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Ultra Wide-Band : State of the Art; Implementation of a Performance-Controllable Low-Noise Amplifier

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**Abstract:** Ultra Wide-Band (UWB) transmissions exhibit performances vastly superior to existing wireless systems - superlative data-rate capacity, high security, low cost, low power consumption - and are emerging as the hottest topic of research for upcoming wireless generations. This communication protocol is studied in detail, with mention of the history and estimates for the near future; the present and possible applications are mentioned; the advantages and unresolved issues are detailed; a typical UWB transceiver architecture is studied; the modulation and coding schemes are enumerated; and the possibility of long-range communication is touched upon. Finally, a new performance-controllable low-noise amplifier (LNA) destined for UWB systems is described. Inverse proportionality relations mean that better values are obtained for the noise figure, power consumption, bandwidth, and output impedance when the gain is higher. The amplifier was simulated in the 0.35<sub>{μ}</sub>m SiGe BiCMOS technology from ST Microelectronics. The gain of the LNA is controllable in the range from 0dB to 29dB; bandwidths of up-to 10GHz are obtained, covering the entire authorised UWB band; noise figures as low as 2.7dB are exhibited; the power consumption is always below 7mW; and an excellent temperature stability is shown - a gain drop of only 0.5dB in the temperature range from -40 ° C to 85 ° C.

**Key Words:** Low-Noise Amplifier, Ultra Wide-Band

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