Cactus® Technologies

Cactus Technologies designs and manufactures the highest endurance and reliability Industrial Flash Storage Devices in the market. Four product lines with many form factors each allow the system designer to select the right solution to meet their budget.

Cactus has a solution to support the widely varying requirements of OEM, VAR, and Industrial Companies worldwide.

Product Lines

Industrial Grade (SLC) Embedded Flash Storage Devices

- Long Life Cycles – Fixed BOM Control
- Rugged, reliable, based on select SLC NAND components
- Industrial strength wear leveling and defect management
- Available in a wide variety of industry-standard form factors

- Industry Leading
  - Handling unexpected power interruption
  - Endurance, data integrity, quality & reliability
  - Temperature options (-40C to 85C)
  - SMART – Self Monitoring Analysis and Reporting Technology for useable life prediction
  - Optional ATA Security, Physical Write Protect Switch, and others on select products

Industrial pSLC

- Over 6 times the endurance of Industrial MLC
- Based on pSLC NAND with Fixed BOM Control
- Several form factors to choose from

Industrial MLC

- Most reliable MLC NAND products with Fixed BOM Control
- Qualified and tested to industry-leading MLC specs
- Available in a wide variety of industry-standard form factors

Industrial 3D

- Most reliable 3D NAND products with Fixed BOM Control
- The lowest-cost solution offered in the Cactus lineup
- Extensively tested Industrial 3D NAND
- Available in several industry-standard form factors

Industrial Grade Embedded Flash Storage Devices offer the highest specifications for Ruggedness, Temperature, Altitude, Endurance, and Reliability. They are ideal for the most demanding industrial and OEM applications and only use SLC (Single Level Cell) NAND memory.

Industrial Grade SLC

Product	Compact-Flash	Compact-Flash	Compact-Flash	SD	SD	SD	SD	microSD	USB Flash Drive	CFast	mSATA	2.5"SATA SSD
Series	303-32	503	603	806-32	806C-32	809	807	803M	300	X00S	940SM1	940S
Capacities (Min)	128MB	1GB	128MB	128MB	128MB	512MB	4GB	1GB	512MB	1GB	8GB	8GB
Capacities (Max)	16GB	64GB	64GB	8GB	4GB	2GB	32GB	4GB	32GB	64GB	128GB	256GB
Sequential Transfers (Min)	25 MB/s	30 MB/s	45 MB/s	18 MB/s	15 MB/s	20 MB/s	30 MB/s	17 MB/s	25 MB/s	135 MB/s	415 MB/s	405 MB/s
Sequential Transfers (Max)	35 MB/s	50 MB/s	65 MB/s	20 MB/s	20 MB/s	20 MB/s	35 MB/s	20 MB/s	30 MB/s	320 MB/s	540 MB/s	540 MB/s

ATA/IDE Interface Devices

The ATA/IDE interface, aka PATA (Parallel ATA), was developed in the early 1990s, and the CompactFlash form factor is still used in many industrial designs today.

SD Interface Devices

The SD interface was developed in the late 1990s to accommodate small form factor designs with a low pin count bus. Many embedded processors and microcontrollers have built-in SD interfaces for easy implementation. Cactus offers SD & microSD cards, as well as a solderable SDChip.

SATA Interface Devices

The SATA interface, developed in 2003, has been the workhorse for the embedded OEM industry, with much higher performance than the previous ATA/IDE and SD interfaces. Cactus offers CFast, mSATA, and 2.5" SATA SSD form factors.

USB Interface Device

The USB interface was developed in the mid 1990s and is best known for removable USB Flash Drives. As with the SD interface, many processors have an integrated USB interface which is ideal for the Cactus USB Flash Drive.

PCIe Interface Devices

The PCIe interface offers an extremely high-performance connection between the host system and the flash storage device. Cactus offers the PCIe Interface on multiple M.2 form factors, a CFexpress card, and our PCIeChip embedded solution.

