TX62p                                  |   | J27   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_TX62n                                  |   | J26   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_RX61p                                  |   | F30   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_RX61n                                  |   | F29   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_TX61p                                  |   | K25   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_TX61n                                  |   | K24   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_RX60p                                  |   | G30   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_RX60n                                  |   | G29   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_TX60p                                  |   | L26   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_TX60n                                  |   | L25   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_RX59p                                  |   | H30   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_RX59n                                  |   | H29   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_TX59p                                  |   | L24   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_TX59n                                  |   | L23   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_RX58p                                  |   | J30   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_RX58n                                  |   | J29   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_TX58p                                  |   | M25   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_TX58n                                  |   | M24   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_RX57p                                  |   | E32   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_RX57n                                  |   | E31   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_TX57p                                  |   | M23   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_TX57n                                  |   | M22   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_RX56p                                  |   | F32   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_RX56n                                  |   | F31   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_TX56p                                  |   | M27   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_TX56n                                  |   | M26   |                             |                               |                               |
|             |            | NC (Note 3)       |   |   | L28   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_RX55p                                  |   | G32   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_RX55n                                  |   | G31   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_TX55p                                  |   | N25   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_TX55n                                  |   | N24   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_RX54p                                  |   | H32   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_RX54n                                  |   | H31   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_TX54p                                  |   | N23   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_TX54n                                  |   | N22   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_RX53p                                  |   | J32   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_RX53n                                  |   | J31   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_TX53p                                  |   | P23   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_TX53n                                  |   | P22   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_RX52p                                  |   | K30   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_RX52n                                  |   | K29   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_TX52p                                  |   | N27   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_TX52n                                  |   | N26   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_RX51p                                  |   | K32   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_RX51n                                  |   | K31   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_TX51p                                  |   | P29   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_TX51n                                  |   | P28   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_RX50p                                  |   | L30   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_RX50n                                  |   | L29   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_TX50p                                  |   | P27   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_TX50n                                  |   | P26   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_RX49p                                  |   | N29   |                             |                               |                               |



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|-------------|------------|-------------------|---|---|-------|-----------------------------|-------------------------------|-------------------------------|
| B2          |            | IO                | DIFFIO_RX49n                                  |   | N28   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_TX49p                                  |   | P25   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_TX49n                                  |   | P24   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_RX48p                                  |   | M30   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_RX48n                                  |   | M29   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_TX48p                                  |   | R27   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_TX48n                                  |   | R26   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_RX47p                                  |   | L32   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_RX47n                                  |   | L31   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_TX47p                                  |   | R23   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_TX47n                                  |   | R22   |                             |                               |                               |
|             |            | NC (Note 3)       |   |   | P30   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_RX46p                                  |   | N31   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_RX46n                                  |   | N30   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_TX46p                                  |   | R25   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_TX46n                                  |   | R24   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_RX45p                                  |   | M32   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_RX45n                                  |   | M31   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_TX45p                                  |   | R29   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_TX45n                                  |   | R28   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_RX44p                                  |   | P32   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_RX44n                                  |   | P31   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_TX44p                                  |   | T28   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_TX44n                                  |   | T27   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_RX43p                                  |   | R31   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_RX43n                                  |   | R30   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_TX43p                                  |   | T23   |                             |                               |                               |
| B2          |            | IO                | DIFFIO_TX43n                                  |   | T22   |                             |                               |                               |
| B2          |            | IO                | CLK0n/DIFFIO_RX_C0n                           |   | T31   |                             |                               |                               |
| B2          |            | IO                | CLK0p/DIFFIO_RX_C0p                           |   | T32   |                             |                               |                               |
| B2          |            | CLK1n             | INPUT   |   | T29   |                             |                               |                               |
| B2          |            | CLK1p             | INPUT   |   | T30   |                             |                               |                               |
|             |            | VCCD_PLL1         |   |   | U24   |                             |                               |                               |
|             |            | VCCA_PLL1         |   |   | T24   |                             |                               |                               |
|             |            | GND_A_PLL1        |   |   | T25   |                             |                               |                               |
|             |            | GND_A_PLL1        |   |   | T26   |                             |                               |                               |
|             |            | GND_A_PLL2        |   |   | U25   |                             |                               |                               |
|             |            | GND_A_PLL2        |   |   | U26   |                             |                               |                               |
|             |            | VCCA_PLL2         |   |   | V26   |                             |                               |                               |
|             |            | VCCD_PLL2         |   |   | V25   |                             |                               |                               |
| B1          |            | IO                | CLK2p/DIFFIO_RX_C1p                           |   | U32   |                             |                               |                               |
| B1          |            | IO                | CLK2n/DIFFIO_RX_C1n                           |   | U31   |                             |                               |                               |
| B1          |            | CLK3p             | INPUT   |   | U30   |                             |                               |                               |
| B1          |            | CLK3n             | INPUT   |   | U29   |                             |                               |                               |
| B1          |            | IO                | DIFFIO_RX42p                                  |   | V31   |                             |                               |                               |
| B1          |            | IO                | DIFFIO_RX42n                                  |   | V30   |                             |                               |                               |
| B1          |            | IO                | DIFFIO_TX42p                                  |   | U23   |                             |                               |                               |
| B1          |            | IO                | DIFFIO_TX42n                                  |   | U22   |                             |                               |                               |
| B1          |            | IO                | DIFFIO_RX41p                                  |   | W32   |                             |                               |                               |
| B1          |            | IO                | DIFFIO_RX41n                                  |   | W31   |                             |                               |                               |
| B1          |            | IO                | DIFFIO_TX41p                                  |   | U28   |                             |                               |                               |
| B1          |            | IO                | DIFFIO_TX41n                                  |   | U27   |                             |                               |                               |
| B1          |            | IO                | DIFFIO_RX40p                                  |   | AA32  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_RX40n                                  |   | AA31  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_TX40p                                  |   | V29   |                             |                               |                               |
| B1          |            | IO                | DIFFIO_TX40n                                  |   | V28   |                             |                               |                               |
|             |            | NC (Note 3)       |   |   | W30   |                             |                               |                               |
| B1          |            | IO                | DIFFIO_RX39p                                  |   | Y31   |                             |                               |                               |
| B1          |            | IO                | DIFFIO_RX39n                                  |   | Y30   |                             |                               |                               |
| B1          |            | IO                | DIFFIO_TX39p                                  |   | V24   |                             |                               |                               |
| B1          |            | IO                | DIFFIO_TX39n                                  |   | V23   |                             |                               |                               |
| B1          |            | IO                | DIFFIO_RX38p                                  |   | AB32  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_RX38n                                  |   | AB31  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_TX38p                                  |   | W29   |                             |                               |                               |
| B1          |            | IO                | DIFFIO_TX38n                                  |   | W28   |                             |                               |                               |
| B1          |            | IO                | DIFFIO_RX37p                                  |   | AA30  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_RX37n                                  |   | AA29  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_TX37p                                  |   | W27   |                             |                               |                               |
| B1          |            | IO                | DIFFIO_TX37n                                  |   | W26   |                             |                               |                               |
| B1          |            | IO                | DIFFIO_RX36p                                  |   | Y29   |                             |                               |                               |
| B1          |            | IO                | DIFFIO_RX36n                                  |   | Y28   |                             |                               |                               |



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|-------------|------------|-------------------|---|---|-------|-----------------------------|-------------------------------|-------------------------------|
| B1          |            | IO                | DIFFIO_TX36p                                  |   | W25   |                             |                               |                               |
| B1          |            | IO                | DIFFIO_TX36n                                  |   | W24   |                             |                               |                               |
| B1          |            | IO                | DIFFIO_RX35p                                  |   | AB30  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_RX35n                                  |   | AB29  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_TX35p                                  |   | Y27   |                             |                               |                               |
| B1          |            | IO                | DIFFIO_TX35n                                  |   | Y26   |                             |                               |                               |
| B1          |            | IO                | DIFFIO_RX34p                                  |   | AC32  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_RX34n                                  |   | AC31  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_TX34p                                  |   | AA27  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_TX34n                                  |   | AA26  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_RX33p                                  |   | AB28  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_RX33n                                  |   | AB27  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_TX33p                                  |   | Y25   |                             |                               |                               |
| B1          |            | IO                | DIFFIO_TX33n                                  |   | Y24   |                             |                               |                               |
| B1          |            | IO                | DIFFIO_RX32p                                  |   | AD32  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_RX32n                                  |   | AD31  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_TX32p                                  |   | W23   |                             |                               |                               |
| B1          |            | IO                | DIFFIO_TX32n                                  |   | W22   |                             |                               |                               |
|             |            | NC (Note 3)       |   |   | AD28  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_RX31p                                  |   | AE32  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_RX31n                                  |   | AE31  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_TX31p                                  |   | AD27  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_TX31n                                  |   | AD26  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_RX30p                                  |   | AF32  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_RX30n                                  |   | AF31  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_TX30p                                  |   | AC27  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_TX30n                                  |   | AC26  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_RX29p                                  |   | AG32  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_RX29n                                  |   | AG31  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_TX29p                                  |   | Y23   |                             |                               |                               |
| B1          |            | IO                | DIFFIO_TX29n                                  |   | Y22   |                             |                               |                               |
| B1          |            | IO                | DIFFIO_RX28p                                  |   | AC30  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_RX28n                                  |   | AC29  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_TX28p                                  |   | AA25  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_TX28n                                  |   | AA24  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_RX27p                                  |   | AD30  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_RX27n                                  |   | AD29  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_TX27p                                  |   | AB26  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_TX27n                                  |   | AB25  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_RX26p                                  |   | AH32  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_RX26n                                  |   | AH31  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_TX26p                                  |   | AA23  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_TX26n                                  |   | AA22  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_RX25p                                  |   | AE30  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_RX25n                                  |   | AE29  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_TX25p                                  |   | AB24  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_TX25n                                  |   | AB23  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_RX24p                                  |   | AJ32  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_RX24n                                  |   | AJ31  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_TX24p                                  |   | AC25  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_TX24n                                  |   | AC24  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_RX23p                                  |   | AF30  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_RX23n                                  |   | AF29  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_TX23p                                  |   | AD25  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_TX23n                                  |   | AD24  |                             |                               |                               |
|             |            | NC (Note 3)       |   |   | AF28  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_RX22p                                  |   | AG30  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_RX22n                                  |   | AG29  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_TX22p                                  |   | AE26  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_TX22n                                  |   | AE25  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_RX21p                                  |   | AH30  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_RX21n                                  |   | AH29  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_TX21p                                  |   | AE28  |                             |                               |                               |
| B1          |            | IO                | DIFFIO_TX21n                                  |   | AE27  |                             |                               |                               |
|             |            | NC (Note 3)       |   |   | AF27  |                             |                               |                               |
|             |            | NC (Note 3)       |   |   | AG28  |                             |                               |                               |
| B1          |            | FPLL8CLKn         | INPUT   |   | AJ29  |                             |                               |                               |
| B1          |            | FPLL8CLKp         | INPUT   |   | AJ30  |                             |                               |                               |
|             |            | GND_A_PLL8        |   |   | AG26  |                             |                               |                               |
|             |            | GND_A_PLL8        |   |   | AG27  |                             |                               |                               |
|             |            | VCCA_PLL8         |   |   | AF26  |                             |                               |                               |



