Editorial

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Doctors Will Depend More on RF Devices

With respect to the many forms of machine-to-machine (M2M) and Internet of Things (IoT) applications, high-frequency semiconductors with wireless communications capabilities are being projected for strong growth markets for years to come. Perhaps one of the more significant "submarket" areas within these high-growth markets is in medical electronics.

Advances in RF/microwave integrated circuits (ICs) have made possible tremendous progress in both implanted and external devices for monitoring and controlling bodily functions, such as neurostimulators and heart-rate monitors. With the high-data-rate communications possible over wireless radio bands, medical devices like blood-pressure and heart-rate monitors can now be worn externally.

Some of the same design requirements that are driving the development of sensor-based RF ICs for IoT applications—e.g., the "smart home" and "smart office"—are leading to the performance improvements needed for medical applications, including low-power consumption and long operating lifetimes. By building applications around some of these new, low-power ICs, key health-monitoring functions can be performed while drawing only microamperes of current.

With the expected simultaneous growth in medical electronic and wireless IoT markets, RF/microwave IC developers willing to engage in medical electronic markets can leverage many of the requirements for IoT applications (extreme miniaturization and conservation of energy, to name two) into medical electronic solutions.

Potential solutions range from audio-frequency transceivers that can aid the hearing-impaired to pill-sized cameras that can be swallowed for endoscopic imaging and analysis. The use of implantable, low-power wireless transceivers has been touted by many researchers around the world as a means of extending life when used to communicate with, as well as control, the heart and lungs. It can also enable control of robotic limbs in place of injured or nonfunctioning ones.

Among the challenges facing IC developers for medical applications are the extreme miniaturization of these circuits and the long-term reliability. Nevertheless, advances in semiconductor technology are poised to provide medical electronic solutions that will contribute to the longevity and quality of life for many patients. mw

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