CoolRunner Power Estimator Tool

Here's how to determine how much power your design will use.

by John Hubbard, CPLD Applications Engineer, Xilinx,
john.hubbard@xilinx.com

The CoolRunner Power Estimator tool was developed to help you estimate the power consumed by your CoolRunner CPLD designs. This is an easy to use spreadsheet and Perl script available for download from the Xilinx website. The latest version is available for download from WebPACK™ by selecting the Utilities button.

Estimating Low Power

Estimating the power consumption of CoolRunner CPLDs is quick and easy. After you have targeted a particular device, you import the data created by the Perl script into the spreadsheet. Then you enter only two types of parameters:

- Signal frequencies for all signals.
- Output loading capacitance.

Output capacitive loading can be specified for each individual pin or specified as a default value for all pins.

Displayed in the spreadsheet (Figure 1) are three end results based on these two input parameters:

- Total I_{dd} consumed by the design.
- Total power consumed by the design.
- Total power consumed by output capacitance loading.

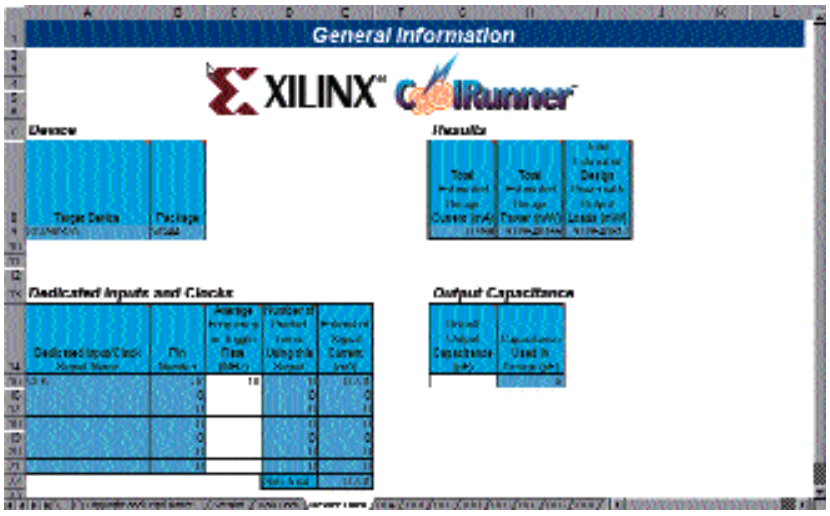

Figure 1 - Device data sheet showing results.

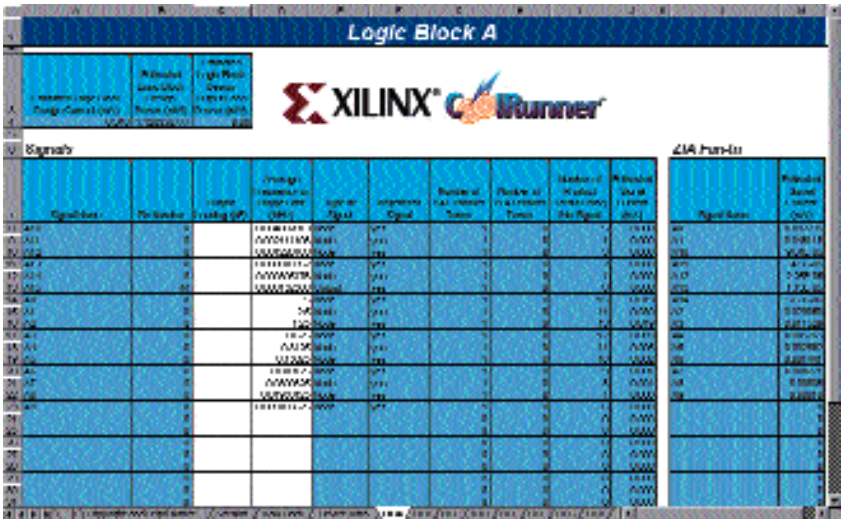

Figure 2 - Logic Block A sheet showing signal details.

There are estimates throughout the tool that show I_{dd} for specific architectural areas in the device as shown in Figure 2. For example, if you are attempting to reduce the overall device current, you can see what fast module or logic block is consuming the most current. Then it is easy to see what specific signals are demanding the most current within a logic block, because the current estimations for individual signals are shown.

In addition to the power estimation, this tool can assist you during the fitting process by displaying other important information. For example, statistical data for each individual signal is available including pin number, fan-in number of product terms, and fan-out number of product terms that load the signal. Fan-in data from the Zero Power Interconnect Array (ZIA) can easily be seen for each logic block as well as the fast module Global ZIA fan-in and fan-out data for XPLA2 devices.

This extra data is quite useful in determining the layout of a design within the CoolRunner device; you can effortlessly see the details of how the fitter arranged the design. Using this information, your design can be rearranged to better improve the timing performance.

Conclusion

The CoolRunner Power Estimator tool is an easy way to estimate power and I_{dd} information. Not only can you determine the power loading, you can also use this tool to help improve timing performance by visually interpreting the results in the spreadsheet.