Pin Information for HardCopy® II HC230 / Stratix® II EP2S180  
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| Bank Number | VREF Group | Pin Name/Function | Optional Function(s)/DQ Group for DQS x4 Mode | Configuration Function for Stratix II Only (Note 1) | F1020 | DQ Group for DQS x8/x9 Mode | DQ Group for DQS x16/x18 Mode | DQ Group for DQS x32/x36 Mode |
|-------------|------------|-------------------|---|---|-------|-----------------------------|-------------------------------|-------------------------------|
|             |            | VCCD_PLL8         |   |   | AF25  |                             |                               |                               |
| B8          | VREFB8N0   | TDI               |   | TDI   | AL31  |                             |                               |                               |
| B8          | VREFB8N0   | TMS               |   | TMS   | AE24  |                             |                               |                               |
| B8          | VREFB8N0   | TCK               |   | TCK   | AF24  |                             |                               |                               |
| B8          | VREFB8N0   | TRST              |   | TRST  | AK30  |                             |                               |                               |
| B8          | VREFB8N0   | nCONFIG           |   | nCONFIG   | AL30  |                             |                               |                               |
| B8          | VREFB8N0   | VCCSEL            |   | VCCSEL  | AC23  |                             |                               |                               |
| B8          | VREFB8N0   | IO                |   |   | AB21  |                             |                               |                               |
| B8          | VREFB8N0   | IO                |   | CS  | AC22  |                             |                               |                               |
| B8          | VREFB8N0   | IO                |   | CLKUSR  | AD23  |                             |                               |                               |
| B8          | VREFB8N0   | IO                |   | nWS   | AE23  |                             |                               |                               |
| B8          | VREFB8N0   | IO                |   | nRS   | AF23  |                             |                               |                               |
| B8          | VREFB8N0   | VREFB8N0          | VREFB8N0                                      |   | AK31  |                             |                               |                               |
| B8          | VREFB8N0   | IO                | DQ17B   |   | AH28  | DQ8B                        |                               |                               |
| B8          | VREFB8N0   | IO                | DQSn17B                                       |   | AK29  | DQ8B                        | DQ3B                          | DQ1B                          |
| B8          | VREFB8N0   | IO                | DQ17B   |   | AJ28  | DQ8B                        | DQ3B                          |                               |
| B8          | VREFB8N0   | IO                | DQ17B   |   | AM29  | DQ8B                        | DQ3B                          | DQ1B                          |
| B8          | VREFB8N0   | IO                | DQ17B   |   | AL29  | DQ8B                        | DQ3B                          | DQ1B                          |
| B8          | VREFB8N0   | IO                | DQS17B  |   | AK28  | DQVLD8B                     |                               |                               |
|             |            | NC (Note 7)       |   |   | AD22  |                             |                               |                               |
| B8          | VREFB8N0   | IO                |   |   | AC21  |                             |                               |                               |
| B8          | VREFB8N1   | IO                |   |   | AB20  |                             |                               |                               |
| B8          | VREFB8N1   | IO                | DQ16B   |   | AK27  | DQ8B                        | DQ3B                          | DQ1B                          |
| B8          | VREFB8N1   | IO                | DQSn16B                                       |   | AL28  | DQSn8B                      | DQ3B                          | DQ1B                          |
| B8          | VREFB8N1   | IO                | DQ16B   |   | AJ27  | DQ8B                        | DQ3B                          | DQ1B                          |
| B8          | VREFB8N1   | IO                | DQ16B   |   | AM28  | DQ8B                        | DQ3B                          | DQ1B                          |
| B8          | VREFB8N1   | IO                | DQ16B   |   | AM27  | DQ8B                        | DQ3B                          | DQ1B                          |
| B8          | VREFB8N1   | IO                | DQS16B  |   | AL27  | DQS8B                       | DQVLD3B                       |                               |
| B8          | VREFB8N0   | IO                |   |   | AD21  |                             |                               |                               |
| B8          | VREFB8N1   | VREFB8N1          | VREFB8N1                                      |   | AG25  |                             |                               |                               |
| B8          | VREFB8N0   | IO                |   |   | AE22  |                             |                               |                               |
| B8          | VREFB8N1   | IO                |   |   | AF22  |                             |                               |                               |
| B8          | VREFB8N1   | IO                | DQ15B   |   | AK26  | DQ7B                        | DQ3B                          | DQ1B                          |
| B8          | VREFB8N1   | IO                | DQSn15B                                       |   | AL26  | DQ7B                        | DQSn3B                        | DQ1B                          |
| B8          | VREFB8N1   | IO                | DQ15B   |   | AJ26  | DQ7B                        | DQ3B                          | DQ1B                          |
| B8          | VREFB8N1   | IO                | DQ15B   |   | AM25  | DQ7B                        | DQ3B                          | DQ1B                          |
| B8          | VREFB8N1   | IO                | DQ15B   |   | AM26  | DQ7B                        | DQ3B                          | DQ1B                          |
| B8          | VREFB8N1   | IO                | DQS15B  |   | AL25  | DQVLD7B                     | DQS3B                         |                               |
| B8          | VREFB8N2   | IO                |   |   | AB19  |                             |                               |                               |
| B8          | VREFB8N2   | IO                |   |   | AC20  |                             |                               |                               |
| B8          | VREFB8N1   | IO                |   |   | AE21  |                             |                               |                               |
| B8          | VREFB8N2   | IO                | DQ14B   |   | AG24  | DQ7B                        | DQ3B                          | DQ1B                          |
| B8          | VREFB8N2   | IO                | DQSn14B                                       |   | AH25  | DQSn7B                      | DQ3B                          | DQ1B                          |
| B8          | VREFB8N2   | IO                | DQ14B   |   | AH26  | DQ7B                        | DQ3B                          | DQ1B                          |
| B8          | VREFB8N2   | IO                | DQ14B   |   | AH24  | DQ7B                        | DQ3B                          | DQ1B                          |
| B8          | VREFB8N2   | IO                | DQ14B   |   | AK25  | DQ7B                        | DQ3B                          | DQ1B                          |
| B8          | VREFB8N2   | IO                | DQS14B  |   | AJ25  | DQS7B                       |                               |                               |
| B8          | VREFB8N1   | IO                |   |   | AD20  |                             |                               |                               |
| B8          | VREFB8N3   | VREFB8N3          | VREFB8N3                                      |   | AG21  |                             |                               |                               |
| B8          | VREFB8N2   | IO                |   |   | AF21  |                             |                               |                               |
| B8          | VREFB8N3   | IO                |   |   | AC19  |                             |                               |                               |
| B8          | VREFB8N2   | IO                | DQ13B   |   | AM24  | DQ6B                        |                               |                               |
| B8          | VREFB8N2   | IO                | DQSn13B                                       |   | AL24  | DQ6B                        | DQ2B                          | DQSn1B                        |
| B8          | VREFB8N2   | IO                | DQ13B   |   | AK24  | DQ6B                        | DQ2B                          | DQ1B                          |
| B8          | VREFB8N2   | IO                | DQ13B   |   | AK23  | DQ6B                        | DQ2B                          | DQ1B                          |
| B8          | VREFB8N2   | IO                | DQ13B   |   | AM23  | DQ6B                        | DQ2B                          | DQ1B                          |
| B8          | VREFB8N2   | IO                | DQS13B  |   | AL23  | DQVLD6B                     |                               | DQS1B                         |
| B8          | VREFB8N2   | IO                |   |   | AE20  |                             |                               |                               |
| B8          | VREFB8N3   | IO                |   |   | AD19  |                             |                               |                               |
| B8          | VREFB8N2   | IO                |   |   | AF20  |                             |                               |                               |
| B8          | VREFB8N3   | IO                | DQ12B   |   | AG23  | DQ6B                        | DQ2B                          | DQ1B                          |
| B8          | VREFB8N3   | IO                | DQSn12B                                       |   | AH22  | DQSn6B                      | DQ2B                          | DQ1B                          |
| B8          | VREFB8N3   | IO                | DQ12B   |   | AG22  | DQ6B                        | DQ2B                          | DQ1B                          |
| B8          | VREFB8N3   | IO                | DQ12B   |   | AK22  | DQ6B                        | DQ2B                          | DQ1B                          |
| B8          | VREFB8N3   | IO                | DQ12B   |   | AJ23  | DQ6B                        | DQ2B                          | DQ1B                          |
| B8          | VREFB8N3   | IO                | DQS12B  |   | AJ22  | DQS6B                       | DQVLD2B                       | DQVLD1B                       |
| B8          | VREFB8N3   | IO                |   |   | AB18  |                             |                               |                               |
| B8          | VREFB8N2   | VREFB8N2          | VREFB8N2                                      |   | AJ24  |                             |                               |                               |
| B8          | VREFB8N3   | IO                |   |   | AG20  |                             |                               |                               |
| B8          | VREFB8N2   | IO                |   |   | AE19  |                             |                               |                               |
| B8          | VREFB8N3   | IO                | DQ11B   |   | AM22  | DQ5B                        | DQ2B                          | DQ1B                          |



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| Bank Number | VREF Group | Pin Name/Function | Optional Function(s)/DQ Group for DQS x4 Mode | Configuration Function for Stratix II Only (Note 1) | F1020 | DQ Group for DQS x8/x9 Mode | DQ Group for DQS x16/x18 Mode | DQ Group for DQS x32/x36 Mode |
|-------------|------------|-------------------|---|---|-------|-----------------------------|-------------------------------|-------------------------------|
| B8          | VREFB8N3   | IO                | DQSn11B                                       |   | AL22  | DQ5B                        | DQSn2B                        | DQ1B                          |
| B8          | VREFB8N3   | IO                | DQ11B   |   | AJ21  | DQ5B                        | DQ2B                          | DQ1B                          |
| B8          | VREFB8N3   | IO                | DQ11B   |   | AK21  | DQ5B                        | DQ2B                          | DQ1B                          |
| B8          | VREFB8N3   | IO                | DQ11B   |   | AM21  | DQ5B                        | DQ2B                          | DQ1B                          |
| B8          | VREFB8N3   | IO                | DQS11B  |   | AL21  | DQVLD5B                     | DQS2B                         |                               |
| B8          | VREFB8N3   | IO                |   |   | AF19  |                             |                               |                               |
| B8          | VREFB8N3   | IO                |   |   | AC18  |                             |                               |                               |
|             |            | NC (Note 7)       |   |   | AD18  |                             |                               |                               |
| B8          | VREFB8N4   | IO                | DQ10B   |   | AH20  | DQ5B                        | DQ2B                          | DQ1B                          |
| B8          | VREFB8N4   | IO                | DQSn10B                                       |   | AJ20  | DQSn5B                      | DQ2B                          | DQ1B                          |
| B8          | VREFB8N4   | IO                | DQ10B   |   | AJ19  | DQ5B                        | DQ2B                          | DQ1B                          |
| B8          | VREFB8N4   | IO                | DQ10B   |   | AH19  | DQ5B                        | DQ2B                          | DQ1B                          |
| B8          | VREFB8N4   | IO                | DQ10B   |   | AL20  | DQ5B                        | DQ2B                          | DQ1B                          |
| B8          | VREFB8N4   | IO                | DQS10B  |   | AK20  | DQS5B                       |                               |                               |
| B8          | VREFB8N4   | VREFB8N4          | VREFB8N4                                      |   | AK19  |                             |                               |                               |
|             |            | NC (Note 7)       |   |   | AB17  |                             |                               |                               |
| B8          | VREFB8N4   | IO                |   | RUnLU   | AG17  |                             |                               |                               |
| B8          | VREFB8N4   | IO                | DEV_OE  | DEV_OE  | AH17  |                             |                               |                               |
| B8          | VREFB8N4   | IO                | DEV_CLRn                                      | DEV_CLRn  | AG19  |                             |                               |                               |
| B8          | VREFB8N4   | IO                |   | nCS   | AG18  |                             |                               |                               |
| B12         | VREFB8N4   | IO                | PLL12_FBn/OUT2n                               |   | AL19  |                             |                               |                               |
| B12         | VREFB8N4   | IO                | PLL12_FBp/OUT2p                               |   | AM19  |                             |                               |                               |
|             |            | NC (Note 7)       |   |   | AC17  |                             |                               |                               |
| B12         | VREFB8N4   | IO                | PLL12_OUT1n                                   |   | AH18  |                             |                               |                               |
| B12         | VREFB8N4   | IO                | PLL12_OUT1p                                   |   | AJ18  |                             |                               |                               |
| B12         | VREFB8N4   | IO                | PLL12_OUT0n                                   |   | AK18  |                             |                               |                               |
| B12         | VREFB8N4   | IO                | PLL12_OUT0p                                   |   | AL18  |                             |                               |                               |
| B8          | VREFB8N4   | IO                | CLK5n   |   | AJ17  |                             |                               |                               |
| B8          | VREFB8N4   | IO                | CLK5p   |   | AK17  |                             |                               |                               |
| B8          | VREFB8N4   | IO                | CLK4n   |   | AL17  |                             |                               |                               |
| B8          | VREFB8N4   | IO                | CLK4p   |   | AM17  |                             |                               |                               |
| B12         |            | VCC_PLL12_OUT     |   |   | AF16  |                             |                               |                               |
|             |            | VCCD_PLL12        |   |   | AE18  |                             |                               |                               |
|             |            | VCCA_PLL12        |   |   | AF18  |                             |                               |                               |
|             |            | GND_A_PLL12       |   |   | AD17  |                             |                               |                               |
|             |            | GND_A_PLL12       |   |   | AE17  |                             |                               |                               |
|             |            | GND_A_PLL6        |   |   | AD16  |                             |                               |                               |
|             |            | GND_A_PLL6        |   |   | AE16  |                             |                               |                               |
|             |            | VCCA_PLL6         |   |   | AE15  |                             |                               |                               |
|             |            | VCCD_PLL6         |   |   | AD15  |                             |                               |                               |
| B10         |            | VCC_PLL6_OUT      |   |   | AF15  |                             |                               |                               |
| B7          | VREFB7N0   | IO                | CLK7p   |   | AH16  |                             |                               |                               |
| B7          | VREFB7N0   | IO                | CLK7n   |   | AG16  |                             |                               |                               |
| B7          | VREFB7N0   | IO                | CLK6p   |   | AM16  |                             |                               |                               |
| B7          | VREFB7N0   | IO                | CLK6n   |   | AL16  |                             |                               |                               |
| B10         | VREFB7N0   | IO                | PLL6_OUT1p                                    |   | AJ15  |                             |                               |                               |
| B10         | VREFB7N0   | IO                | PLL6_OUT1n                                    |   | AH15  |                             |                               |                               |
| B10         | VREFB7N0   | IO                | PLL6_OUT0p                                    |   | AK16  |                             |                               |                               |
| B10         | VREFB7N0   | IO                | PLL6_OUT0n                                    |   | AJ16  |                             |                               |                               |
| B10         | VREFB7N0   | IO                | PLL6_FBp/OUT2p                                |   | AL15  |                             |                               |                               |
| B10         | VREFB7N0   | IO                | PLL6_FBn/OUT2n                                |   | AK15  |                             |                               |                               |
| B7          | VREFB7N1   | IO                |   |   | AC16  |                             |                               |                               |
| B7          | VREFB7N0   | VREFB7N0          | VREFB7N0                                      |   | AK14  |                             |                               |                               |
| B7          | VREFB7N0   | IO                | DQ9B  |   | AM14  | DQ4B                        |                               |                               |
| B7          | VREFB7N0   | IO                | DQSn9B  |   | AL13  | DQ4B                        | DQ1B                          | DQ0B                          |
| B7          | VREFB7N0   | IO                | DQ9B  |   | AJ13  | DQ4B                        | DQ1B                          |                               |
| B7          | VREFB7N0   | IO                | DQ9B  |   | AJ14  | DQ4B                        | DQ1B                          | DQ0B                          |
| B7          | VREFB7N0   | IO                | DQ9B  |   | AL14  | DQ4B                        | DQ1B                          | DQ0B                          |
| B7          | VREFB7N0   | IO                | DQS9B   |   | AK13  | DQVLD4B                     |                               |                               |
| B7          | VREFB7N0   | IO                |   |   | AB16  |                             |                               |                               |
| B7          | VREFB7N0   | IO                |   |   | AC15  |                             |                               |                               |
| B7          | VREFB7N0   | IO                | DQ8B  |   | AG15  | DQ4B                        | DQ1B                          | DQ0B                          |
| B7          | VREFB7N1   | IO                | DQSn8B  |   | AH14  | DQSn4B                      | DQ1B                          | DQ0B                          |
| B7          | VREFB7N1   | IO                | DQ8B  |   | AF13  | DQ4B                        | DQ1B                          | DQ0B                          |
| B7          | VREFB7N1   | IO                | DQ8B  |   | AG13  | DQ4B                        | DQ1B                          | DQ0B                          |
| B7          | VREFB7N1   | IO                | DQ8B  |   | AH13  | DQ4B                        | DQ1B                          | DQ0B                          |
| B7          | VREFB7N1   | IO                | DQS8B   |   | AG14  | DQS4B                       | DQVLD1B                       |                               |
| B7          | VREFB7N1   | IO                |   |   | AE14  |                             |                               |                               |
| B7          | VREFB7N1   | IO                | DQ7B  |   | AM12  | DQ3B                        | DQ1B                          | DQ0B                          |
| B7          | VREFB7N1   | IO                | DQSn7B  |   | AL12  | DQ3B                        | DQSn1B                        | DQ0B                          |
| B7          | VREFB7N1   | VREFB7N1          | VREFB7N1                                      |   | AF14  |                             |                               |                               |



