A new hand-held microsystem architecture for biological analysis

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Abstract: This paper presents a hand-held microsystem based on new fully integrated magnetoresistive biochips for biomolecular recognition (DNA hybridization, antibody antigen interaction, etc.). Magnetoresistive chip surfaces are chemically treated, enabling the immobilization of probe biomolecules such as DNA or antibodies. Fluid handling is also integrated in the biochip. The proposed microsystem not only integrates the biochip, which is an array of 16 × 16 magnetoresistive sensors, but it also provides all the electronic circuitry for addressing and reading out each transducer. The proposed architecture and circuits were specifically designed for achieving a compact, programmable and portable microsystem. The microsystem also integrates a hand-held analyzer connected through a wireless channel. A prototype of the system was already developed and detection of magnetic nanoparticles was obtained. This indicates that the system may be used for magnetic label based bioassays. © 2006 IEEE.

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