Renice SSD Power-failure Protection

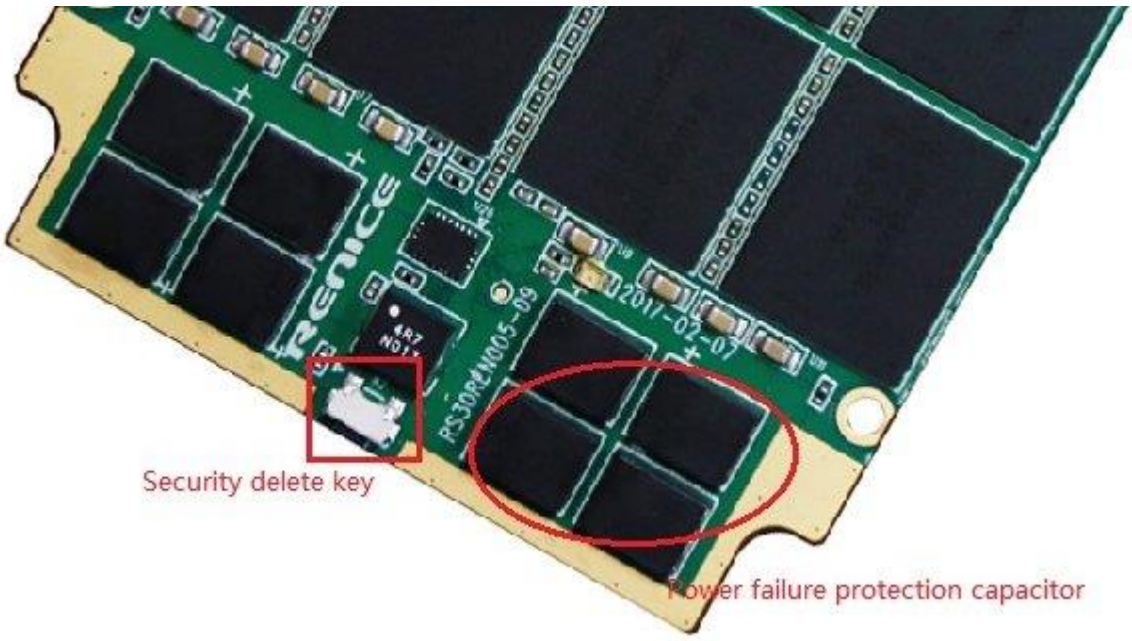
- rBackUp Technology

rBackUp (Rapid Backup) refers to a technique of how to flush data stored in DDr into NAND Flash within a very short period. It is developed by Renice to solve the problem that regular power failure protecting mechanism (based on tantalum capacitor) does not work when capacitor ages with power less than initial design as time goes by.

Background:

Mainstream SSD deploy SDRAM or DDR to improve the R/W speed. That follows the issue of data loss or mapping table loss when sudden power failure occurs. To guarantee the data integrity, usually SSD makers design a power failure protecting mechanism based on Super-Capacitor or Tantalum Capacitor, which will work as backup power for SSD in power failure circumstance.

The design seems to be perfect to balance the performance and reliability. However there is a potential hazard behind it in real application. Both Super-Capacitor and Tantalum Capacitor keep aging as charge & discharge times increase. Common warranty period from SSD makers is 3 to 5 years, which apparently does not take this problem into account.



If the left power of Tantalum Capacitor becomes only 50% of initial design as it ages. Then it would be not enough to power the SSD to write all data into SDRAM into NAND Flash, which might cause damages to SSD as below conditions:

1. Mapping Table under updating is lost and whole SSD corrupt;
2. Data stored in SDRAM is lost;
3. If there are frequent power-failure, False add-on Bad Block will significantly increase;

These issues are all threats to SSD reliability, which cannot be accepted by critical applications.

The rBackUp technique, based on which the time taken to write data in DDR into NAND Flash is shortened by 50%~70% as before. Perfectly solved the potential hazards caused by capacitor aging.