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## Intel Pushes Low Power Limits With Claremont Chip

Peter Judge, September 19, 2011, 1:37 pm

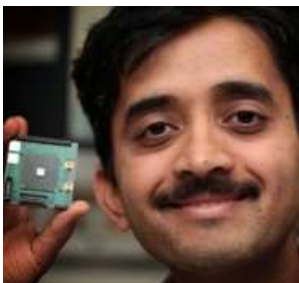


### IDF: Intel shows chip which needs no heatsink and can be powered by a tiny solar cell

Intel has demonstrated a processor that uses so little energy it could change the way IT devices are powered, and boost Intel's showing in mobile devices.

Intel's mainstream low-power activity at the Intel Developer Forum (IDF) event in San Francisco last week centred on [Ultrabooks](#), powered by its [Ivy Bridge](#) chips which use ["Tri-Gate" technology](#) to reduce power. But a demonstration of its Claremont chip showed that power reductions can go further, until devices need no heatsink, and can be powered by small solar cells.

### A cell the size of a postage stamp



The Claremont prototype, demonstrated at IDF by Intel's Justin Rattner and researcher Sriram Vangal (pictured), reduces the voltages down to near the theoretical limit – the "threshold" where electronic gates on the chip will switch.

The "near threshold voltage" (NTV) Claremont chip was shown working with no heatsink, and powered by a solar cell the size of a postage stamp. Having the voltage from 1V to around 500mV achieves a five-to-ten-times improvement in energy use, because of knock-on effects in system design, according to a [blog](#) by Vangal.

Operating at lower voltages increases the risk of unreliability, since the difference between a "1" and a "0" is much smaller. Redesigning parts of the chip has meant that Claremont should run at around 10mW and can be left "always on" in a lower

power state.

Lower voltage means less heat, so the chips can potentially be run up to higher power, without the need for extreme cooling methods – such as the [AMD Bulldozer cooled by liquid helium](#) which entered the Guinness Book of Records last week.

As well as meeting Green IT demands, lower power chips would give Intel more clout in mobile devices, where it has been [losing ground to ARM](#), even with partners such as [Microsoft](#) and [Apple](#).



"This could be compelling for smart phones, tablets and other devices allowing one design to efficiently scale all the way, obviating the need for heterogeneous architectures," said Vangal.

The solar cell in the demonstration could just as easily have been any other low-energy power source, but a solar source was chosen to show the possibility of small devices needing no power beyond what they can harvest.

"One goal of NTV research is to enable 'zero power' architectures where power consumption is so low that we could power entire digital devices off [solar energy](#), or off of the energy that surrounds us every day in the form of [vibrations](#) and [ambient wireless signals](#)," said Vangal.

Other proposed sources of scavenged energy include that [produced by typing](#), as well as [body heat](#), and [ambient sound](#).



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