

# **TRIM**

## ***White Paper***

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***Apacer Technology Inc.***

1F, No.32, Zhongcheng Rd., Tucheng Dist., New Taipei City, Taiwan, R.O.C

Tel: +886-2-2267-8000      Fax: +886-2-2267-2261

# TRIM Command Strengthens SSD

## Overview

TRIM, though in capital letters usually, is a memory computation command rather than an abbreviation. It is mainly a SATA command that enables the operating system to inform the SSD (Solid State Drive) which blocks of previously stored data are no longer valid, due to erases by the host or operating system, such as file deletions or disk formatting. Once notified, SSD will begin the discard of the invalid LBAs and retain more space for itself, in fact, the discarded is no longer recoverable.

When an LBA is replaced by the operating system, as with overwrite of a file, the SSD is informed that the originally occupied LBA is determined as no longer in use or invalid. The SSD will not save those blocks in garbage collected sectors. Noticeably, a file deletion command by host or operating system never actually erases the actual content, rather, just the file is marked as deleted. This issue is even specifically noticeable for flash based memory devices, such as SSDs. In fact, an SSD will keep garbage collecting the invalid, previously occupied LBAs, if it is not informed that these LBAs can be erased. Thus, the SSD would experience a significant performance downfall.

With the TRIM command, when a file is permanently erased or the drive is reformatted, the operating system will send this command to the SSD with the associated LBAs that are no longer valid. In that sense, the SSD is notified with the LBAs to be erased and reused. Thus, the SSD will then discard the previously occupied data. This greatly reduces the loading for garbage collection and saves more space for better performance and lower write amplification, and even eliminates the possibility of data retrieval.

### Notes:

- TRIM does not work on RAID volumes.
- Though supported in Linux Kernel 2.6.33 or later versions, TRIM is not automatically enabled in Linux OS. Please refer to specific version regarding enabling TRIM command automatically.
- TRIM command can be enabled in non-supporting operating systems. Please refer to the specific operating systems to download the required utilities.

## Revision History

Revision	Date	Description	Remark
1.0	1/26/2017	Official release	

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1F, No.32, Zhongcheng Rd.,  
Tucheng Dist., New Taipei City, Taiwan

Tel: +886-2-2267-8000 Fax: +886-2-2267-2261

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