New Technology Enables a Chip Scale Atomic Clock

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The Symmetricom® QUANTUM™ Chip Scale Atomic Clock (SA.45s CSAC) delivers the accuracy and stability of an atomic clock to portable applications for the first time.

Atomic clocks have enabled a world where ultra-precise timekeeping is now mandatory for communications, navigation, signal processing and many other applications critical to a modern functioning society. However, as smaller, lighter and more energy efficient—in other words, more portable—versions of these systems have emerged, atomic clocks themselves have not followed the same trend lines. Why not? Two reasons: First, legacy atomic clock technologies only scale so small. Second, even if you could make today's smallest atomic clocks significantly smaller than they are already (about the size of a deck of cards), they would still have serious shortcomings in portable applications—where battery power and ambient temperatures are real issues.

Enter the chip scale atomic clock (CSAC). This is not simply a miniaturized version of bigger clocks, but a reinvention. For example, rather than a cesium tube as a resonance cell, it uses a tiny hollowed-out silicon cube filled with cesium gas. At one end is a vertical cavity surface emitting laser (VCSEL) that shines a beam through the gas. At the other is a photo detector that senses how much light gets through the resonance cell.

Click here [1] to view the white paper from Symmetricom [2].

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