

07/02/2006

Creative IC Design Ideas Presented at Chip Olympics

Two postgraduate students from the Department of Electrical and Electronic Engineering of the Hong Kong University of Science and Technology (HKUST) present their innovative IC design technology today (7 February 2006) at the International Solid-State Circuits Conference, also known as the "Chip Olympics."

MPhil candidate Ng Wing Lun is presenting an innovative design technology for a quadrature signal generator, a key component of new-generation high-frequency communications equipment capable of regulating output frequencies accurately at low voltages and low power consumptions.

Conventional quadrature signal generators employ active devices that would inevitably increase power consumption, limit the maximum operation frequency and degrade the accuracy of frequency regulation in high-frequency applications. Ng's study found that replacing the active devices with an on-chip passive transformer not only reduces the circuit's power consumption, but also improves its performance in terms of operation frequency and accuracy. He added: "Our target is to bring to reality the idea of a single-chip communication system, using standard low-cost digital CMOS processes."

For his part, PhD candidate Man Tsz Yin has developed a new technology for designing the power converter used in battery-powered electronic products. The technology significantly enhances converter power efficiency, thus extending the effective operational time from each charging cycle.

Man points out that the main feature of this converter is supplying voltage input to circuits by transforming battery voltage in a power-effective manner. However, existing design technology only enables an efficient voltage conversion under a particular operation condition. He added: "The newly developed technology can adaptively minimize converters power losses under different operation conditions."

Both Ng and Man enjoy the debate and discussion with other outstanding postgraduates in the Department's IC design teams and regard them as the main source of their motivation and innovative ideas. "A new design concept does not happen by chance. I often get inspiration from other students," said Ng, who also presented an innovative design technology for another key communications equipment component at last year's Chip Olympics.

This year's Chip Olympics are being held from 5 to 9 February in San Francisco.



Ng Wing Lun and Man Tsz Yin with their supervisors, Drs Howard Luong, Mansun Chan and Philip Mok



Ng Wing Lun

Man Tsz Yin