SoftExplorer : a Software Power/Energy Consumption Estimation Tool

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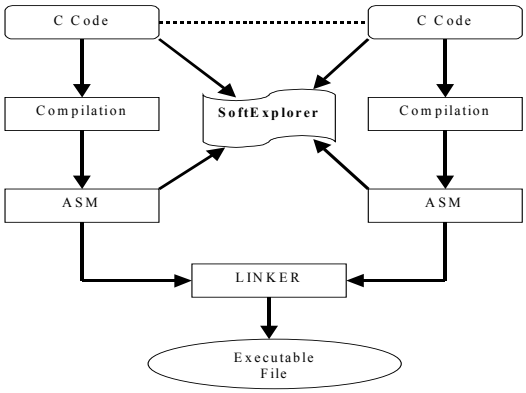
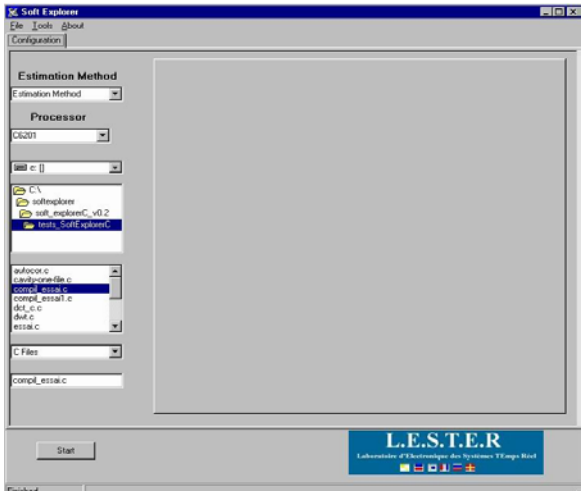
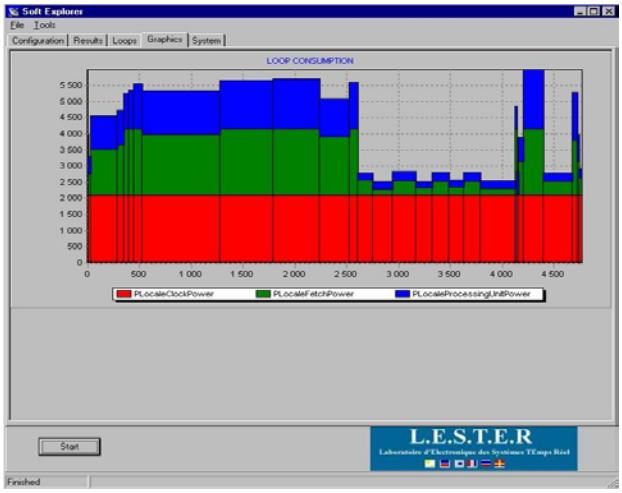
SoftExplorer is a power/energy estimation tool that is developed into the Low Power Design Group of the LESTER laboratory. This tool allows the programmer to rapidly estimate the power and energy consumption of its application executed on a processor.
SoftExplorer is based on power models: one model for each targets (processor).



SoftExplorer uses both ASM or C files to estimate the power/energy consumption; the user does not need to realize the linkage step (ASM) to estimate his application consumption.



The first graphical interface allows the user to choose estimation method (C or ASM), the target and the application that he wants to estimate. Today, four processors are available: a low power DSP (TI TMS320VC5510), two powerful DSPs (TI TMS320C6201and TMS320C6701) and a general purpose (ARM7TDMI).
The estimation time with SoftExplorer, for a complex application like MPEG2 encoder algorithm, requires about one second of CPU time.



Another graphical interface shows to the user a representation of the power consumption of each loop in function of its execution time; we give also the power repartition between the different functional units for each loop. With this representation, the programmer can rapidly see what are the loops that he must optimize for decreasing the power and/or energy consumption.
SoftExplorer has been tested on several kinds of digital signal processing applications. The table above presents consumption results for some applications. For each application, we give the error between our estimations and the physical measures realized on a development board.

Algo	Measures		Estimations		Error
	P(W)	E(mJ)	P(W)	E(mJ)	(%)
DCT	5.98	383	5.9	377	*-1.5*
DWT	3.75	8.71	3.83	8.89	*+2.1*
EFR	2.64	10.7	2.62	10.63	*-0.75*
MPEG	5.82	0.23	5.59	0.22	*-4*

The SoftExplorer beta version is available on our web site (http://lester.univ-ubs.fr:8080/tools/tool.htm); an online version will be soon available.