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| Bank Number | VREF Group | Pin Name/Function | Optional Function(s)/DQ Group for DQS x4 Mode | Configuration Function for Stratix II Only (Note 1) | F1020 | DQ Group for DQS x8/x9 Mode | DQ Group for DQS x16/x18 Mode | DQ Group for DQS x32/x36 Mode |
|-------------|------------|-------------------|---|---|-------|-----------------------------|-------------------------------|-------------------------------|
| B7          | VREFB7N1   | IO                | DQ7B  |   | AM11  | DQ3B                        | DQ1B                          | DQ0B                          |
| B7          | VREFB7N1   | IO                | DQ7B  |   | AJ12  | DQ3B                        | DQ1B                          | DQ0B                          |
| B7          | VREFB7N1   | IO                | DQ7B  |   | AK12  | DQ3B                        | DQ1B                          | DQ0B                          |
| B7          | VREFB7N1   | IO                | DQS7B   |   | AL11  | DQVLD3B                     | DQS1B                         |                               |
| B7          | VREFB7N1   | IO                |   |   | AD14  |                             |                               |                               |
| B7          | VREFB7N1   | IO                |   |   | AB15  |                             |                               |                               |
| B7          | VREFB7N1   | IO                | DQ6B  |   | AM10  | DQ3B                        | DQ1B                          | DQ0B                          |
| B7          | VREFB7N1   | IO                | DQSn6B  |   | AK11  | DQSn3B                      | DQ1B                          | DQ0B                          |
| B7          | VREFB7N1   | IO                | DQ6B  |   | AL10  | DQ3B                        | DQ1B                          | DQ0B                          |
| B7          | VREFB7N1   | IO                | DQ6B  |   | AH11  | DQ3B                        | DQ1B                          | DQ0B                          |
| B7          | VREFB7N2   | IO                | DQ6B  |   | AJ11  | DQ3B                        | DQ1B                          | DQ0B                          |
| B7          | VREFB7N2   | IO                | DQS6B   |   | AK10  | DQS3B                       |                               |                               |
| B7          | VREFB7N1   | IO                |   |   | AC14  |                             |                               |                               |
| B7          | VREFB7N2   | IO                |   |   | AE13  |                             |                               |                               |
| B7          | VREFB7N2   | IO                | DQ5B  |   | AG12  | DQ2B                        |                               |                               |
| B7          | VREFB7N2   | IO                | DQSn5B  |   | AG11  | DQ2B                        | DQ0B                          | DQSn0B                        |
| B7          | VREFB7N2   | IO                | DQ5B  |   | AF10  | DQ2B                        | DQ0B                          | DQ0B                          |
| B7          | VREFB7N2   | IO                | DQ5B  |   | AG10  | DQ2B                        | DQ0B                          | DQ0B                          |
| B7          | VREFB7N2   | IO                | DQ5B  |   | AF12  | DQ2B                        | DQ0B                          | DQ0B                          |
| B7          | VREFB7N2   | IO                | DQS5B   |   | AF11  | DQVLD2B                     |                               | DQS0B                         |
| B7          | VREFB7N2   | IO                |   |   | AD13  |                             |                               |                               |
| B7          | VREFB7N2   | VREFB7N2          | VREFB7N2                                      |   | AJ9   |                             |                               |                               |
| B7          | VREFB7N2   | IO                | DQ4B  |   | AM9   | DQ2B                        | DQ0B                          | DQ0B                          |
| B7          | VREFB7N2   | IO                | DQSn4B  |   | AL9   | DQSn2B                      | DQ0B                          | DQ0B                          |
| B7          | VREFB7N2   | IO                | DQ4B  |   | AJ8   | DQ2B                        | DQ0B                          | DQ0B                          |
| B7          | VREFB7N2   | IO                | DQ4B  |   | AK8   | DQ2B                        | DQ0B                          | DQ0B                          |
| B7          | VREFB7N2   | IO                | DQ4B  |   | AJ10  | DQ2B                        | DQ0B                          | DQ0B                          |
| B7          | VREFB7N2   | IO                | DQS4B   |   | AK9   | DQS2B                       | DQVLD0B                       | DQVLD0B                       |
| B7          | VREFB7N2   | IO                |   |   | AB14  |                             |                               |                               |
| B7          | VREFB7N2   | IO                |   |   | AE12  |                             |                               |                               |
| B7          | VREFB7N2   | IO                | DQ3B  |   | AM8   | DQ1B                        | DQ0B                          | DQ0B                          |
| B7          | VREFB7N3   | IO                | DQSn3B  |   | AL8   | DQ1B                        | DQSn0B                        | DQ0B                          |
| B7          | VREFB7N3   | IO                | DQ3B  |   | AJ7   | DQ1B                        | DQ0B                          | DQ0B                          |
| B7          | VREFB7N3   | IO                | DQ3B  |   | AK7   | DQ1B                        | DQ0B                          | DQ0B                          |
| B7          | VREFB7N3   | IO                | DQ3B  |   | AM7   | DQ1B                        | DQ0B                          | DQ0B                          |
| B7          | VREFB7N3   | IO                | DQS3B   |   | AL7   | DQVLD1B                     | DQS0B                         |                               |
| B7          | VREFB7N3   | IO                |   |   | AC13  |                             |                               |                               |
| B7          | VREFB7N3   | IO                |   |   | AB13  |                             |                               |                               |
| B7          | VREFB7N3   | IO                | DQ2B  |   | AM6   | DQ1B                        | DQ0B                          | DQ0B                          |
| B7          | VREFB7N3   | IO                | DQSn2B  |   | AL6   | DQSn1B                      | DQ0B                          | DQ0B                          |
| B7          | VREFB7N3   | IO                | DQ2B  |   | AJ6   | DQ1B                        | DQ0B                          | DQ0B                          |
| B7          | VREFB7N3   | IO                | DQ2B  |   | AK6   | DQ1B                        | DQ0B                          | DQ0B                          |
| B7          | VREFB7N3   | IO                | DQ2B  |   | AM5   | DQ1B                        | DQ0B                          | DQ0B                          |
| B7          | VREFB7N3   | IO                | DQS2B   |   | AL5   | DQS1B                       |                               |                               |
| B7          | VREFB7N3   | VREFB7N3          | VREFB7N3                                      |   | AE9   |                             |                               |                               |
| B7          | VREFB7N2   | IO                |   |   | AD12  |                             |                               |                               |
| B7          | VREFB7N3   | IO                |   |   | AE11  |                             |                               |                               |
| B7          | VREFB7N3   | IO                |   |   | AC12  |                             |                               |                               |
| B7          | VREFB7N3   | IO                | DQ1B  |   | AH9   | DQ0B                        |                               |                               |
| B7          | VREFB7N3   | IO                | DQSn1B  |   | AH8   | DQ0B                        |                               |                               |
| B7          | VREFB7N3   | IO                | DQ1B  |   | AH7   | DQ0B                        |                               |                               |
| B7          | VREFB7N4   | IO                | DQ1B  |   | AH6   | DQ0B                        |                               |                               |
| B7          | VREFB7N3   | IO                | DQ1B  |   | AG9   | DQ0B                        |                               |                               |
| B7          | VREFB7N4   | IO                | DQS1B   |   | AG8   | DQVLD0B                     |                               |                               |
| B7          | VREFB7N3   | IO                |   |   | AD11  |                             |                               |                               |
| B7          | VREFB7N4   | IO                |   |   | AE10  |                             |                               |                               |
| B7          | VREFB7N4   | IO                | DQ0B  |   | AM4   | DQ0B                        |                               |                               |
| B7          | VREFB7N4   | IO                | DQSn0B  |   | AK5   | DQSn0B                      |                               |                               |
| B7          | VREFB7N4   | IO                | DQ0B  |   | AH5   | DQ0B                        |                               |                               |
| B7          | VREFB7N4   | IO                | DQ0B  |   | AJ5   | DQ0B                        |                               |                               |
| B7          | VREFB7N4   | IO                | DQ0B  |   | AL4   | DQ0B                        |                               |                               |
| B7          | VREFB7N4   | IO                | DQS0B   |   | AK4   | DQS0B                       |                               |                               |
| B7          | VREFB7N4   | IO                |   |   | AB12  |                             |                               |                               |
| B7          | VREFB7N4   | VREFB7N4          | VREFB7N4                                      |   | AK2   |                             |                               |                               |
| B7          | VREFB7N4   | IO                |   |   | AC11  |                             |                               |                               |
| B7          | VREFB7N4   | IO                | RDN7  |   | AB11  |                             |                               |                               |
| B7          | VREFB7N4   | IO                | RUP7  |   | AD10  |                             |                               |                               |
| B7          | VREFB7N4   | PORSEL            |   | PORSEL  | AL2   |                             |                               |                               |
| B7          | VREFB7N4   | nIO_PULLUP        |   | nIO_PULLUP  | AK3   |                             |                               |                               |
| B7          | VREFB7N4   | PLL_ENA           |   | PLL_ENA   | AF8   |                             |                               |                               |
|             |            | GND               |   |   | AF9   |                             |                               |                               |



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| Bank Number | VREF Group | Pin Name/Function | Optional Function(s)/DQ Group for DQS x4 Mode | Configuration Function for Stratix II Only (Note 1) | F1020 | DQ Group for DQS x8/x9 Mode | DQ Group for DQS x16/x18 Mode | DQ Group for DQS x32/x36 Mode |
|-------------|------------|-------------------|---|---|-------|-----------------------------|-------------------------------|-------------------------------|
| B7          | VREFB7N4   | nCEO              |   | nCEO  | AL3   |                             |                               |                               |
|             |            | NC (Note 4)       |   |   | AE8   |                             |                               |                               |
|             |            | NC (Note 5)       |   |   | AE7   |                             |                               |                               |
|             |            | NC (Note 6)       |   |   | AF7   |                             |                               |                               |
|             |            | NC (Note 6)       |   |   | AG7   |                             |                               |                               |
|             |            | NC (Note 8)       |   |   | AJ3   |                             |                               |                               |
|             |            | NC (Note 8)       |   |   | AJ4   |                             |                               |                               |
|             |            | NC (Note 3)       |   |   | AG5   |                             |                               |                               |
|             |            | NC (Note 3)       |   |   | AF6   |                             |                               |                               |
|             |            | NC (Note 7)       |   |   | AD7   |                             |                               |                               |
|             |            | NC (Note 7)       |   |   | AD6   |                             |                               |                               |
|             |            | NC (Note 7)       |   |   | AH4   |                             |                               |                               |
|             |            | NC (Note 7)       |   |   | AH3   |                             |                               |                               |
|             |            | NC (Note 7)       |   |   | AD9   |                             |                               |                               |
|             |            | NC (Note 7)       |   |   | AD8   |                             |                               |                               |
|             |            | NC (Note 7)       |   |   | AG4   |                             |                               |                               |
|             |            | NC (Note 7)       |   |   | AG3   |                             |                               |                               |
|             |            | NC (Note 3)       |   |   | AF5   |                             |                               |                               |
|             |            | NC (Note 7)       |   |   | AC7   |                             |                               |                               |
|             |            | NC (Note 7)       |   |   | AC6   |                             |                               |                               |
|             |            | NC (Note 7)       |   |   | AJ2   |                             |                               |                               |
|             |            | NC (Note 7)       |   |   | AJ1   |                             |                               |                               |
|             |            | NC (Note 7)       |   |   | AC9   |                             |                               |                               |
|             |            | NC (Note 7)       |   |   | AC8   |                             |                               |                               |
|             |            | NC (Note 7)       |   |   | AE6   |                             |                               |                               |
|             |            | NC (Note 7)       |   |   | AE5   |                             |                               |                               |
| B6          |            | IO                |   |   | AB8   |                             |                               |                               |
| B6          |            | IO                |   |   | AB7   |                             |                               |                               |
| B6          |            | IO                |   |   | AH2   |                             |                               |                               |
| B6          |            | IO                |   |   | AH1   |                             |                               |                               |
| B6          |            | IO                |   |   | AB10  |                             |                               |                               |
| B6          |            | IO                |   |   | AB9   |                             |                               |                               |
| B6          |            | IO                |   |   | AF4   |                             |                               |                               |
| B6          |            | IO                |   |   | AF3   |                             |                               |                               |
| B6          |            | IO                |   |   | AB6   |                             |                               |                               |
| B6          |            | IO                |   |   | AB5   |                             |                               |                               |
| B6          |            | IO                |   |   | AG2   |                             |                               |                               |
| B6          |            | IO                |   |   | AG1   |                             |                               |                               |
| B6          |            | IO                |   |   | AA9   |                             |                               |                               |
| B6          |            | IO                |   |   | AA8   |                             |                               |                               |
| B6          |            | IO                |   |   | AD4   |                             |                               |                               |
| B6          |            | IO                |   |   | AD3   |                             |                               |                               |
| B6          |            | IO                |   |   | AA11  |                             |                               |                               |
| B6          |            | IO                |   |   | AA10  |                             |                               |                               |
| B6          |            | IO                |   |   | AF2   |                             |                               |                               |
| B6          |            | IO                |   |   | AF1   |                             |                               |                               |
| B6          |            | IO                |   |   | Y11   |                             |                               |                               |
| B6          |            | IO                |   |   | Y10   |                             |                               |                               |
| B6          |            | IO                |   |   | AE4   |                             |                               |                               |
| B6          |            | IO                |   |   | AE3   |                             |                               |                               |
| B6          |            | IO                |   |   | AA7   |                             |                               |                               |
| B6          |            | IO                |   |   | AA6   |                             |                               |                               |
| B6          |            | IO                |   |   | AE2   |                             |                               |                               |
| B6          |            | IO                |   |   | AE1   |                             |                               |                               |
|             |            | NC (Note 3)       |   |   | AD5   |                             |                               |                               |
| B6          |            | IO                |   |   | W11   |                             |                               |                               |
| B6          |            | IO                |   |   | W10   |                             |                               |                               |
| B6          |            | IO                |   |   | AD2   |                             |                               |                               |
| B6          |            | IO                |   |   | AD1   |                             |                               |                               |
| B6          |            | IO                |   |   | Y9    |                             |                               |                               |
| B6          |            | IO                |   |   | Y8    |                             |                               |                               |
| B6          |            | IO                |   |   | AC4   |                             |                               |                               |
| B6          |            | IO                |   |   | AC3   |                             |                               |                               |
| B6          |            | IO                |   |   | Y7    |                             |                               |                               |
| B6          |            | IO                |   |   | Y6    |                             |                               |                               |
| B6          |            | IO                |   |   | AC2   |                             |                               |                               |
| B6          |            | IO                |   |   | AC1   |                             |                               |                               |
| B6          |            | IO                |   |   | W5    |                             |                               |                               |
| B6          |            | IO                |   |   | W4    |                             |                               |                               |
| B6          |            | IO                |   |   | AB4   |                             |                               |                               |
| B6          |            | IO                |   |   | AB3   |                             |                               |                               |