Customization Services: Custom Labeling & Preloading Content • Custom firmware/ID Custom Feature Sets • Complete Custom Products

Industrial 3D

Cactus Industrial 3D products are based on Kioxia INDUSTRIAL 3D NAND rated at -40C to 85C operation and with much higher endurance and reliability than the standard 3D NAND. They are for applications that require high performance with a lower cost per MB. Industrial 3D products are available in M.2 (2242), M.2 (2280), CFexpress, microSD, and our new PCIeChip. Cactus offers heat sink versions of select parts to ensure long life in wide-temperature operating environments.

Product	M.2 PCIe 2242	M.2 PCIe 2280	CFexpress	microSD	PCIeChip
Series	270PM6	270PM7	270P	290M	290PC
Capacities (Min)	128GB	128GB	128GB	64GB	128GB
Capacities (Max)	512GB	1TB	512GB	256GB	512GB
Sequential Transfers (Read)	1600MB/s	1600MB/s	1000MB/s	85MB/sec	1800MB/sec
Sequential Transfers (Write)	1400MB/s	1400MB/s	845MB/s	55MB/sec	1200MB/sec

M.2 PCIe Heat Sink Option
Heat Sinks allow for full-speed operation at wide temperature ranges of -40C to 85C

The Cactus Industrial pSLC products are based on pSLC (Pseudo-SLC) NAND memory with over 6 times the Endurance of Industrial MLC products which use MLC NAND.

Product	SD	CFast	mSATA	M.2 SATA 2242	M.2 SATA 2280	2.5" SATA SSD	microSD
Series	245	245S	245SM1	245SM6	245SM7	245S	295M
Capacities (Min)	4GB	4GB	4GB	4GB	32GB	8GB	16GB
Capacities (Max)	64GB	64GB	256GB	128GB	128GB	512GB	64GB
Sequential Transfers (Read)	80MB/s	350MB/s	540MB/s	540MB/s	540MB/s	540MB/s	95MB/sec
Sequential Transfers (Write)	65MB/s	310MB/s	450MB/s	450MB/s	450MB/s	445MB/s	70MB/sec

Industrial pSLC

Cactus Extras

- Pre-Sales Engineering Design Assistance
- Post-Sales Applications Engineering Support
- Leading Industrial Grade Flash Storage Supplier
- Development Adapters
- Bonded Inventory
- Extended Last-Time-Shipments Available

The Cactus Industrial MLC products are based on MLC NAND memory and offer a cost-effective solution for budget-limited applications. They are ideal for lower endurance applications.

Industrial MLC

Product	Compact-Flash	SD	microSD	CFast	mSATA	M.2 SATA 2242	M.2 SATA 2280	2.5" SATA SSD
Series	240	240	240M	240S	240SM1	240SM6	240SM7	240S
Capacities (Min)	4GB	4GB	8GB	8GB	8GB	8GB	64GB	16GB
Capacities (Max)	128GB	128GB	32GB	128GB	512GB	256GB	256GB	1TB
Sequential Transfers (Min)	80MB/s	45MB/s	50MB/s	180MB/s	460MB/s	355MB/s	345MB/s	460MB/s
Sequential Transfers (Max)	110MB/s	80MB/s	85MB/s	350MB/s	560MB/s	560MB/s	545MB/s	560MB/s

Product Grade Selector

Industrial Grade	Industrial pSLC	Industrial MLC	Industrial 3D	Consumer	
SLC Single Level Cell	pSLC Pseudo SLC	MLC Multi Level Cell	Industrial 3D TLC	3D TLC/QLC	NAND Type
1	1	2	3	3	Bits/Cell
70K / 60K	20K	3K	3K	1K	Endurance Cycles
★★★★★	★⯪☆☆☆	★☆☆☆☆	★☆☆☆☆	⯪☆☆☆☆	Reliability
★★★★★	★⯪☆☆☆	★☆☆☆☆	★☆☆☆☆	⯪☆☆☆☆	Data Retention
★★★★★	★★☆☆☆	★★☆☆☆	★★☆☆☆	☆☆☆☆☆	Life Cycle
✓	✓	✓	✓	✕	Locked-BOM
$$$$	$$$	$$	$$	$	Cost

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