Expandable cache proposed by G. Bournoutian and Orailoglu is very efficient in reducing miss rate and energy consumption with small area overhead. However, in the original expandable cache, using only MSB for cache expansion may lead to thrashing problems. In this work, based on the structure of expandable cache, we will introduce a new cache design which has more flexible expansion schemes to fit different run-time program behaviors. The expansion scheme of our proposed cache design is dynamically changed by executing configuration instructions which are inserted at compile time.