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| Bank Number | VREF Group | Pin Name/Function | Optional Function(s)/DQ Group for DQS x4 Mode | Configuration Function for Stratix II Only (Note 1) | F1020 | DQ Group for DQS x8/x9 Mode | DQ Group for DQS x16/x18 Mode | DQ Group for DQS x32/x36 Mode |
|-------------|------------|-------------------|---|---|-------|-----------------------------|-------------------------------|-------------------------------|
| B6          |            | IO                |   |   | W7    |                             |                               |                               |
| B6          |            | IO                |   |   | W6    |                             |                               |                               |
| B6          |            | IO                |   |   | AB2   |                             |                               |                               |
| B6          |            | IO                |   |   | AB1   |                             |                               |                               |
| B6          |            | IO                |   |   | W9    |                             |                               |                               |
| B6          |            | IO                |   |   | W8    |                             |                               |                               |
| B6          |            | IO                |   |   | Y5    |                             |                               |                               |
| B6          |            | IO                |   |   | Y4    |                             |                               |                               |
| B6          |            | IO                |   |   | V5    |                             |                               |                               |
| B6          |            | IO                |   |   | V4    |                             |                               |                               |
| B6          |            | IO                |   |   | AA4   |                             |                               |                               |
| B6          |            | IO                |   |   | AA3   |                             |                               |                               |
| B6          |            | IO                |   |   | V7    |                             |                               |                               |
| B6          |            | IO                |   |   | V6    |                             |                               |                               |
| B6          |            | IO                |   |   | AA2   |                             |                               |                               |
| B6          |            | IO                |   |   | AA1   |                             |                               |                               |
|             |            | NC (Note 3)       |   |   | W3    |                             |                               |                               |
| B6          |            | IO                |   |   | V10   |                             |                               |                               |
| B6          |            | IO                |   |   | V9    |                             |                               |                               |
| B6          |            | IO                |   |   | Y3    |                             |                               |                               |
| B6          |            | IO                |   |   | Y2    |                             |                               |                               |
| B6          |            | IO                |   |   | U11   |                             |                               |                               |
| B6          |            | IO                |   |   | U10   |                             |                               |                               |
| B6          |            | IO                |   |   | W2    |                             |                               |                               |
| B6          |            | IO                |   |   | W1    |                             |                               |                               |
| B6          |            | IO                |   |   | U6    |                             |                               |                               |
| B6          |            | IO                |   |   | U5    |                             |                               |                               |
| B6          |            | IO                |   |   | V3    |                             |                               |                               |
| B6          |            | IO                |   |   | V2    |                             |                               |                               |
| B6          |            | CLK9n             | INPUT   |   | U4    |                             |                               |                               |
| B6          |            | CLK9p             | INPUT   |   | U3    |                             |                               |                               |
| B6          |            | IO                | CLK8n   |   | U2    |                             |                               |                               |
| B6          |            | IO                | CLK8p   |   | U1    |                             |                               |                               |
|             |            | NC (Note 4)       |   |   | U7    |                             |                               |                               |
|             |            | NC (Note 5)       |   |   | U9    |                             |                               |                               |
|             |            | NC (Note 6)       |   |   | U8    |                             |                               |                               |
|             |            | NC (Note 6)       |   |   | V8    |                             |                               |                               |
|             |            | NC (Note 6)       |   |   | R8    |                             |                               |                               |
|             |            | NC (Note 6)       |   |   | T8    |                             |                               |                               |
|             |            | NC (Note 5)       |   |   | R9    |                             |                               |                               |
|             |            | NC (Note 4)       |   |   | T9    |                             |                               |                               |
| B5          |            | CLK11p            | INPUT   |   | T3    |                             |                               |                               |
| B5          |            | CLK11n            | INPUT   |   | T4    |                             |                               |                               |
| B5          |            | IO                | CLK10p  |   | T1    |                             |                               |                               |
| B5          |            | IO                | CLK10n  |   | T2    |                             |                               |                               |
| B5          |            | IO                |   |   | T11   |                             |                               |                               |
| B5          |            | IO                |   |   | T10   |                             |                               |                               |
| B5          |            | IO                |   |   | P2    |                             |                               |                               |
| B5          |            | IO                |   |   | P1    |                             |                               |                               |
| B5          |            | IO                |   |   | T6    |                             |                               |                               |
| B5          |            | IO                |   |   | T5    |                             |                               |                               |
| B5          |            | IO                |   |   | R3    |                             |                               |                               |
| B5          |            | IO                |   |   | R2    |                             |                               |                               |
| B5          |            | IO                |   |   | R11   |                             |                               |                               |
| B5          |            | IO                |   |   | R10   |                             |                               |                               |
| B5          |            | IO                |   |   | M2    |                             |                               |                               |
| B5          |            | IO                |   |   | M1    |                             |                               |                               |
| B5          |            | IO                |   |   | R5    |                             |                               |                               |
| B5          |            | IO                |   |   | R4    |                             |                               |                               |
| B5          |            | IO                |   |   | N3    |                             |                               |                               |
| B5          |            | IO                |   |   | N2    |                             |                               |                               |
|             |            | NC (Note 3)       |   |   | P3    |                             |                               |                               |
| B5          |            | IO                |   |   | R7    |                             |                               |                               |
| B5          |            | IO                |   |   | R6    |                             |                               |                               |
| B5          |            | IO                |   |   | L2    |                             |                               |                               |
| B5          |            | IO                |   |   | L1    |                             |                               |                               |
| B5          |            | IO                |   |   | P11   |                             |                               |                               |
| B5          |            | IO                |   |   | P10   |                             |                               |                               |
| B5          |            | IO                |   |   | M4    |                             |                               |                               |
| B5          |            | IO                |   |   | M3    |                             |                               |                               |
| B5          |            | IO                |   |   | P5    |                             |                               |                               |





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| Bank Number | VREF Group | Pin Name/Function | Optional Function(s)/DQ Group for DQS x4 Mode | Configuration Function for Stratix II Only (Note 1) | F1020 | DQ Group for DQS x8/x9 Mode | DQ Group for DQS x16/x18 Mode | DQ Group for DQS x32/x36 Mode |
|-------------|------------|-------------------|---|---|-------|-----------------------------|-------------------------------|-------------------------------|
| B5          |            | IO                |   |   | P4    |                             |                               |                               |
| B5          |            | IO                |   |   | N5    |                             |                               |                               |
| B5          |            | IO                |   |   | N4    |                             |                               |                               |
| B5          |            | IO                |   |   | P7    |                             |                               |                               |
| B5          |            | IO                |   |   | P6    |                             |                               |                               |
| B5          |            | IO                |   |   | L4    |                             |                               |                               |
| B5          |            | IO                |   |   | L3    |                             |                               |                               |
| B5          |            | IO                |   |   | P9    |                             |                               |                               |
| B5          |            | IO                |   |   | P8    |                             |                               |                               |
| B5          |            | IO                |   |   | K2    |                             |                               |                               |
| B5          |            | IO                |   |   | K1    |                             |                               |                               |
| B5          |            | IO                |   |   | N9    |                             |                               |                               |
| B5          |            | IO                |   |   | N8    |                             |                               |                               |
| B5          |            | IO                |   |   | K4    |                             |                               |                               |
| B5          |            | IO                |   |   | K3    |                             |                               |                               |
| B5          |            | IO                |   |   | N7    |                             |                               |                               |
| B5          |            | IO                |   |   | N6    |                             |                               |                               |
| B5          |            | IO                |   |   | J2    |                             |                               |                               |
| B5          |            | IO                |   |   | J1    |                             |                               |                               |
| B5          |            | IO                |   |   | M7    |                             |                               |                               |
| B5          |            | IO                |   |   | M6    |                             |                               |                               |
| B5          |            | IO                |   |   | H2    |                             |                               |                               |
| B5          |            | IO                |   |   | H1    |                             |                               |                               |
| B5          |            | IO                |   |   | N11   |                             |                               |                               |
| B5          |            | IO                |   |   | N10   |                             |                               |                               |
| B5          |            | IO                |   |   | J4    |                             |                               |                               |
| B5          |            | IO                |   |   | J3    |                             |                               |                               |
|             |            | NC (Note 3)       |   |   | J5    |                             |                               |                               |
| B5          |            | IO                |   |   | M11   |                             |                               |                               |
| B5          |            | IO                |   |   | M10   |                             |                               |                               |
| B5          |            | IO                |   |   | G2    |                             |                               |                               |
| B5          |            | IO                |   |   | G1    |                             |                               |                               |
| B5          |            | IO                |   |   | L6    |                             |                               |                               |
| B5          |            | IO                |   |   | L5    |                             |                               |                               |
| B5          |            | IO                |   |   | G4    |                             |                               |                               |
| B5          |            | IO                |   |   | G3    |                             |                               |                               |
| B5          |            | IO                |   |   | M9    |                             |                               |                               |
| B5          |            | IO                |   |   | M8    |                             |                               |                               |
| B5          |            | IO                |   |   | F2    |                             |                               |                               |
| B5          |            | IO                |   |   | F1    |                             |                               |                               |
| B5          |            | IO                |   |   | L10   |                             |                               |                               |
| B5          |            | IO                |   |   | L9    |                             |                               |                               |
| B5          |            | IO                |   |   | F4    |                             |                               |                               |
| B5          |            | IO                |   |   | F3    |                             |                               |                               |
| B5          |            | IO                |   |   | L8    |                             |                               |                               |
| B5          |            | IO                |   |   | L7    |                             |                               |                               |
| B5          |            | IO                |   |   | E2    |                             |                               |                               |
| B5          |            | IO                |   |   | E1    |                             |                               |                               |
|             |            | NC (Note 7)       |   |   | K9    |                             |                               |                               |
|             |            | NC (Note 7)       |   |   | K8    |                             |                               |                               |
|             |            | NC (Note 7)       |   |   | E4    |                             |                               |                               |
|             |            | NC (Note 7)       |   |   | E3    |                             |                               |                               |
|             |            | NC (Note 7)       |   |   | K7    |                             |                               |                               |
|             |            | NC (Note 7)       |   |   | K6    |                             |                               |                               |
|             |            | NC (Note 7)       |   |   | D2    |                             |                               |                               |
|             |            | NC (Note 7)       |   |   | D1    |                             |                               |                               |
|             |            | NC (Note 7)       |   |   | J9    |                             |                               |                               |
|             |            | NC (Note 7)       |   |   | J8    |                             |                               |                               |
|             |            | NC (Note 7)       |   |   | H4    |                             |                               |                               |
|             |            | NC (Note 7)       |   |   | H3    |                             |                               |                               |
|             |            | NC (Note 7)       |   |   | J7    |                             |                               |                               |
|             |            | NC (Note 7)       |   |   | J6    |                             |                               |                               |
|             |            | NC (Note 7)       |   |   | G6    |                             |                               |                               |
|             |            | NC (Note 7)       |   |   | G5    |                             |                               |                               |
|             |            | NC (Note 3)       |   |   | H5    |                             |                               |                               |
|             |            | NC (Note 3)       |   |   | H6    |                             |                               |                               |
|             |            | NC (Note 3)       |   |   | F5    |                             |                               |                               |
|             |            | NC (Note 8)       |   |   | D4    |                             |                               |                               |
|             |            | NC (Note 8)       |   |   | D3    |                             |                               |                               |
|             |            | NC (Note 6)       |   |   | G7    |                             |                               |                               |
|             |            | NC (Note 6)       |   |   | G8    |                             |                               |                               |



