ABSTRACT

A Narrow-Band High-Speed Switched-Capacitor

Sixth Order Bandpass Ladder Filter.

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In narrow-band high-speed switched-capacitor filters, the main limitation comes from the capacitance spread at the system level and from amplifier settling time at the circuit level. A secondary clock, that averages at an integer fraction of the main clock signal, is used to reduce the capacitance spread relaxing the OTA requirements. The secondary clock is pulse position modulated to reduce the power of alias components.

Frequency prewarping equations to account for the secondary clock has been presented. At the circuit level, after a review of cascode transconductance amplifiers, a multiple path amplifier with reduced input capacitance and enhanced slew-rate has been proposed. The presented amplifiers have been compared in terms of their settling time performance in a switched-capacitor amplifier with computer simulations.

The proposed three-path amplifier with improved settling time performance has been prototyped in a 0.5 _m CMOS technology and characterized, experimental results have been presented. Finally, a sixth order bandpass ladder switched-capacitor filter with a center frequency of 10 MHz and main clock frequency of 60 MHz has been prototyped in a 0.35 _m CMOS technology. The filter is powered by the proposed three-path amplifiers and uses a secondary clock to reduce the capacitance spread by a factor of four. Experimental results have been presented.