FLEXXON

Neumüller
Elektronik GmbH

RELIABLE AND ENDURING
NAND STORAGE
FOR MEDICAL APPLICATIONS

The demand for flash storage devices in the Global MedTech Market is rising due to technological advancement. In order to increase efficiency in medical devices, flash memory became the most effective and essential necessity. Notably, the technological advancement in 5G technology has further driven the decentralization of health care from hospitals to outpatient clinics and patients' homes. Hence, medical technologies are moving towards telehealth and portable compact medical devices with the support of 5G technology in the near future.

Flexxon has a strong understanding of global urgency and the requirements of the medical industry with our extensive experience in supporting Medical applications. Our high-quality memory devices and well-built global supply chain helped to maintain a profound relationship with our key medical device manufacturers around the world.

Key Requirements of Medtech

The medical applications monitor and contain vital medical data which concerns the matter of **life and death** when doctors are making decisions.

Therefore, the medical applications require memory storage with the utmost reliability and compatibility as those medical data are essential to be stored accurately.

Aside from product reliability, both product features and supply longevity with fixed BOM solutions are crucial for the Medical industry. Flexxon does not negotiate with that and provides:

High Quality Solution: Flexxon undergoes a series of stringent reliability tests to ensure product quality and efficiency.

Robust Design: Flexxon products provide wide compatibility to various Medtech systems to run effectively without fail.

Longevity Supply: Flexxon supports a fixed-BOM solution for over 10 years as we understand that Medtech companies expect long-term support upon product qualification.

The medical applications require an entire solution to fortify their system and Flexxon is making it worthwhile. Our business strate-gy and products fulfill the key requirements of the MedTech industry.

Advantages of Flexxon Flash Storage

With a huge base of medical customers on hand, Flexxon constantly updates and customizes our product/solution with advanced features to meet the demand for ensuring the highest level of reliability, endurance, and compatibility which is a plus against the competitors.

Flexxon offers the following advantages over our competitors:

High-IOPS (Input/output Operations Per Second)
Flexxon provides solutions with the High-IOPS features that facilitate random performance with 8 times faster for smaller data transfer compared to the sequential performance because most of the solutions in the market only focus on sequential performance.

Power Loss Protection (PLP)
Flexxon offers power loss protection to the memory devices from firmware level or hardware by including power capacitors. Power loss protection minimizes the loss of crucial data and NAND drives corruption in the medical devices.

Advanced Wear-Leveling
Being a manufacturer of flash storage solutions, Flexxon develops our own firmware to meet our customers' requirements for highly reliable and enduring solutions. We optimize our solutions with an Advanced Wear Leveling feature to erasure and rewrite in the memory blocks for an extended life expectancy.

S.M.A.R.T. Tool

S.M.A.R.T. tool allows our customers to monitor and estimate the health and remaining life of our storage to avoid critical failures. This feature facilitates shorter testing time for the medical customers to determine the durability of the memory storage in their device.

Smaller Capacities

Flexxon supports smaller storage capacities as well. We can support as low as 128MB for memory cards while most market players are going ahead with 16GB and above. Instead of paying more for extra storage space, we ensure that our customers enjoy the top quality products in a cost-saving manner with the capacities they require.

Longevity Supply

Flexxon values the customers and therefore supports supply allocation with Fixed BOM solution for the long term. Our business strategy ensures to support the customers with the fixed-BOM solution for up to 10 years upon product qualification. It will save the customer's time and effort of re-qualification for a new solution.

Medical Applications of MedTech Focus

Flexxon is highly focused on the niche market and gained success along with experience and knowledge about the medical industry that helps them to create compatible solutions for Medtech. Following are some of the medical applications that Flexxon excels in supporting with an established solution:

CPAP

It is a compact design homecare machine specifically used for patients who have breathing problems such as sleep apnea.

