EMBEDDED

SanDisk® TransFlash™

Memory Module

The small, scalable, semi-removable solution for next-generation embedded flash data storage applications.

As flash data storage requirements continue to increase, flash storage memory modules offer a small, scalable and semi-removable alternative to embedded NOR and NAND components. Based on the industry-standard serial SD™ interface, SanDisk's incredibly small TransFlash memory module is ideal for designs where space is limited, as well as storage-hungry designs demanding 32MB* or larger amounts of embedded flash. TransFlash is perfect for today's industrial and consumer applications requiring a small footprint, high capacity, scalable storage solution.

SanDisk's TransFlash is the world's smallest removable flash memory storage module, measuring a miniscule 11mm by 15mm and 1mm thick. The optimal solution for the embedded flash storage market, TransFlash is currently available in 32MB, 64MB and 128MB capacities (with higher capacities coming soon).

When compared to flash data storage solutions based on the component design, semi-removable TransFlash offers system designers and manufacturers significant advantages such as lower overall manufacturing costs, greater design flexibility and scalability, seamless technology transitions, and faster time to market.

Empower your designs today with SanDisk's innovative TransFlash memory module.

Actual Size

*1MB = 1 million bytes

STORE YOUR WORLD IN OURS™

SanDisk TransFlash. The next evolutionary embedded flash solution.

SanDisk, the world's largest supplier of flash data storage products, continues to lead the industry in the ongoing evolution of application memory solutions. Our newest innovation, TransFlash, combines the low cost and small size of component flash with the flexibility of removable media. The result is a superior flash module solution with a wide range of capacities.
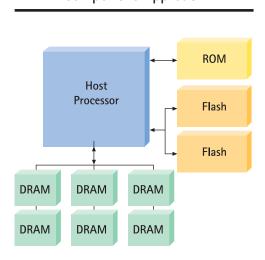
In comparing a flash component vs. a TransFlash module, the "old" component memory solution requires multiple memory components directly soldered onto the printed circuit board. This approach creates many problems, among them:

- Host processor managing individual memory components
- Constantly changing memory technologies requiring frequent hardware and software updates
- Limited flexibility in memory capacity without hardware re-spin
- Limited scalability
- Limited field memory upgradeability
- Requires complicated memory management and reliability algorithms
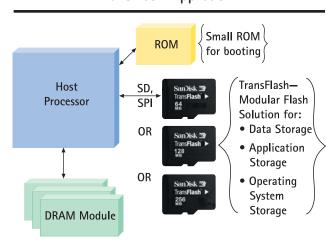
In contrast, SanDisk's new scalable TransFlash module approach offers significant design and manufacturing advantages, including:

- The same physical form factor (footprint) for a wide range of capacities
- On-board controller eliminates the need for host memory management and separate software development for ECC and wear leveling
- Seamless memory component technology transitions
- Industry-standard serial interface to minimize risks (plus backwards compatibility)
- Unprecedented upgradeability and flexibility
- On-board savings in real estate

Component Approach

TransFlash Approach

More features, more benefits, less risk.

SanDisk's TransFlash memory module gives system designers and manufacturers a variety of innovative features and important benefits:

Features	Benefits
Extremely Small Size	Offers high capacity in an incredibly small form factor (11mm by 15mm and 1mm thick)
Scalability	Provides the same physical form factor (footprint) for a wide range of capacities; offers easy upgradeability and design flexibility
Semi-Removable	Allows postponement of memory capacity decision without risk of disturbing the board layout
Standard Interface	Runs on an industry-standard serial SD interface; minimizes design risk; fully backwards compatible
Simpler Memory Management	On-board controller eliminates the need for host memory management and separate software development; provides seamless memory component technology transitions; simple interface enables easy board layout
Extended Temperature Range	Also available from -40°C to 85°C to meet the unique demands of embedded applications

A wide range of industrial and consumer embedded flash applications.

Flash application usage and storage requirements are increasing daily. Today's new devices demand greater flash storage to permanently store operating systems applications and data. SanDisk TransFlash provides a small, scalable, and semi-removable solution for a variety of next-generation embedded flash applications.

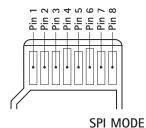| Industrial Applications	Consumer Applications
• Networking Systems (routers, switches) • Digital Set Top Boxes • Medical/Industrial Instrumentations • Industrial Handheld Devices (scanners, terminals) • GPS Navigation Systems • Automotive Infotainment and Diagnostic Systems • Factory Automation Systems	• Mobile Phones • PDAs • Digital Still Cameras • MP3 Music Players • Electronic Books/Toys • Smart Watches • Digital Audio

specifications**

Power	
DC Input Voltage	2.7V to 3.6V

Power Dissipation–room temp., at 3V	
Sleep	100 µA
Read	45 mA Typical; 50 mA max
Write	55 mA Typical; 58 mA max

Environmental	
Temperature	
Operating	–25°C to 85°C
Non-Operating Commercial	–40°C to 85°C
Moisture	
Operating	25°C/85% rel. humidity
Non-Operating	40°C/85% rel. humidity
Shock	
Operating	1,000 G max
Non-Operating	1,000 G max

Reliability and Maintenance	
MTBF *(Mean Time Between Failures)*	>1,000,000 Hours
Data Reliability	<1 non-recoverable error in 10^{14} bits read

Physical	
Length	11mm +/- 0.1mm
Width	15mm +/- 0.1mm
Thickness *(body)*	1.0mm +/- 0.1mm
Weight	0.40 g. max

Ordering Information	
Order Model #	SDQCJP-32-201 32MB
	SDQCJP-64-201 64MB
	SDQCJP-128-201 128MB
	SDQCJP-256-201 256MB***

**Specifications and product offerings are subject to change without notice

***Available in Q1 '05

Pin 1 Pin 2 Pin 3 Pin 4 Pin 5 Pin 6 Pin 7 Pin 8

SD MODE

Pin No.	Name	Type	Description
1	DAT2	I/O/PP	Data Line (bit 2)
2	CD/DAT3	I/O/PP	Card Detect/Data line (Bit 3)
3	CMD	PP	Command Response
4	VDD	S	Supply Voltage
5	CLK	I	Clock
6	VSS	S	Supply Voltage Ground
7	DAT0	I/O/PP	Data Line (bit 0)
8	DAT1²*	I/O/PP	Data Line (bit 1)

SPI MODE

Pin No.	Name	Type	Description
1	RSV	—	—
2	CS	I	Chip Select (neg true)
3	DI	I	Data In
4	VDD	S	Supply Voltage
5	SCLK	I	Clock
6	VSS	S	Supply Voltage Ground
7	DO	O/PP	Data Out
8	RSV	—	—

*The extended DAT line (DAT1) is an input on power-up. It starts to operate as DAT lines after SET_BUS_WIDTH command is sent.

For more information visit our web site at http://www.sandisk.com

80-11-00807 11/04