# Advantages of MAX+PLUS II Fitting

The Altera® MAX+PLUS® II software is a fully integrated programmable logic design environment that can support devices with different architectures, run on multiple platforms, provide an easy-to-use interface, and offer a broad range of features. The MAX+PLUS II software also offers efficient device utilization and superior first- and second-time fitting, which enhances overall performance. This technical brief evaluates the first-and second-time fitting results of the Altera MAX+PLUS II version 8.1 and Lattice ispDS+ version 5.0 development systems.

First-Time Fitting Results for Lattice & Altera Devices

Altera Applications recently compared the first-time fitting results of the MAX+PLUS II and ispDS+ software by compiling 49 customer designs and implementing them into ispLSI2128-100LM160 and EPM7128SQC160-10 device. All 49 designs fit into the Altera device, but only 32 of these designs fit into the Lattice device. This technical brief only compares these 32 designs that fit in both Altera and Lattice devices. Of the 17 designs that did not fit into the Lattice device, seven failed because the device lacked enough macrocells; the other 10 designs did not fit due to architectural idiosyncrasies. First-time fitting results are shown in Figure 1.
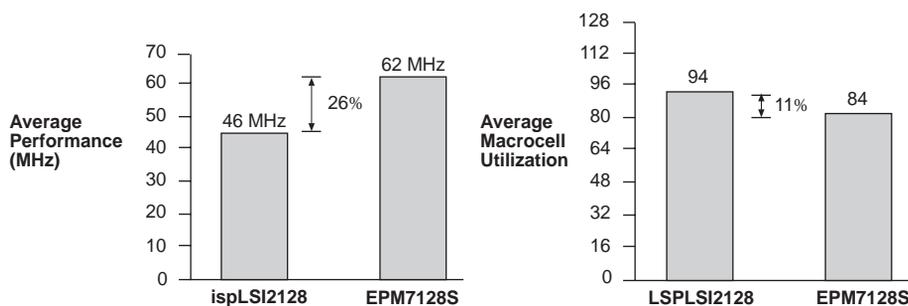
Figure 1. First-Time Fitting Results
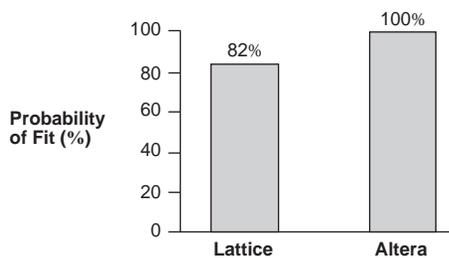
Altera & Lattice Device Comparison

Next, Altera Applications compared the performance and logic utilization of the MAX+PLUS II and ispDS+ software. As shown in Figure 2, the MAX+PLUS II software averaged 26% higher performance and 11% lower macrocell utilization than Lattice's ispDS+ software for first-time fitting.

Figure 2. Free Pin Assignment Performance & Utilization

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Second-Time Fitting Results for Lattice & Altera Devices

In designs that used between 115 and 128 macrocells (90% to 100% utilization), only 61% had a probability of fitting in the ispDS+ software (see Figure 3). Each of the 32 designs that fit into the Lattice device were compiled three times for the random pin assignments, totaling 96 compilations. After three compilations for each design, the results showed that Lattice's fitter demonstrated different results in both performance and density, whereas the MAX+PLUS II software consistently achieved identical density and performance results for all three compilations, and thus had a second-time fit of 100% (see Figure 3).

Figure 3. Probability of a Second-Time Fit: ispDS+ vs. MAX+PLUS II   Note (1)
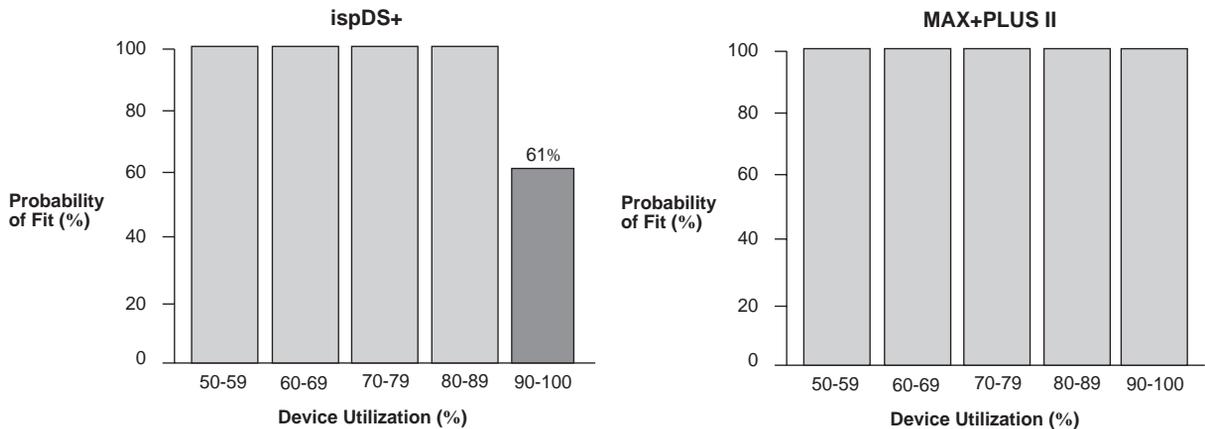
Note:
(1)   Device utilization is determined by the number of macrocells that a specific design uses divided by the total number of macrocells in the device.

The document listed below provides more detailed information. Part numbers are in parentheses.

■   *MAX+PLUS II Programmable Logic Development System & Software* available in the Altera *1998 Data Book* (A-DB-0198-01)

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