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| Bank Number | VREF Group | Pin Name/Function | Optional Function(s)/DQ Group for DQS x4 Mode | Configuration Function for Stratix II Only (Note 1) | F1020 | DQ Group for DQS x8/x9 Mode | DQ Group for DQS x16/x18 Mode | DQ Group for DQS x32/x36 Mode |
|-------------|------------|-------------------|---|---|-------|-----------------------------|-------------------------------|-------------------------------|
|             |            | NC (Note 5)       |   |   | H8    |                             |                               |                               |
|             |            | NC (Note 4)       |   |   | H7    |                             |                               |                               |
|             |            | TEMPDIODEp        |   |   | G9    |                             |                               |                               |
|             |            | TEMPDIODEn        |   |   | B3    |                             |                               |                               |
| B4          | VREFB4N0   | TDO               |   | TDO   | C3    |                             |                               |                               |
|             |            | NC (Note 2)       |   | MSEL3   | H10   |                             |                               |                               |
|             |            | NC (Note 2)       |   | MSEL2   | J10   |                             |                               |                               |
|             |            | NC (Note 2)       |   | MSEL1   | F6    |                             |                               |                               |
|             |            | NC (Note 2)       |   | MSEL0   | B2    |                             |                               |                               |
| B4          | VREFB4N0   | IO                | RUP4  |   | L12   |                             |                               |                               |
| B4          | VREFB4N0   | IO                | RDN4  |   | K11   |                             |                               |                               |
| B4          | VREFB4N0   | IO                |   |   | J11   |                             |                               |                               |
| B4          | VREFB4N0   | VREFB4N0          | VREFB4N0                                      |   | C2    |                             |                               |                               |
| B4          | VREFB4N0   | IO                |   |   | K12   |                             |                               |                               |
| B4          | VREFB4N0   | IO                | DQS0T   |   | C4    | DQS0T                       |                               |                               |
| B4          | VREFB4N0   | IO                | DQ0T  |   | B4    | DQ0T                        |                               |                               |
| B4          | VREFB4N0   | IO                | DQ0T  |   | D5    | DQ0T                        |                               |                               |
| B4          | VREFB4N0   | IO                | DQ0T  |   | E5    | DQ0T                        |                               |                               |
| B4          | VREFB4N0   | IO                | DQSn0T  |   | C5    | DQSn0T                      |                               |                               |
| B4          | VREFB4N0   | IO                | DQ0T  |   | A4    | DQ0T                        |                               |                               |
| B4          | VREFB4N1   | IO                |   |   | L13   |                             |                               |                               |
| B4          | VREFB4N1   | IO                |   |   | J12   |                             |                               |                               |
| B4          | VREFB4N0   | IO                | DQS1T   |   | B5    | DQVLD0T                     |                               |                               |
| B4          | VREFB4N0   | IO                | DQ1T  |   | A5    | DQ0T                        |                               |                               |
| B4          | VREFB4N1   | IO                | DQ1T  |   | D6    | DQ0T                        |                               |                               |
| B4          | VREFB4N0   | IO                | DQ1T  |   | C6    | DQ0T                        |                               |                               |
| B4          | VREFB4N1   | IO                | DQSn1T  |   | B6    | DQ0T                        |                               |                               |
| B4          | VREFB4N0   | IO                | DQ1T  |   | A6    | DQ0T                        |                               |                               |
| B4          | VREFB4N1   | IO                |   |   | H11   |                             |                               |                               |
| B4          | VREFB4N1   | IO                |   |   | K13   |                             |                               |                               |
| B4          | VREFB4N1   | IO                |   |   | J13   |                             |                               |                               |
| B4          | VREFB4N1   | VREFB4N1          | VREFB4N1                                      |   | H9    |                             |                               |                               |
| B4          | VREFB4N1   | IO                | DQS2T   |   | D7    | DQS1T                       |                               |                               |
| B4          | VREFB4N1   | IO                | DQ2T  |   | B7    | DQ1T                        | DQ0T                          | DQ0T                          |
| B4          | VREFB4N1   | IO                | DQ2T  |   | E7    | DQ1T                        | DQ0T                          | DQ0T                          |
| B4          | VREFB4N1   | IO                | DQ2T  |   | E6    | DQ1T                        | DQ0T                          | DQ0T                          |
| B4          | VREFB4N1   | IO                | DQSn2T  |   | C7    | DQSn1T                      | DQ0T                          | DQ0T                          |
| B4          | VREFB4N1   | IO                | DQ2T  |   | A7    | DQ1T                        | DQ0T                          | DQ0T                          |
| B4          | VREFB4N2   | IO                |   |   | L14   |                             |                               |                               |
| B4          | VREFB4N1   | IO                |   |   | H12   |                             |                               |                               |
| B4          | VREFB4N1   | IO                | DQS3T   |   | B8    | DQVLD1T                     | DQS0T                         |                               |
| B4          | VREFB4N1   | IO                | DQ3T  |   | C9    | DQ1T                        | DQ0T                          | DQ0T                          |
| B4          | VREFB4N1   | IO                | DQ3T  |   | A8    | DQ1T                        | DQ0T                          | DQ0T                          |
| B4          | VREFB4N1   | IO                | DQ3T  |   | C8    | DQ1T                        | DQ0T                          | DQ0T                          |
| B4          | VREFB4N1   | IO                | DQSn3T  |   | B9    | DQ1T                        | DQSn0T                        | DQ0T                          |
| B4          | VREFB4N1   | IO                | DQ3T  |   | A9    | DQ1T                        | DQ0T                          | DQ0T                          |
| B4          | VREFB4N2   | IO                |   |   | K14   |                             |                               |                               |
| B4          | VREFB4N2   | IO                | DQS4T   |   | F9    | DQS2T                       | DQVLD0T                       | DQVLD0T                       |
| B4          | VREFB4N2   | IO                | DQ4T  |   | D8    | DQ2T                        | DQ0T                          | DQ0T                          |
| B4          | VREFB4N2   | IO                | DQ4T  |   | E8    | DQ2T                        | DQ0T                          | DQ0T                          |
| B4          | VREFB4N2   | IO                | DQ4T  |   | F8    | DQ2T                        | DQ0T                          | DQ0T                          |
| B4          | VREFB4N2   | IO                | DQSn4T  |   | E9    | DQSn2T                      | DQ0T                          | DQ0T                          |
| B4          | VREFB4N2   | IO                | DQ4T  |   | F10   | DQ2T                        | DQ0T                          | DQ0T                          |
| B4          | VREFB4N3   | IO                |   |   | L15   |                             |                               |                               |
| B4          | VREFB4N2   | VREFB4N2          | VREFB4N2                                      |   | D9    |                             |                               |                               |
| B4          | VREFB4N2   | IO                |   |   | H13   |                             |                               |                               |
| B4          | VREFB4N2   | IO                | DQS5T   |   | C10   | DQVLD2T                     |                               | DQS0T                         |
| B4          | VREFB4N2   | IO                | DQ5T  |   | A10   | DQ2T                        | DQ0T                          | DQ0T                          |
| B4          | VREFB4N2   | IO                | DQ5T  |   | B10   | DQ2T                        | DQ0T                          | DQ0T                          |
| B4          | VREFB4N2   | IO                | DQ5T  |   | D10   | DQ2T                        | DQ0T                          | DQ0T                          |
| B4          | VREFB4N2   | IO                | DQSn5T  |   | C11   | DQ2T                        | DQ0T                          | DQSn0T                        |
| B4          | VREFB4N2   | IO                | DQ5T  |   | D11   | DQ2T                        |                               |                               |
| B4          | VREFB4N2   | IO                |   |   | J14   |                             |                               |                               |
| B4          | VREFB4N3   | IO                |   |   | K15   |                             |                               |                               |
| B4          | VREFB4N2   | IO                | DQS6T   |   | F11   | DQS3T                       |                               |                               |
| B4          | VREFB4N2   | IO                | DQ6T  |   | E11   | DQ3T                        | DQ1T                          | DQ0T                          |
| B4          | VREFB4N2   | IO                | DQ6T  |   | G10   | DQ3T                        | DQ1T                          | DQ0T                          |
| B4          | VREFB4N2   | IO                | DQ6T  |   | G11   | DQ3T                        | DQ1T                          | DQ0T                          |
| B4          | VREFB4N3   | IO                | DQSn6T  |   | F12   | DQSn3T                      | DQ1T                          | DQ0T                          |
| B4          | VREFB4N3   | IO                | DQ6T  |   | G12   | DQ3T                        | DQ1T                          | DQ0T                          |
| B4          | VREFB4N3   | IO                |   |   | H14   |                             |                               |                               |



Pin Information for HardCopy® II HC230 / Stratix® II EP2S180  
F1020 Companion Devices  
Version 1.1

| Bank Number | VREF Group | Pin Name/Function | Optional Function(s)/DQ Group for DQS x4 Mode | Configuration Function for Stratix II Only (Note 1) | F1020 | DQ Group for DQS x8/x9 Mode | DQ Group for DQS x16/x18 Mode | DQ Group for DQS x32/x36 Mode |
|-------------|------------|-------------------|---|---|-------|-----------------------------|-------------------------------|-------------------------------|
| B4          | VREFB4N3   | IO                | DQS7T   |   | C12   | DQVLD3T                     | DQS1T                         |                               |
| B4          | VREFB4N3   | IO                | DQ7T  |   | D12   | DQ3T                        | DQ1T                          | DQ0T                          |
| B4          | VREFB4N3   | IO                | DQ7T  |   | A11   | DQ3T                        | DQ1T                          | DQ0T                          |
| B4          | VREFB4N3   | IO                | DQ7T  |   | B11   | DQ3T                        | DQ1T                          | DQ0T                          |
| B4          | VREFB4N3   | VREFB4N3          | VREFB4N3                                      |   | G14   |                             |                               |                               |
| B4          | VREFB4N3   | IO                | DQSn7T  |   | B12   | DQ3T                        | DQSn1T                        | DQ0T                          |
| B4          | VREFB4N3   | IO                | DQ7T  |   | A12   | DQ3T                        | DQ1T                          | DQ0T                          |
| B4          | VREFB4N3   | IO                |   |   | J15   |                             |                               |                               |
| B4          | VREFB4N3   | IO                |   |   | L16   |                             |                               |                               |
| B4          | VREFB4N3   | IO                | DQS8T   |   | F14   | DQS4T                       | DQVLD1T                       |                               |
| B4          | VREFB4N3   | IO                | DQ8T  |   | E13   | DQ4T                        | DQ1T                          | DQ0T                          |
| B4          | VREFB4N3   | IO                | DQ8T  |   | F13   | DQ4T                        | DQ1T                          | DQ0T                          |
| B4          | VREFB4N3   | IO                | DQ8T  |   | G13   | DQ4T                        | DQ1T                          | DQ0T                          |
| B4          | VREFB4N3   | IO                | DQSn8T  |   | E14   | DQSn4T                      | DQ1T                          | DQ0T                          |
| B4          | VREFB4N3   | IO                | DQ8T  |   | F15   | DQ4T                        | DQ1T                          | DQ0T                          |
| B4          | VREFB4N3   | IO                |   |   | K16   |                             |                               |                               |
| B4          | VREFB4N4   | IO                |   |   | L17   |                             |                               |                               |
| B4          | VREFB4N4   | IO                | DQS9T   |   | C13   | DQVLD4T                     |                               |                               |
| B4          | VREFB4N4   | IO                | DQ9T  |   | B14   | DQ4T                        | DQ1T                          | DQ0T                          |
| B4          | VREFB4N4   | IO                | DQ9T  |   | D14   | DQ4T                        | DQ1T                          | DQ0T                          |
| B4          | VREFB4N4   | IO                | DQ9T  |   | D13   | DQ4T                        | DQ1T                          |                               |
| B4          | VREFB4N4   | VREFB4N4          | VREFB4N4                                      |   | C14   |                             |                               |                               |
| B4          | VREFB4N4   | IO                | DQSn9T  |   | B13   | DQ4T                        | DQ1T                          | DQ0T                          |
| B4          | VREFB4N4   | IO                | DQ9T  |   | A14   | DQ4T                        |                               |                               |
| B4          | VREFB4N4   | IO                |   |   | K17   |                             |                               |                               |
| B9          | VREFB4N4   | IO                | PLL5_FBn/OUT2n                                |   | E15   |                             |                               |                               |
| B9          | VREFB4N4   | IO                | PLL5_FBp/OUT2p                                |   | D15   |                             |                               |                               |
| B9          | VREFB4N4   | IO                | PLL5_OUT0n                                    |   | C15   |                             |                               |                               |
| B9          | VREFB4N4   | IO                | PLL5_OUT0p                                    |   | B15   |                             |                               |                               |
| B9          | VREFB4N4   | IO                | PLL5_OUT1n                                    |   | D16   |                             |                               |                               |
| B9          | VREFB4N4   | IO                | PLL5_OUT1p                                    |   | C16   |                             |                               |                               |
| B4          | VREFB4N4   | IO                | CLK12n  |   | B16   |                             |                               |                               |
| B4          | VREFB4N4   | IO                | CLK12p  |   | A16   |                             |                               |                               |
| B4          | VREFB4N4   | IO                | CLK13n  |   | F16   |                             |                               |                               |
| B4          | VREFB4N4   | IO                | CLK13p  |   | E16   |                             |                               |                               |
| B9          |            | VCC_PLL5_OUT      |   |   | J16   |                             |                               |                               |
|             |            | VCCD_PLL5         |   |   | H15   |                             |                               |                               |
|             |            | VCCA_PLL5         |   |   | G15   |                             |                               |                               |
|             |            | GND_A_PLL5        |   |   | G16   |                             |                               |                               |
|             |            | GND_A_PLL5        |   |   | H16   |                             |                               |                               |
|             |            | GND_A_PLL11       |   |   | G18   |                             |                               |                               |
|             |            | GND_A_PLL11       |   |   | H18   |                             |                               |                               |
|             |            | VCCA_PLL11        |   |   | H17   |                             |                               |                               |
|             |            | VCCD_PLL11        |   |   | J18   |                             |                               |                               |
| B11         |            | VCC_PLL11_OUT     |   |   | J17   |                             |                               |                               |
| B3          | VREFB3N0   | IO                | CLK14p  |   | A17   |                             |                               |                               |
| B3          | VREFB3N0   | IO                | CLK14n  |   | B17   |                             |                               |                               |
| B3          | VREFB3N0   | IO                | CLK15p  |   | C17   |                             |                               |                               |
| B3          | VREFB3N0   | IO                | CLK15n  |   | D17   |                             |                               |                               |
| B11         | VREFB3N0   | IO                | PLL11_OUT0p                                   |   | B18   |                             |                               |                               |
| B11         | VREFB3N0   | IO                | PLL11_OUT0n                                   |   | C18   |                             |                               |                               |
| B11         | VREFB3N0   | IO                | PLL11_OUT1p                                   |   | D18   |                             |                               |                               |
| B11         | VREFB3N0   | IO                | PLL11_OUT1n                                   |   | E18   |                             |                               |                               |
| B11         | VREFB3N0   | IO                | PLL11_FBp/OUT2p                               |   | A19   |                             |                               |                               |
| B11         | VREFB3N0   | IO                | PLL11_FBn/OUT2n                               |   | B19   |                             |                               |                               |
| B3          | VREFB3N0   | IO                |   | PGM2  | F18   |                             |                               |                               |
| B3          | VREFB3N0   | IO                |   | PGM1  | F19   |                             |                               |                               |
| B3          | VREFB3N0   | IO                |   | PGM0  | E17   |                             |                               |                               |
| B3          | VREFB3N0   | IO                |   | ASDO  | F17   |                             |                               |                               |
| B3          | VREFB3N0   | IO                |   | nCSO  | G19   |                             |                               |                               |
| B3          | VREFB3N1   | IO                |   | CRC_ERROR   | G20   |                             |                               |                               |
| B3          | VREFB3N1   | IO                |   | DATA0   | H19   |                             |                               |                               |
| B3          | VREFB3N1   | IO                |   | DATA1   | F20   |                             |                               |                               |
| B3          | VREFB3N0   | VREFB3N0          | VREFB3N0                                      |   | C19   |                             |                               |                               |
| B3          | VREFB3N0   | IO                | DQS10T  |   | D19   | DQS5T                       |                               |                               |
| B3          | VREFB3N0   | IO                | DQ10T   |   | B20   | DQ5T                        | DQ2T                          | DQ1T                          |
| B3          | VREFB3N0   | IO                | DQ10T   |   | E19   | DQ5T                        | DQ2T                          | DQ1T                          |
| B3          | VREFB3N0   | IO                | DQ10T   |   | C20   | DQ5T                        | DQ2T                          | DQ1T                          |
| B3          | VREFB3N1   | IO                | DQSn10T                                       |   | D20   | DQSn5T                      | DQ2T                          | DQ1T                          |
| B3          | VREFB3N1   | IO                | DQ10T   |   | E20   | DQ5T                        | DQ2T                          | DQ1T                          |
| B3          | VREFB3N0   | IO                |   |   | K18   |                             |                               |                               |



Pin Information for HardCopy® II HC230 / Stratix® II EP2S180  
F1020 Companion Devices  
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| Bank Number | VREF Group | Pin Name/Function | Optional Function(s)/DQ Group for DQS x4 Mode | Configuration Function for Stratix II Only (Note 1) | F1020 | DQ Group for DQS x8/x9 Mode | DQ Group for DQS x16/x18 Mode | DQ Group for DQS x32/x36 Mode |
|-------------|------------|-------------------|---|---|-------|-----------------------------|-------------------------------|-------------------------------|
| B3          | VREFB3N1   | IO                |   |   | L18   |                             |                               |                               |
| B3          | VREFB3N2   | IO                |   |   | J19   |                             |                               |                               |
| B3          | VREFB3N1   | IO                | DQS11T  |   | B21   | DQVLD5T                     | DQS2T                         |                               |
| B3          | VREFB3N1   | IO                | DQ11T   |   | A21   | DQ5T                        | DQ2T                          | DQ1T                          |
| B3          | VREFB3N1   | IO                | DQ11T   |   | C21   | DQ5T                        | DQ2T                          | DQ1T                          |
| B3          | VREFB3N1   | IO                | DQ11T   |   | A22   | DQ5T                        | DQ2T                          | DQ1T                          |
| B3          | VREFB3N1   | IO                | DQSn11T                                       |   | B22   | DQ5T                        | DQSn2T                        | DQ1T                          |
| B3          | VREFB3N1   | IO                | DQ11T   |   | C22   | DQ5T                        | DQ2T                          | DQ1T                          |
| B3          | VREFB3N2   | IO                |   |   | K19   |                             |                               |                               |
| B3          | VREFB3N1   | VREFB3N1          | VREFB3N1                                      |   | F21   |                             |                               |                               |
| B3          | VREFB3N2   | IO                |   |   | L19   |                             |                               |                               |
| B3          | VREFB3N1   | IO                | DQS12T  |   | D22   | DQS6T                       | DQVLD2T                       | DQVLD1T                       |
| B3          | VREFB3N1   | IO                | DQ12T   |   | D23   | DQ6T                        | DQ2T                          | DQ1T                          |
| B3          | VREFB3N1   | IO                | DQ12T   |   | D21   | DQ6T                        | DQ2T                          | DQ1T                          |
| B3          | VREFB3N2   | IO                | DQ12T   |   | F22   | DQ6T                        | DQ2T                          | DQ1T                          |
| B3          | VREFB3N2   | IO                | DQSn12T                                       |   | E22   | DQSn6T                      | DQ2T                          | DQ1T                          |
| B3          | VREFB3N1   | IO                | DQ12T   |   | F23   | DQ6T                        | DQ2T                          | DQ1T                          |
| B3          | VREFB3N2   | IO                |   |   | H20   |                             |                               |                               |
| B3          | VREFB3N2   | IO                |   |   | J20   |                             |                               |                               |
| B3          | VREFB3N3   | IO                |   |   | K20   |                             |                               |                               |
| B3          | VREFB3N2   | IO                | DQS13T  |   | B23   | DQVLD6T                     |                               | DQS1T                         |
| B3          | VREFB3N2   | IO                | DQ13T   |   | A23   | DQ6T                        | DQ2T                          | DQ1T                          |
| B3          | VREFB3N2   | IO                | DQ13T   |   | C23   | DQ6T                        | DQ2T                          | DQ1T                          |
| B3          | VREFB3N2   | IO                | DQ13T   |   | C24   | DQ6T                        | DQ2T                          | DQ1T                          |
| B3          | VREFB3N2   | IO                | DQSn13T                                       |   | B24   | DQ6T                        | DQ2T                          | DQSn1T                        |
| B3          | VREFB3N2   | IO                | DQ13T   |   | A24   | DQ6T                        |                               |                               |
| B3          | VREFB3N2   | IO                |   |   | G21   |                             |                               |                               |
| B3          | VREFB3N2   | VREFB3N2          | VREFB3N2                                      |   | D24   |                             |                               |                               |
|             |            | NC (Note 7)       |   |   | H21   |                             |                               |                               |
| B3          | VREFB3N2   | IO                | DQS14T  |   | B25   | DQS7T                       |                               |                               |
| B3          | VREFB3N2   | IO                | DQ14T   |   | A25   | DQ7T                        | DQ3T                          | DQ1T                          |
| B3          | VREFB3N2   | IO                | DQ14T   |   | A26   | DQ7T                        | DQ3T                          | DQ1T                          |
| B3          | VREFB3N2   | IO                | DQ14T   |   | D26   | DQ7T                        | DQ3T                          | DQ1T                          |
| B3          | VREFB3N2   | IO                | DQSn14T                                       |   | B26   | DQSn7T                      | DQ3T                          | DQ1T                          |
| B3          | VREFB3N2   | IO                | DQ14T   |   | C26   | DQ7T                        | DQ3T                          | DQ1T                          |
| B3          | VREFB3N4   | IO                |   |   | J21   |                             |                               |                               |
| B3          | VREFB3N3   | IO                |   |   | G22   |                             |                               |                               |
| B3          | VREFB3N3   | IO                |   |   | L20   |                             |                               |                               |
| B3          | VREFB3N3   | IO                | DQS15T  |   | D25   | DQVLD7T                     | DQS3T                         |                               |
| B3          | VREFB3N3   | IO                | DQ15T   |   | E24   | DQ7T                        | DQ3T                          | DQ1T                          |
| B3          | VREFB3N3   | IO                | DQ15T   |   | C25   | DQ7T                        | DQ3T                          | DQ1T                          |
| B3          | VREFB3N3   | IO                | DQ15T   |   | E27   | DQ7T                        | DQ3T                          | DQ1T                          |
| B3          | VREFB3N3   | IO                | DQSn15T                                       |   | E25   | DQ7T                        | DQSn3T                        | DQ1T                          |
| B3          | VREFB3N3   | IO                | DQ15T   |   | E26   | DQ7T                        | DQ3T                          | DQ1T                          |
| B3          | VREFB3N4   | IO                |   |   | K21   |                             |                               |                               |
| B3          | VREFB3N3   | VREFB3N3          | VREFB3N3                                      |   | F25   |                             |                               |                               |
| B3          | VREFB3N3   | IO                |   |   | H22   |                             |                               |                               |
| B3          | VREFB3N3   | IO                | DQS16T  |   | B27   | DQS8T                       | DQVLD3T                       |                               |
| B3          | VREFB3N3   | IO                | DQ16T   |   | A27   | DQ8T                        | DQ3T                          | DQ1T                          |
| B3          | VREFB3N3   | IO                | DQ16T   |   | A28   | DQ8T                        | DQ3T                          | DQ1T                          |
| B3          | VREFB3N3   | IO                | DQ16T   |   | D27   | DQ8T                        | DQ3T                          | DQ1T                          |
| B3          | VREFB3N3   | IO                | DQSn16T                                       |   | B28   | DQSn8T                      | DQ3T                          | DQ1T                          |
| B3          | VREFB3N3   | IO                | DQ16T   |   | C27   | DQ8T                        | DQ3T                          | DQ1T                          |
|             |            | NC (Note 7)       |   |   | J22   |                             |                               |                               |
|             |            | NC (Note 7)       |   |   | L21   |                             |                               |                               |
|             |            | NC (Note 7)       |   |   | K22   |                             |                               |                               |
| B3          | VREFB3N4   | IO                | DQS17T  |   | C28   | DQVLD8T                     |                               |                               |
| B3          | VREFB3N4   | IO                | DQ17T   |   | B29   | DQ8T                        | DQ3T                          | DQ1T                          |
| B3          | VREFB3N4   | IO                | DQ17T   |   | A29   | DQ8T                        | DQ3T                          | DQ1T                          |
| B3          | VREFB3N4   | IO                | DQ17T   |   | D28   | DQ8T                        | DQ3T                          |                               |
| B3          | VREFB3N4   | VREFB3N4          | VREFB3N4                                      |   | C31   |                             |                               |                               |
| B3          | VREFB3N4   | IO                | DQSn17T                                       |   | C29   | DQ8T                        | DQ3T                          | DQ1T                          |
| B3          | VREFB3N4   | IO                | DQ17T   |   | E28   | DQ8T                        |                               |                               |
| B3          | VREFB3N4   | IO                |   | DATA2   | G23   |                             |                               |                               |
| B3          | VREFB3N4   | IO                |   | DATA3   | H23   |                             |                               |                               |
| B3          | VREFB3N4   | IO                |   | DATA4   | J23   |                             |                               |                               |
| B3          | VREFB3N4   | IO                |   | DATA5   | L22   |                             |                               |                               |
| B3          | VREFB3N4   | IO                |   | DATA6   | F24   |                             |                               |                               |
| B3          | VREFB3N4   | IO                |   | DATA7   | G24   |                             |                               |                               |
| B3          | VREFB3N4   | IO                |   | RDYnBSY   | H24   |                             |                               |                               |
| B3          | VREFB3N4   | IO                | INIT_DONE                                     | INIT_DONE   | G25   |                             |                               |                               |



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| Bank Number | VREF Group | Pin Name/Function | Optional Function(s)/DQ Group for DQS x4 Mode | Configuration Function for Stratix II Only (Note 1) | F1020 | DQ Group for DQS x8/x9 Mode | DQ Group for DQS x16/x18 Mode | DQ Group for DQS x32/x36 Mode |
|-------------|------------|-------------------|---|---|-------|-----------------------------|-------------------------------|-------------------------------|
| B3          | VREFB3N4   | nSTATUS           |   | nSTATUS   | B30   |                             |                               |                               |
| B3          | VREFB3N4   | nCE               |   | nCE   | C30   |                             |                               |                               |
| B3          | VREFB3N4   | DCLK              |   | DCLK  | B31   |                             |                               |                               |
| B3          | VREFB3N4   | CONF_DONE         |   | CONF_DONE   | J25   |                             |                               |                               |
|             |            | VCCIO2            |   |   | C32   |                             |                               |                               |
|             |            | VCCIO2            |   |   | M28   |                             |                               |                               |
|             |            | VCCIO2            |   |   | R32   |                             |                               |                               |
|             |            | VCCIO2            |   |   | T21   |                             |                               |                               |
|             |            | VCCIO1            |   |   | AA28  |                             |                               |                               |
|             |            | VCCIO1            |   |   | AK32  |                             |                               |                               |
|             |            | VCCIO1            |   |   | U21   |                             |                               |                               |
|             |            | VCCIO1            |   |   | V32   |                             |                               |                               |
|             |            | VCCIO8            |   |   | AA17  |                             |                               |                               |
|             |            | VCCIO8            |   |   | AH21  |                             |                               |                               |
|             |            | VCCIO8            |   |   | AM18  |                             |                               |                               |
|             |            | VCCIO8            |   |   | AM30  |                             |                               |                               |
|             |            | VCCIO7            |   |   | AA16  |                             |                               |                               |
|             |            | VCCIO7            |   |   | AH12  |                             |                               |                               |
|             |            | VCCIO7            |   |   | AM3   |                             |                               |                               |
|             |            | VCCIO7            |   |   | AM15  |                             |                               |                               |
|             |            | VCCIO6            |   |   | AA5   |                             |                               |                               |
|             |            | VCCIO6            |   |   | AK1   |                             |                               |                               |
|             |            | VCCIO6            |   |   | U12   |                             |                               |                               |
|             |            | VCCIO6            |   |   | V1    |                             |                               |                               |
|             |            | VCCIO5            |   |   | C1    |                             |                               |                               |
|             |            | VCCIO5            |   |   | M5    |                             |                               |                               |
|             |            | VCCIO5            |   |   | R1    |                             |                               |                               |
|             |            | VCCIO5            |   |   | T12   |                             |                               |                               |
|             |            | VCCIO4            |   |   | A3    |                             |                               |                               |
|             |            | VCCIO4            |   |   | A15   |                             |                               |                               |
|             |            | VCCIO4            |   |   | E12   |                             |                               |                               |
|             |            | VCCIO4            |   |   | M16   |                             |                               |                               |
|             |            | VCCIO3            |   |   | A18   |                             |                               |                               |
|             |            | VCCIO3            |   |   | A30   |                             |                               |                               |
|             |            | VCCIO3            |   |   | E21   |                             |                               |                               |
|             |            | VCCIO3            |   |   | M17   |                             |                               |                               |
|             |            | VCCINT            |   |   | AA12  |                             |                               |                               |
|             |            | VCCINT            |   |   | AC10  |                             |                               |                               |
|             |            | VCCINT            |   |   | K10   |                             |                               |                               |
|             |            | VCCINT            |   |   | K23   |                             |                               |                               |
|             |            | VCCINT            |   |   | M21   |                             |                               |                               |
|             |            | VCCINT            |   |   | N13   |                             |                               |                               |
|             |            | VCCINT            |   |   | N15   |                             |                               |                               |
|             |            | VCCINT            |   |   | N17   |                             |                               |                               |
|             |            | VCCINT            |   |   | N19   |                             |                               |                               |
|             |            | VCCINT            |   |   | P14   |                             |                               |                               |
|             |            | VCCINT            |   |   | P16   |                             |                               |                               |
|             |            | VCCINT            |   |   | P18   |                             |                               |                               |
|             |            | VCCINT            |   |   | P20   |                             |                               |                               |
|             |            | VCCINT            |   |   | R13   |                             |                               |                               |
|             |            | VCCINT            |   |   | R15   |                             |                               |                               |
|             |            | VCCINT            |   |   | R17   |                             |                               |                               |
|             |            | VCCINT            |   |   | R19   |                             |                               |                               |
|             |            | VCCINT            |   |   | T14   |                             |                               |                               |
|             |            | VCCINT            |   |   | T16   |                             |                               |                               |
|             |            | VCCINT            |   |   | T18   |                             |                               |                               |
|             |            | VCCINT            |   |   | T20   |                             |                               |                               |
|             |            | VCCINT            |   |   | U13   |                             |                               |                               |
|             |            | VCCINT            |   |   | U15   |                             |                               |                               |
|             |            | VCCINT            |   |   | U17   |                             |                               |                               |
|             |            | VCCINT            |   |   | U19   |                             |                               |                               |
|             |            | VCCINT            |   |   | V14   |                             |                               |                               |
|             |            | VCCINT            |   |   | V16   |                             |                               |                               |
|             |            | VCCINT            |   |   | V18   |                             |                               |                               |
|             |            | VCCINT            |   |   | V20   |                             |                               |                               |
|             |            | VCCINT            |   |   | W13   |                             |                               |                               |
|             |            | VCCINT            |   |   | W15   |                             |                               |                               |
|             |            | VCCINT            |   |   | W17   |                             |                               |                               |
|             |            | VCCINT            |   |   | W19   |                             |                               |                               |
|             |            | VCCINT            |   |   | W21   |                             |                               |                               |
|             |            | VCCINT            |   |   | Y14   |                             |                               |                               |



