# Flash Storages Development of SD Memory Cards and microSD Memory Cards

- Use of TDK's proprietary controller, TDK GBDriver RD4, supporting UHS-I
- SD card/microSD memory cards resistant to unexpected power interruption

# November 14, 2017

Today TDK Corporation (President: Shigenao Ishiguro) announced the gradual launch of SD Memory cards (MMRD4 series) and microSD Memory cards (MURD4 series) from January 2018. Both series support UHS-I for industrial application.

The rapid progression of IoT has increased demand for smaller SD/microSD Memory cards with low power consumption for the storage of sensor information. However, as SD/microSD Memory cards for general use adopt TLC and MLC type flash memory to reduce costs, they are largely unsuitable for industrial application in terms of durability and reliability.

The MMRD4 and MURD4 series consist of highly reliable SD/microSD Memory cards equipped with very durable SLC/pSLC flash memory as well as the newly developed SD controller, TDK GBDriverRD4. In addition to data retention capacity and durability, the cards feature robust data security in the event of power interruption, ensuring safe usage in IoT devices that are often turned off to conserve power.

The new products also have a data security function, with the option for TDK's original authentication function, in addition to the SD standard compliant password lock. They also provide great security against falsification and leakage of data stored on a NAND-type flash memory.

The MMRD4 and MURD4 series will be exhibited in TDK's booth at Embedded Technology 2017 / IoT Technology 2017 at Pacifico Yokohama, from November 15 to 17, 2017.

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# Main applications

- Semiconductor manufacturing equipment, NC machine tools, sequencers, programmable logic controllers, panel computers, embedded CPU boards and other factory automation equipment
- Automated ticket gates, automated ticket vending machines, commuter pass vending machines, train movement management systems, automated air ticketing machines, automated check-in systems and other railway and transportation service equipment
- Cash registers and other point-of-sales (POS) equipment, convenience store and kiosk terminals, ATMs and other banking terminals
- Information terminals and thin-client computers, RAID SSD installations and other IT equipment for cloud computing systems
- Automotive navigation systems, digital tachographs, drive recorders, rear view monitors and other vehicle installations
- Multi-function printers (MFPs), commercial-use projectors, telephone conferencing systems, electronic blackboards and other office automation equipment

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- Karaoke on demand systems, arcade games and other amusement and game equipment
- Digital signage, electronic billboards, electronic point-of-purchase (POP) displays and other advertising display equipment
- Diagnostic imaging systems, blood analysis equipment, medical PCs, electronic patient records systems, DNA microarray systems, automatic biochemistry analyzers, remote medical care devices, automated care devices and other medical and data analysis equipment
- Base station equipment for mobile data communication systems and other communication and broadcasting equipment and information system devices
- Smart electricity meters, power grid infrastructure equipment, automated power equipment control systems, energy management systems, building air conditioning systems and other smart grid equipment
- Biometric authentication systems, entry/exit control systems, security terminals for surveillance cameras and other security equipment
- Earthquake emergency information systems, household fire detectors and other disaster prevention related equipment

## Main features and advantages

# 1. Incorporation of TDK GBDriver RD4, a NAND-type flash memory controller IC, independently developed by TDK

The products adopt GBDriver RD4, a controller independently developed by TDK, as a flash memory controller IC that affects the performance and reliability of SD/microSD Memory cards. It achieves the high reliability required for industrial and embedding applications. Moreover, TDK is prepared to immediately provide upward compatible products when the flash memories are updated or are no longer produced.

#### 2. High-speed access while maintaining data reliability

Compliant with SD Specification 3.01, the products support speed class 10 and UHS-I. While maintaining high reliability, it realizes a maximum reading speed of 75 MB/s and writing speed of 50 MB/s<sup>\*1</sup>.

# 3. Incorporation of SLC/pSLC flash memory

Products using the latest SLC NAND flash and pSLC NAND flash are included as standard in the lineup. Customers can choose the products that best meet their needs.

#### 4. Incorporation of global static wear leveling function

TDK's original static wear leveling algorithm counts the number of times each memory block is erased (programmed) and uniformly replaces the blocks. Static blocks, such as OS, are also periodically leveled, which drastically improves the lifespan of the installed flash memory. Moreover, it allows the range of static wear leveling to be set freely. (In this case, the area outside the set area of static wear leveling is controlled by dynamic wear leveling.)

#### 5. Enhanced tolerance to power interruption

The power interruption tolerance algorithm in TDK GBDriverRD4 prevents the corruption of data other than the data being written in the event of a power interruption. This highly reliable SD/microSD Memory card is resistant to unexpected power interruptions.

# 6. Error recovery function

The auto-refresh function reads all data on the flash memory, including areas not to be read, and automatically corrects errors as needed, preventing data loss caused by a read disturb error or a data

retention error. Because the auto-refresh function is executed as a background operation, there is almost no response delay to command execution from the host.

## 7. Security function

# (a) Protection function

The incorporation of an SD standard protection function allows customers to set and remove a password to protect important data.

#### (b) TDK original security function

The host and SD/microSD Memory cards implement mutual authentication, which limits access or response from an impersonating third party. (This is an optional function and requires the conclusion of a separate confidentiality agreement.)

#### 8. SMART command support

The amount of times all memory blocks have been erased (programmed) can be obtained using the SMART command, which allows the flash memory status to be easily determined and facilitates appropriate lifespan management. Moreover, TDK's original software is available for free.

## 9. Solution Support

TDK has independently developed and marketed the GBDriver series of NAND Flash memory controllers since 2000, and provides technical support to customers in Japan and overseas, supported by its advanced proprietary technologies. This includes the dispatch of field application engineers, which is a vital service, especially in the embedded systems market, and support for the implementation of reliability monitoring functions.

#### Notes

\*1: The incorporation of SLC flash memory depends on the system environment.

# Production and sales plan

- Production site: Taiwan
- Production plan: 10,000 units/month/series
- Commencement of production: December 2017

You can download this text and associated images from www.global.tdk.com/corp/en/news\_center/press/20171114\_01.htm.

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