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(54) **DNA-BASED MEMORY DEVICE AND METHOD OF READING AND WRITING SAME**

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(57) **ABSTRACT**

The present invention is directed to a memory device having very high storage density capability. In general, the memory device includes an array of individual memory cells which store information that is assigned a value based on the molecular contents of the memory cell. In a preferred embodiment, the molecules utilized for storing information in the memory cells may be single-strand polynucleotides, for instance single-strand oligonucleotides of between about 5 and about 20 monomer units. The present invention is also directed to methods and systems useful for writing and reading the molecular-based memory devices. In particular, the devices may be written and read via modified atomic force microscopy processes.

23 Claims, 14 Drawing Sheets