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| Bank Number | VREF Group | Pin Name/Function | Optional Function(s)/DQ Group for DQS x4 Mode | Configuration Function for Stratix II Only (Note 1) | F1020 | DQ Group for DQS x8/x9 Mode | DQ Group for DQS x16/x18 Mode | DQ Group for DQS x32/x36 Mode |
|-------------|------------|-------------------|---|---|-------|-----------------------------|-------------------------------|-------------------------------|
|             |            | VCCINT            |   |   | Y16   |                             |                               |                               |
|             |            | VCCINT            |   |   | Y18   |                             |                               |                               |
|             |            | VCCINT            |   |   | Y20   |                             |                               |                               |
|             |            | GND               |   |   | A2    |                             |                               |                               |
|             |            | GND               |   |   | A13   |                             |                               |                               |
|             |            | GND               |   |   | A20   |                             |                               |                               |
|             |            | GND               |   |   | A31   |                             |                               |                               |
|             |            | GND               |   |   | AA14  |                             |                               |                               |
|             |            | GND               |   |   | AA19  |                             |                               |                               |
|             |            | GND               |   |   | AA21  |                             |                               |                               |
|             |            | GND               |   |   | AB22  |                             |                               |                               |
|             |            | GND               |   |   | AC5   |                             |                               |                               |
|             |            | GND               |   |   | AC28  |                             |                               |                               |
|             |            | GND               |   |   | AF17  |                             |                               |                               |
|             |            | GND               |   |   | AG6   |                             |                               |                               |
|             |            | GND               |   |   | AH10  |                             |                               |                               |
|             |            | GND               |   |   | AH23  |                             |                               |                               |
|             |            | GND               |   |   | AH27  |                             |                               |                               |
|             |            | GND               |   |   | AL1   |                             |                               |                               |
|             |            | GND               |   |   | AL32  |                             |                               |                               |
|             |            | GND               |   |   | AM2   |                             |                               |                               |
|             |            | GND               |   |   | AM13  |                             |                               |                               |
|             |            | GND               |   |   | AM20  |                             |                               |                               |
|             |            | GND               |   |   | AM31  |                             |                               |                               |
|             |            | GND               |   |   | B1    |                             |                               |                               |
|             |            | GND               |   |   | B32   |                             |                               |                               |
|             |            | GND               |   |   | E10   |                             |                               |                               |
|             |            | GND               |   |   | E23   |                             |                               |                               |
|             |            | GND               |   |   | F7    |                             |                               |                               |
|             |            | GND               |   |   | F27   |                             |                               |                               |
|             |            | GND               |   |   | G17   |                             |                               |                               |
|             |            | GND               |   |   | J24   |                             |                               |                               |
|             |            | GND               |   |   | K5    |                             |                               |                               |
|             |            | GND               |   |   | K28   |                             |                               |                               |
|             |            | GND               |   |   | L11   |                             |                               |                               |
|             |            | GND               |   |   | M12   |                             |                               |                               |
|             |            | GND               |   |   | M14   |                             |                               |                               |
|             |            | GND               |   |   | M19   |                             |                               |                               |
|             |            | GND               |   |   | N1    |                             |                               |                               |
|             |            | GND               |   |   | N14   |                             |                               |                               |
|             |            | GND               |   |   | N16   |                             |                               |                               |
|             |            | GND               |   |   | N18   |                             |                               |                               |
|             |            | GND               |   |   | N20   |                             |                               |                               |
|             |            | GND               |   |   | N32   |                             |                               |                               |
|             |            | GND               |   |   | P12   |                             |                               |                               |
|             |            | GND               |   |   | P13   |                             |                               |                               |
|             |            | GND               |   |   | P15   |                             |                               |                               |
|             |            | GND               |   |   | P17   |                             |                               |                               |
|             |            | GND               |   |   | P19   |                             |                               |                               |
|             |            | GND               |   |   | P21   |                             |                               |                               |
|             |            | GND               |   |   | R14   |                             |                               |                               |
|             |            | GND               |   |   | R16   |                             |                               |                               |
|             |            | GND               |   |   | R18   |                             |                               |                               |
|             |            | GND               |   |   | R20   |                             |                               |                               |
|             |            | GND               |   |   | T7    |                             |                               |                               |
|             |            | GND               |   |   | T13   |                             |                               |                               |
|             |            | GND               |   |   | T15   |                             |                               |                               |
|             |            | GND               |   |   | T17   |                             |                               |                               |
|             |            | GND               |   |   | T19   |                             |                               |                               |
|             |            | GND               |   |   | U14   |                             |                               |                               |
|             |            | GND               |   |   | U16   |                             |                               |                               |
|             |            | GND               |   |   | U18   |                             |                               |                               |
|             |            | GND               |   |   | U20   |                             |                               |                               |
|             |            | GND               |   |   | V11   |                             |                               |                               |
|             |            | GND               |   |   | V13   |                             |                               |                               |
|             |            | GND               |   |   | V15   |                             |                               |                               |
|             |            | GND               |   |   | V17   |                             |                               |                               |
|             |            | GND               |   |   | V19   |                             |                               |                               |
|             |            | GND               |   |   | V22   |                             |                               |                               |
|             |            | GND               |   |   | V27   |                             |                               |                               |
|             |            | GND               |   |   | W12   |                             |                               |                               |



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| Bank Number | VREF Group | Pin Name/Function | Optional Function(s)/DQ Group for DQS x4 Mode | Configuration Function for Stratix II Only (Note 1) | F1020 | DQ Group for DQS x8/x9 Mode | DQ Group for DQS x16/x18 Mode | DQ Group for DQS x32/x36 Mode |
|-------------|------------|-------------------|---|---|-------|-----------------------------|-------------------------------|-------------------------------|
|             |            | GND               |   |   | W14   |                             |                               |                               |
|             |            | GND               |   |   | W16   |                             |                               |                               |
|             |            | GND               |   |   | W18   |                             |                               |                               |
|             |            | GND               |   |   | W20   |                             |                               |                               |
|             |            | GND               |   |   | Y1    |                             |                               |                               |
|             |            | GND               |   |   | Y13   |                             |                               |                               |
|             |            | GND               |   |   | Y15   |                             |                               |                               |
|             |            | GND               |   |   | Y17   |                             |                               |                               |
|             |            | GND               |   |   | Y19   |                             |                               |                               |
|             |            | GND               |   |   | Y32   |                             |                               |                               |
|             |            | VCCPD2            |   |   | N21   |                             |                               |                               |
|             |            | VCCPD2            |   |   | R21   |                             |                               |                               |
|             |            | VCCPD1            |   |   | V21   |                             |                               |                               |
|             |            | VCCPD1            |   |   | Y21   |                             |                               |                               |
|             |            | VCCPD8            |   |   | AA18  |                             |                               |                               |
|             |            | VCCPD8            |   |   | AA20  |                             |                               |                               |
|             |            | VCCPD7            |   |   | AA13  |                             |                               |                               |
|             |            | VCCPD7            |   |   | AA15  |                             |                               |                               |
|             |            | VCCPD6            |   |   | Y12   |                             |                               |                               |
|             |            | VCCPD6            |   |   | Y12   |                             |                               |                               |
|             |            | VCCPD5            |   |   | N12   |                             |                               |                               |
|             |            | VCCPD5            |   |   | R12   |                             |                               |                               |
|             |            | VCCPD4            |   |   | M13   |                             |                               |                               |
|             |            | VCCPD4            |   |   | M15   |                             |                               |                               |
|             |            | VCCPD3            |   |   | M18   |                             |                               |                               |
|             |            | VCCPD3            |   |   | M20   |                             |                               |                               |

Notes on Pin Table:

- (1) These pins should be connected on the board to properly configure the FPGA prototype. See Stratix II device pin table for details.
- (2) These NO CONNECT (NC) pins are MSEL configuration input pins in the Stratix II device and should be connected on the board to configure the FPGA prototype.
- (3) This NC pin is a VREF pin in the Stratix II device and should be connected to the VREF input reference voltage for the FPGA prototype. If the VREF is not used, connect pin to VCC or GND.
- (4) This NC pin is a VCCD\_PLL pin in the Stratix II device and should be connected to the VCCD\_PLL power for the FPGA prototype.
- (5) This NC pin is a VCCA\_PLL pin in the Stratix II device and should be connected to the VCCA\_PLL power for the FPGA prototype.
- (6) This NC pin is a GNDA\_PLL pin in the Stratix II device and should be connected to the GNDA\_PLL ground for the FPGA prototype.
- (7) This NC pin is an IO pin in the Stratix II device and can be left unconnected.
- (8) This NC pin is an FPLLxCLKp/n input pin in the Stratix II device and should be connected to GND for the FPGA prototype.



| Pin Name                                 | Pin Type (1st, 2nd, & 3rd Function) | Pin Description   |
|--|-------------------------------------|---|
| <b>Supply and Reference Pins</b>         |                                     |   |
| VCCINT                                   | Power                               | These are internal logic array voltage supply pins. VCCINT also supplies power to the input buffers used for the LVDS, LVPECL, HyperTransport™ technology, differential HSTL, differential SSTL, HSTL, and SSTL I/O standards. All VCCINT pins must be connected to 1.2 V.  |
| VCCIO[1..8]                              | Power                               | These are I/O supply voltage pins for banks 1 through 8. Each bank can support a different voltage level. VCCIO supplies power to the output buffers for all I/O standards including TDO and nCEO. VCCIO also supplies power to the input buffers used for the LVTTTL, LVCMOS, 1.5 V, 1.8 V, 2.5 V, 3.3-V PCI, and 3.3-V PCI-X I/O standards.   |
| VCCPD[1..8]                              | Power                               | Dedicated power pins. This supply is used to power the I/O pre-drivers and the 3.3-V/2.5-V buffers of the configuration input pins and JTAG pins. VCCPD powers all the JTAG pins (TCK, TMS, TDI, and TRST) and the following configuration pins: nCONFIG, DCLK (when used as an input), nIO_Pullup, and nCE. The VCCPD pins must be connected to 3.3 V and must ramp-up from 0 V to 3.3 V within 100 ms to ensure successful configuration.   |
| GND                                      | Ground                              | Device ground pins. All GND pins should be connected to the board GND plane   |
| VREFB[3,4,7,8]N[0..4]                    | Input                               | Input reference voltage for each I/O bank. If a bank is used for a voltage-referenced I/O standard, then these pins are used as the voltage-reference pins for that bank. All the VREF pins within a bank are shorted together. VREF pins are not used, designers should connect them to either VCC or GND.   |
| VCC_PLL5_OUT                             | Power                               | External clock output VCCIO power for PLL5 clock outputs PLL5_OUT[1..0]p, PLL5_OUT[1..0]n, PLL5_FBp/OUT2p & PLL5_FBN/OUT2n. This pin should be connected to the VCCIO level of bank 9.  |
| VCC_PLL6_OUT                             | Power                               | External clock output VCCIO power for PLL6 clock outputs PLL6_OUT[1..0]p, PLL6_OUT[1..0]n, PLL6_FBp/OUT2p & PLL6_FBN/OUT2n. This pin should be connected to the VCCIO level of bank 10.   |
| VCC_PLL11_OUT                            | Power                               | External clock output VCCIO power for PLL11 clock outputs PLL11_OUT[1..0]p, PLL11_OUT[1..0]n, PLL11_FBp/OUT2p & PLL11_FBN/OUT2n. This pin should be connected to the VCCIO level of bank 11.  |
| VCC_PLL12_OUT                            | Power                               | External clock output VCCIO power for PLL12 clock outputs PLL12_OUT[1..0]p, PLL12_OUT[1..0]n, PLL12_FBp/OUT2p & PLL12_FBN/OUT2n. This pin should be connected to the VCCIO level of bank 12.  |
| VCCA_PLL[1,2,5..8,11,12]                 | Power                               | Analog power for PLLs[1,2,5..8,11,12]. The designer must connect these pins to 1.2 V, even if the PLL is not used.  |
| VCCD_PLL[1,2,5..8,11,12]                 | Power                               | Digital power for PLLs[1,2,5..8,11,12]. The designer must connect these pins to 1.2 V, even if the PLL is not used.   |
| GNDA_PLL[1,2,5..8,11,12]                 | Ground                              | Analog ground for PLLs[1,2,5..8,11,12]. All analog GND pins should be connected to the board analog GND plane.  |
| NC                                       | No Connect                          | Do not drive signals into these pins. Exceptions are the configuration pins and the pins noted in this pin list. These pins should be properly connected on the board when prototyping with the Stratix II FPGA device. Make sure to check the pin out information for the Stratix II FPGA prototype compiled design when laying out the board to ensure compatibility between the HardCopy II device and the Stratix II FPGA prototype device.   |
| RUP4                                     | I/O, Input                          | Reference pin for banks 3 & 4. The external precision resistor Rup must be connected to the designated RUP pin within bank 4. If not required, this pin is a regular I/O pin.   |
| RDN4                                     | I/O, Input                          | Reference pin for banks 3 & 4. The external precision resistor Rdn must be connected to the designated RDN pin within bank 4. If not required, this pin is a regular I/O pin.   |
| RUP7                                     | I/O, Input                          | Reference pin for banks 7 & 8. The external precision resistor Rup must be connected to the designated RUP pin within bank 7. If not required, this pin is a regular I/O pin.   |
| RDN7                                     | I/O, Input                          | Reference pin for banks 7 & 8. The external precision resistor Rdn must be connected to the designated RDN pin within bank 7. If not required, this pin is a regular I/O pin.   |
| <b>Dedicated Configuration/JTAG Pins</b> |                                     |   |
| nIO_PULLUP                               | Input                               | Dedicated input that chooses whether the internal pull-ups on the user I/O pins and dual-purpose I/O pins (INIT_DONE, DEV_OE, DEV_CLRn) are on or off before and during power up. A logic high (1.5 V, 1.8 V, 2.5 V, or 3.3 V) turns off the weak pull-up, while a logic low turns them on.   |
| VCCSEL                                   | Input                               | Dedicated input that selects which input buffer is used on configuration input pins: nCONFIG, DCLK (when used as an input) and nCE. The 3.3-V/2.5-V input buffer is powered by VCCPD, while the 1.8-V/1.5-V input buffer is powered by VCCIO. The VCCSEL input buffer is powered by VCCPD and must be hardwired to VCCPD or ground. A logic high (VCCPD) selects the 1.8-V/1.5-V input buffer, while a logic low selects the 3.3-V/2.5-V input buffer. VCCSEL should be set to comply with the logic levels driven out of the configuration device or MAX II device/microprocessor with flash memory. |
| TEMPDIODEp                               | Input                               | Pin used in conjunction with the temperature sensing diode (bias-high input) inside the HardCopy II device. If the temperature sensing diode is not used then connect this pin to GND.  |
| TEMPDIODEn                               | Input                               | Pin used in conjunction with the temperature sensing diode (bias-low input) inside the HardCopy II device. If the temperature sensing diode is not used then connect this pin to GND.   |
| DCLK                                     | Input                               | Dedicated configuration clock pin on Stratix II devices, but kept in HardCopy II for compatibility reasons. It's not required to clock this pin for HardCopy II.  |
| nCE                                      | Input                               | Dedicated active-low chip enable. When nCE is low, the device is enabled. When nCE is high, the device is disabled. In multi-device configuration, nCE of the first device is tied low while its nCEO pin drives the nCE of the next device in the chain. In single device configuration, nCE is tied low.  |
| nCONFIG                                  | Input                               | Dedicated power up block control input. Pulling this pin low during user-mode will cause the HardCopy II to enter a reset state & tri-state all I/O pins. Returning this pin to a logic high level will initiate the power up and initialization sequence. It is not available as a user I/O pin.   |
| CONF_DONE                                | Bidirectional (open-drain)          | This is a dedicated power up block status pin. As a status output, the CONF_DONE pin drives low before and during initialization. Once the power up delays are done and the initialization cycle starts, CONF_DONE is released. It is not available as a user I/O pin.  |
| nCEO                                     | Output                              | Output that drives low when device initialization is complete. During multi-device configuration, this pin feeds a subsequent device's nCE pin. During single device configuration, this pin is left floating.  |

