

Military Defence & Aerospace Application



Key Requirements



Highest Quality

Extremely Stringent Reliability Test



Military Grade Compliance

100% Tested with MIL Requirements



Military Design

Design with MIL standard



Data Security

Hardware and firmware design for security



Longevity

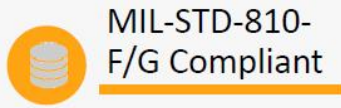
Fixed BOM



Sustained Performance

Sustained both sequential and random read/write performance

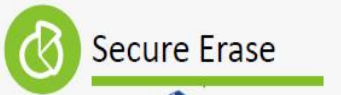
Flexxon Military Advantages



MIL-STD-810-F/G Compliant



Compliant with MIL-STD-810G, it is maintained by a Tri-Service partnership that includes the United States Air Force, Army, and Navy.



Secure Erase



Secure Erase is an operation of completely and irretrievably deleting user data from SSD. It could erase the LBA, mapping table, active data, OS and partition.



Security



Enhanced AES-256 & TCG OPAL security features to minimize the risk of data leakage without undermining system performance.



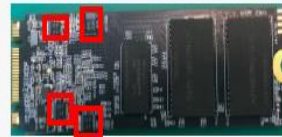
Physical Destruction



Physical destruction takes min 2 seconds to destroy NAND Flash physically and SSD can't be used anymore. