Improving RF performance in Mixed-signal Circuits

Satellite applications using advanced CMOS technology for devices throughout the signal chain benefit from double the capacity, higher integration and lower power consumption.

By Rodd Novak

Satellite communication is perhaps the most challenging mixed-signal, high-reliability application. Not only do the components used in satellites have to withstand a wide range of temperatures and radiation, but they also have to offer high levels of performance and reliability. Space applications are fully entrenched in the commercial arena now, so price and size are also key drivers for devices and components used in this market. Perhaps the greatest concern of all is power. By using devices built with UltraCMOS&#153 technology, a cost-effective silicon on insulator (SOI) technology on a sapphire substrate, satellite system designers are already realizing unprecedented design flexibility as well as improvements in performance and power consumption as compared to GaAs and bulk CMOS alternatives.

There are several key mixed-signal (analog or RF and digital) devices that are now being used in space applications, including phase locked loops (PLLs), intermediate frequency (IF) integrated subsystems, and prescalers. When implemented in UltraCMOS, these devices are enabling the design of lighter, smaller, higher-performing, lower-cost satellite systems that also cost less to launch.

Due to the equations in this article, we have made a PDF [1] available for you to download.

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