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NEW MICROPROCESSOR COULD EXTEND BATTERY LIFE

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MP3 players and 4Gmobile phones could be more energy efficient thanks to a versatile microprocessor developed as part of a project funded by EPSRC at the University of Edinburgh.

Designed using a new automated approach, the processor, known as EnCore, is smaller, faster and uses significantly less power than similar commercial chips. It would extend battery life when used in small, low-powered, battery-operated devices, such as MP3 players or mobile phones.

IMPACT ON INDUSTRY, THE ENVIRONMENT AND THE CONSUMER

- This new approach should allow industry to innovate effectively and get new products to market more quickly.
- The new microprocessors should help industry produce more energy efficient devices with ever greater functionality.
- EnCore devices would use less energy to achieve the same level of computational performance.

- The potential to use one chip for many purposes, or to upgrade to extend its life, would reduce the rate at which devices become obsolete.
- EnCore devices would need recharging less frequently.
- Consumers should benefit from devices that cost less and boast more functions.

27% more efficient
EnCore processor compared with a typical embedded processor such as an ARM Cortex M3.

SYNTHETIC PROCESSORS

The EnCore processor is part of a larger EPSRC project to automate the process of designing future microprocessors. This first EnCore processor (codenamed Calton) is the starting point from which the team will go on to create 'synthetic processors'.

The key innovation is this synthetic approach, explains project leader Professor Nigel Topham from the University of Edinburgh. "In practice, this means that we have software tools that will examine application software and determine how to add more instructions to the processor, and also design the logic to implement those instructions. These tools will eventually learn how to optimise their decision-making procedures and out-perform human designers."

50% less power
used than other processors such as ARM Cortex M3.

WORKING PERFECTLY

The research team have spent four years working on EnCore. The microprocessor was manufactured onto a silicon chip and then tested. "It worked perfectly," recalls Professor Topham. "Having seen this project through from the drawing board to a functioning computer, I am delighted with how well the chip performs in terms of its stability and low power consumption."

THE LATEST DEVELOPMENT

Now there is a newer version of EnCore in fabrication. This chip (codenamed Castle) extends Calton by including an automatically-synthesised accelerator. "A key innovation," explains Professor Topham, "is that this chip allows the instruction set of the processor to be changed dynamically to meet the needs of the application." With most commercial processors only the software can be changed, not the processor.

This advantage makes it suitable for a variety of electronic devices, such as audio (MP3) and video (MPEG4) devices, as well as smart-cards and biometric devices. It also means that, in principle, an

EnCore device would use less energy than other processors as designers could optimise the processor to the application.

RESOURCES

New Microprocessor could extend battery life (PDF 1.1MB)
Downloadable version of the case study.

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