Requirements:
❖ Small form factors
❖ Random performance of small data transfer
❖ Robust storage with power loss protection

For CPAP, Flexxon offers:
● OEM SD Card with High-IOPS (FxPro I)
● SD Card Push-Push Connector
● Flezon's Mylar Speaker from FMS Series

Comparison with our competitors:

8GB MLC SD Card	Competitor (Standard)	Flexxon (High IOPS)
Sequential Read (MB/S)	59	95
Sequential Write (MB/S)	30	30
4k Random Read (IOPS)	1980	3400
4k Random Write (IOPS)	336	1200

Flexxon Features:
High IOPS solution
Advanced wear-leveling
S.M.A.R.T. tool
Power loss protection

Patient Monitoring Devices

The patient monitoring devices include ECG monitoring, respiration, and body temperature.

Requirement:
❖ Heavy writes of small data
❖ smaller capacity microSD of 128MB – 8GB or
❖ larger capacity USB DOM of 128GB
❖ High endurance solution

For a patient monitoring system, Flexxon provides:

Smaller capacity:
● microSD with High-IOPS (FxPRO I / Fx Adv)
● microSD Push-Push Connector
● Flezon's magnetic transducer (FMT Series)

Higher Capacity:
● USB DOM with High-IOPS (FxALP series)
● A speaker from Flezon FMS Series

Comparison with our competitors:

128GB MLC USB DOM	Competitor (Standard)	Flexxon (High IOPS)
Sequential Read (MB/S)	25	31
Sequential Write (MB/S)	17	23
4k Random Read (IOPS)	1800	2000
4k Random Write (IOPS)	336	1000

Flexxon Features:

Smaller capacity:
High Endurance
High-IOPS Solution
Advanced Wear-Leveling
S.M.A.R.T. Tool
Power Loss Protection

Higher Capacity:
High-IOPS solution
AES Encryption
High Endurance
High TBW

Medical Cardiovascular/ECG

The cardiovascular application or ECG machine is used as a monitoring application in the medical industry.

Requirement:
- ❖ Small form factors like eMMC, microSD or CF Card
- ❖ Low density parts eMMC/microSD (4GB/8GB) CF Card (128MB)
- ❖ Power loss protection

For ECG machine, Flexxon offers:
- ❖ CF Card (Legacy II Series)
- ❖ eMMC (Xtra III Series)
- ❖ microSD with High-IOPS (FxPro 1 / FxADV)
- ❖ Push Push Type MicroSD Connector
- ❖ Flezon's Piezo Buzzer (FMB Series)
- ❖ Flezon's MEMS Microphone

Comparing with competitors:

Memory Drive	Competitor (Standard)	Flexxon (High IOPS)
Low Density eMMC/CF Card	16GB/18GB	4GB-8GB/128MB
Customization	✕	✔
Power Loss Protection	✕	✔
Multiple access sharing for S.M.A.R.T. detail	Takes time	Faster and efficient

Flexxon Featues:

eMMC / microSD
- 🗎 Data Integrity in Reflow
- 🎚 Advance Wear-Leveling
- 🗄 System Block Protection
- ↻ Auto Read Refresh

CF Card
- 🎚 Advanced Wear Leveling
- ◆ Customize Erase Sector Commands
- 🗃 Customize UDMA Interface

Large Scale Radiographic System

The large-scale radiographic system is basically the X-Ray type of equipment.

Requirements:
- ❖ Has a small display unit to show results
- ❖ Small form factor
- ❖ High Sequential and Random Performance
- ❖ High Endurance (PE cycle: 30K)

For the radiographic device, Flexxon offers:
- ❖ 16GB - 64GB SD/MicroSD with HighIOPS (FxADV Series)
- ❖ Flezon's Transducer
- ❖ MicroSD Push-Push Connector

Comparing with competitors:

Memory Drive	Competitor	Flexxon
IOPS	Standard	High
Random Performance	✕	✔
Low Capacity	✕	✔
Endurance	Standard	High

Flexxon Features
- 🎚 Advanced wear-leveling
- 🔍 S.M.A.R.T. tool
- ⏻ Power loss protection
- 🖳 HighIOPS solution

X-RAY Mobile Machines

Requirements:
- ❖ Higher capacity like 256GB-512GB
- ❖ High-frequency speed
- ❖ High-endurance
- ❖ Power loss protection (Hardware/firmware)

