

CodRumar 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

he 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 WebPACKTM 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.

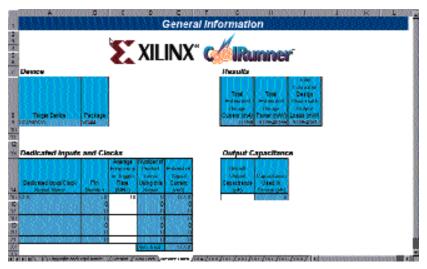


Figure 1 - Device data sheet showing results.

Logic Block A Logic Block A XILINX* CARUTONET Suprato Suprato All Particular All Particu											
Cambbon	Personal		Armage Imperior	April 1	organica Opini	Married Married Control	Parker of	Made of Notes over 1990 He Reed	A district The st 11 feets 10 feets	Newlean	American American Control
AND STREET, SQUARE	N COLUMN			T0000	VIII.	12000	CONTRACTOR OF THE PARTY OF	NUMBER OF	1000	CONTRACTOR SHOW	BRIVE
	S 90000		000000000	Mari	M0.5	180000			000	ALC: NO COLUMN	11000 VAN. III
MACOUS COLUMN	A 100 Miles		10111011	100	27	1000000	CONTRACT.		1000	# T 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	271.00
ANDSTRUCT			00000578	Medi	Mrs.	100,000	2000	100	0000	AU	339 16
W9311320.011	5 10 M	_	OUUT NOW		m	100000	100000	100000	0.00	And the second	173.00
			.:	TT.	M10.500	1016/60			10000	7	THE RESERVE
					700				000		5 STREET
The second second	V 100 100 100 100 100 100 100 100 100 10		10.25	200	27	1		100	10.00		100000
Maria de la companya del companya de la companya del companya de la companya de l	7400000	1	0.0136		Marie Co.			2000	0.000	With the second	5 moves
Market Control	S 000000		93740	NAME:	100000	OF CASE	200	No. of the	0.000	And the second	2,885.99
AND DESCRIPTION	F 3915055		10007	and a	Mark Street	100000000000000000000000000000000000000	AUCUS.	CALCACA	25,000	MARKS 0.00 (A SHOWN
	15 0 1 15 0 1		0.000000000		MILE	0.000000	WHEN THE	0000000	0.000	ALC: UNKNOWN	STATE OF
V 00000000000000	10 25 11 15 16 1		vuncuto		res con	070,70503	CONSTRUCT	SHALLS	0000	A 10 (10 (10 (10 (10 (10 (10 (10 (10 (10	1,000
35 (27.55)				***	MARCH 18	100	100.00	10000	2000	100000000000000000000000000000000000000	17.15
			I		10000	100	2000	30.00	- 000	SECTION AND ADDRESS.	200
				-	-				1000		_
5030 65 37	8 55 9 5 6		I		100	1000	10.5	F	0.000	16 8 5 1 1 1 1 1 1 1	1000
	1000000			100000	10000000	100000	Weekler.	COLORS.	0000	DESCRIPTION OF	a ma bar
MUMBER	A STATE OF			800 PM	FROM CAMP	0000000	BUTROUNC	G15000000	1830	525555341550	A MARINE
	1100000		I		999 (190)	200	有可以有 。	50900000	0000		A DESCRIPTION
AND DESCRIPTIONS	er was need some		CHARLES !	CONT.	Contract Contract	SPECIAL PROPERTY.	But William	STATE OF THE PARTY.	. 0000	DESCRIPTION OF THE PERSON NAMED IN	1000

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.