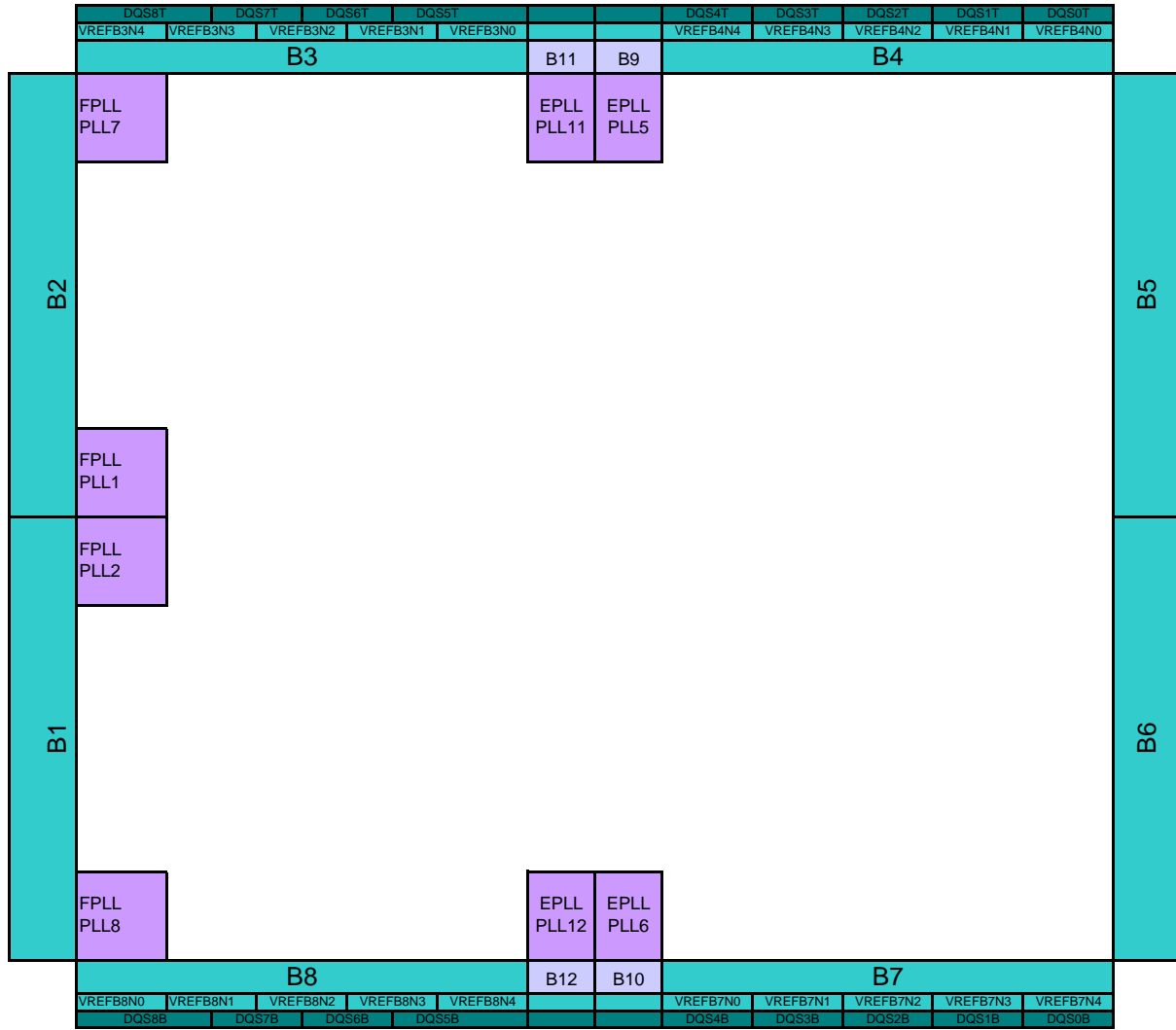




| Pin Name  | Pin Type (1st, 2nd, & 3rd Function) | Pin Description   |
|---|-------------------------------------|---|
| nSTATUS   | Bidirectional (open-drain)          | This is a dedicated power up block status pin. The HardCopy II drives nSTATUS low immediately after power-up and releases it after POR time. As a status output, the nSTATUS is pulled low if an error occurs during initialization. As a status input, the device enters an error state when nSTATUS is driven low by an external source during initialization. It is not available as a user I/O pin. |
| PORSEL  | Input                               | Dedicated input which selects between a POR time of 12 ms or 100 ms. A logic high (1.5-V, 1.8-V, 2.5-V, 3.3-V) selects a POR time of about 12 ms and a logic low selects POR time of about 100 ms. This is in addition to the Instant On delay mode chosen (i.e. instant or additional 50 ms).  |
| TCK   | Input                               | Dedicated JTAG input pin. The JTAG circuitry can be disabled by connecting TCK to GND   |
| TMS   | Input                               | Dedicated JTAG input pin. The JTAG circuitry can be disabled by connecting TMS to VCC   |
| TDI   | Input                               | Dedicated JTAG input pin. The JTAG circuitry can be disabled by connecting TDI to VCC   |
| TDO   | Output                              | Dedicated JTAG output pin. The JTAG circuitry can be disabled by leaving TDO unconnectec  |
| TRST  | Input                               | Dedicated active low JTAG input pin. TRST is used to asynchronously reset the JTAG boundary-scan circuit. The JTAG circuitry can be disabled by connecting TRST to GND.   |
| <b>Clock and PLL Pins</b>   |                                     |   |
| CLK[1,3,9,11]p  | Clock, Input                        | Dedicated clock input pins 1, 3, 9, & 11 that can also be used for data inputs  |
| CLK[1,3,9,11]n  | Clock, Input                        | Dedicated negative terminal clock input pins for differential clock input that can also be used for data inputs.  |
| CLK[0,2]p/DIFFIO_RX_C[0,1]p   | I/O, Clock, RX channel              | These pins can be used as I/O pins, clock input pins, or the positive terminal data pins of differential receiver channels.   |
| CLK[0,2]n/DIFFIO_RX_C[0,1]n   | I/O, Clock, RX channel              | These pins can be used as I/O pins, the negative terminal clock input pins for differential clock input, or the negative terminal data pins of differential receiver channels.  |
| CLK[4-8,10,12-15]p  | I/O, Clock                          | These pins can be used as I/O pins or clock input pins  |
| CLK[4-8,10,12-15]n  | I/O, Clock                          | These pins can be used as I/O pins or negative terminal clock input pins for differential clock input   |
| PLL_ENA   | Input                               | Dedicated input pin that drives the optional pllena port of all or a set of PLLs. If a PLL uses the pllena port, drive the PLL_ENA pin low to reset all PLLs including the counters to their default state. If VCCSEL = 0, then you must drive the PLL_ENA with a 3.3/2.5 V signal to enable the PLLs. If VCCSEL = 1, connect PLL_ENA to 1.8/1.5 V to enable the PLLs.                                  |
| FPLL[7,8]CLKp   | Clock, Input                        | Dedicated clock inputs for fast PLLs (PLLs 7 through 8) that can also be used for data inputs   |
| FPLL[7,8]CLKn   | Clock, Input                        | Dedicated negative terminal associated with FPLL[7..8]CLKp pins that can also be used for data inputs.  |
| PLL5_OUT[0..1]p   | I/O, Output                         | Optional external clock outputs [0..1] from enhanced PLL 5. These pins can be differential (two output pin pairs) or single ended (four clock outputs from PLL5).   |
| PLL5_OUT[0..1]n   | I/O, Output                         | Optional negative terminal for external clock outputs [0..1] from PLL5. If the clock outputs are single ended, then each pair of pins (i.e., PLL5_OUT0p and PLL5_OUT0n are considered one pair) can be either in phase or 180 degrees out of phase.   |
| PLL6_OUT[0..1]p   | I/O, Output                         | Optional external clock outputs [0..1] from enhanced PLL 6. These pins can be differential (two output pin pairs) or single ended (four clock outputs from PLL6).   |
| PLL6_OUT[0..1]n   | I/O, Output                         | Optional negative terminal for external clock outputs [0..1] from PLL6. If the clock outputs are single ended, then each pair of pins (i.e., PLL6_OUT0p and PLL6_OUT0n are considered one pair) can be either in phase or 180 degrees out of phase.   |
| PLL[5..6]_FBp/OUT2p   | I/O, Input, Output                  | These pins can be used as I/O pins, external feedback input pins or external clock outputs for PLL[5..6].   |
| PLL[5..6]_FBn/OUT2n   | I/O, Input, Output                  | These pins can be used as I/O pins, negative terminal input for external feedback input PLL[5..6]_FBp or negative terminal clock output pins for differential clock output.   |
| PLL11_OUT[0..1]p  | I/O, Output                         | Optional external clock outputs [0..1] from enhanced PLL 11. These pins can be differential (two output pin pairs) or single ended (four clock outputs from PLL11).   |
| PLL11_OUT[0..1]n  | I/O, Output                         | Optional negative terminal for external clock outputs [0..1] from PLL11. If the clock outputs are single ended, then each pair of pins (i.e., PLL11_OUT0p and PLL11_OUT0n are considered one pair) can be either in phase or 180 degrees out of phase.  |
| PLL12_OUT[0..1]p  | I/O, Output                         | Optional external clock outputs [0..1] from enhanced PLL 12. These pins can be differential (two output pin pairs) or single ended (four clock outputs from PLL12).   |
| PLL12_OUT[0..1]n  | I/O, Output                         | Optional negative terminal for external clock outputs [0..1] from PLL12. If the clock outputs are single ended, then each pair of pins (i.e., PLL12_OUT0p and PLL12_OUT0n are considered one pair) can be either in phase or 180 degrees out of phase.  |
| PLL[11..12]_FBp/OUT2p   | I/O, Input, Output                  | These pins can be used as I/O pins, external feedback input pins or external clock outputs for PLL[11..12].   |
| PLL[11..12]_FBn/OUT2n   | I/O, Input, Output                  | These pins can be used as I/O pins, negative terminal input for external feedback input PLL[11..12]_FBp or negative terminal clock output pins for differential clock output.   |
| <b>Optional/Dual-Purpose Configuration Pins</b>                       |                                     |   |
| DEV_CLRn  | I/O, Input                          | Optional pin that allows you to override all clears on all device registers. When this pin is driven low, all registers are cleared; when this pin is driven high, all registers behave as programmed.  |
| DEV_OE  | I/O, Input                          | Optional pin that allows you to override all tri-states on the device. When this pin is driven low, all I/O pins are tri-stated; when this pin is driven high, all I/O pins behave as defined in the design.  |
| INIT_DONE   | I/O, Output (open-drain)            | This is a dual-purpose pin and can be used as an I/O pin when not enabled as INIT_DONE. When enabled, a transition from low to high at the pin indicates when the device has entered user mode. If the INIT_DONE output is enabled, the INIT_DONE pin cannot be used as a user I/O pin after configuration.   |
| <b>Dual-Purpose Differential &amp; External Memory Interface Pins</b> |                                     |   |
| DIFFIO_RX[21..64]p/n  | I/O, RX channel                     | Dual-purpose differential receiver channels. These channels can be used for receiving LVDS or HyperTransport compatible signals. Pins with a "p" suffix carry the positive signal for the differential channel. Pins with an "n" suffix carry the negative signal for the differential channel. If not used for differential signaling, these pins are available as user I/O pins.                      |



| Pin Name   | Pin Type (1st, 2nd, & 3rd Function) | Pin Description   |
|--|-------------------------------------|---|
| DIFFIO_TX[21..64]p/n   | I/O, TX channel                     | Dual-purpose differential transmitter channels. These channels can be used for transmitting LVDS or HyperTransport compatible signals. Pins with a "p" suffix carry the positive signal for the differential channel. Pin with an "n" suffix carry the negative signal for the differential channel. If not used for differential signaling, these pins are available as user I/O pins. |
| DQS[0..1][T,B] (x32/x36)<br>DQS[0..3][T,B] (x16/x18)<br>DQS[0..8][T,B] (x8/x9)<br>DQS[0..17][T,B] (x4)     | I/O, DQS                            | Optional data strobe signal for use in external memory interfacing. These pins drive to dedicated DQS phase shift circuitry. The shifted DQS signal can also drive to internal logic.   |
| DQSn[0..1][T,B] (x32/x36)<br>DQSn[0..3][T,B] (x16/x18)<br>DQSn[0..8][T,B] (x8/x9)<br>DQSn[0..17][T,B] (x4) | I/O, DQSn                           | Optional complementary data strobe signal for use in QDR II SRAM. These pins drive to dedicated DQS phase shift circuitry.  |
| DQ[0..1][T,B] (x32/x36)<br>DQ[0..3][T,B] (x16/x18)<br>DQ[0..8][T,B] (x8/x9)<br>DQ[0..17][T,B] (x4)         | I/O, DQ                             | Optional data signal for use in external memory interfacing. The order of the DQ bits within a designated DQ bus is not important; however, use caution when making pin assignments if you plan on migrating to a different memory interface that has a different DQ bus width. Analyze the available DQ pins across all pertinent DQS columns in the pin list.                         |
| DQVLD[0..1][T,B] (x32/x36)<br>DQVLD[0..3][T,B] (x16/x18)<br>DQVLD[0..8][T,B] (x8/x9)                       | I/O, DQVLD                          | Optional data valid signal for use in external memory interfacing.  |



**Notes:**

1. This is a top view of the silicon die. For flip chip packages, the die is mounted upside down in the package; therefore, to obtain the top package view, flip this diagram on its vertical axis.
2. This is a pictorial representation only to get an idea of placement on the device. Refer to the pin list and the Quartus® II software for exact locations.
3. The DQ/DQS groups depicted above are in x8/x9 mode. DQ/DQS support differs across the package offerings.



Pin Information for HardCopy® II HC230 / Stratix® II EP2S180  
F1020 Companion Devices  
Version 1.1

| Version Number | Date       | Changes Made   |
|----------------|------------|--|
| Preliminary    | 12/29/2004 |  |
| 1.0            | 2/3/2005   | Initial revision   |
| 1.1            | 3/27/2007  | Pintable updated to match latest Engineering pintable released 12/13/05. VREF pins and groups are updated.             |
|                |            | Added configuration function column for FPGA prototyping in the pin list.  |
|                |            | Added "DQ Group for DQS x4 Mode" description to the "Optional Function(s)" header in the pin list.                     |
|                |            | Added footnotes in the pin list to describe the HardCopy II pins that have functions which differ from the Stratix II. |
|                |            | Updated PLL numbers for VCCA_PLL, VCCD_PLL, and GNDA_PLL in the pin definition.  |
|                |            | Added more NC pin definition details for the configuration and noted pins.   |
|                |            | Updated CLK[ ]p/n DIFFIO_RX_C[ ]p/n numbers in the pin definition.   |
|                |            | Updated DIFFIO_RX/TX channel numbers in the pin definition.  |
|                |            | Updated DQS, DQSn, DQ, and DQLVD description in the pin definition.  |