Flexxon offers:
- ❖ mSATA (256GB to 512GB)
- ❖ PCIe M.2 512GB
- ❖ USB Drive (16GB)
- ❖ Flezon's Transducer
- ❖ Flezon's Ultrasonic Sensor

Flexxon Features:
- 🎚 Advanced wear-leveling
- 🔒 Encryption Security
- ⏻ Power loss protection
- 🔍 S.M.A.R.T. tool
- ◎ High endurance
- ❖ High TBW

Comparing with competitors:

mSATA (256GB)	Competitor (Standard)	Flexxon (Hardware PLP)
Sequential Read (MB/S)	520	550
Sequential Write (MB/S)	✕	✔
Power Loss Protection	✕	✔
Endurance	MLC	MLC
	100	384
Hardware PLP	–	✔

M.2(512GB)	Competitor (Standard)	Flexxon (Hardware PLP)
Sequential Read (MB/S)	300	3400
Sequential Write (MB/S)	2000	2100
Endurance	3D TLC (1,000PE Cycle)	3D TLC (3,000PE Cycle)
Total Bytes Written (TBW)	100	918
Firmware PLP	–	✔
AES 256/TCG Opal	Yes	✔

Surgical Robotic System

The surgical robotic system is used for crucial surgeries of patients.

Requirements:
- ❖ Heavy writing of data
- ❖ High density products (512GB-1TB)
- ❖ High endurance solution
- ❖ Robust design
- ❖ Customization

Flexxon offers:
- ❖ Industrial USB Drive (FxUA Robust USB 3.1 GEN 1)
- ❖ PCIe SSD M.2 2280 (DEX Pro Series)
- ❖ SATA SSDM.2 2280 (INSPIRE Series)

Comparison with competitors:

Comparison	Competitor	Flexxon
Grade	Commercial	Industrial
Endurance	Low TBW	High TBW
Robust Design	x	✓
Customization	x	✓

Flexxon Features
- 🎚 Advanced wear-leveling
- 🔍 S.M.A.R.T. tool
- ⏻ Power loss protection

Medical Aesthetics Devices

The medical aesthetic devices are used for beauty cosmetic surgery.

Requirements:
- ❖ High compatibility solution
- ❖ Writing of small data
- ❖ Boot OS from memory
- ❖ Heavy operation to memory
- ❖ Customization

Flexxon offers:
- ❖ MicroSD card (FxStd Series)
- ❖ Flexxon customized secure USB Stick (SEC I Series USB) with partition configuration

Comparison with competitors:

Comparison	Competitor	Flexxon
Qualification	Law	High
Authorization	x	✓
Customization	x	✓
Compatibility	Standard	Extensive

Flexxon Features
- 🖥 High IOPS
- 🎚 Advanced wear-leveling
- 🔍 S.M.A.R.T. tool
- ⚙ Unalterable data storage format (USB)
- 🔒 Password protected (USB)

WORM (Write-Once-Read-Many)

The medical and healthcare industry deals with a number of crucial patient data consist of sensitive information. WORM memory solution is the perfect solution that the medical data requires to enhance the security attributes ensuring the highest level of integrity to keep the information intact.

WORM Feature

Unalterable data storage
WORM eliminated the threats of data being modified or deleted. Once patient's confidential records are stored, into WORM, it cannot be altered or removed.

Default WORM Card mode
The tamper-proof WORM solution does not require to enable any software. This Default WORM Card Mode enables real-time monitoring and prohibiting illegal actions towards the data.

Replaces CD/DVD Drives
Old WORM media such as CD-R/DVD-R are becoming obsolete and people are utilizing memory storage devices like memory cards and USB drives. WORM can be the best alter for this.

Ensures Data Integrity
WORM card technology can be utilized in DICOM Medical Imaging, electronic health record (EHR), or electronic medical record (EMR).

Improve your Medical Devices with Flexxon solutions

It is the high time to preserve all the essential medical information into the finest data storage to ensure the applications perform efficiently and effectively. Flexxon'sdata storages are the exact solution to meet the needs of emerging needs in the MedTech market. We are right here to support Medtech with strong and distinctive advantages over their competitors by utilizing our solutions of the highest level of reliability, endurance, and integrity.

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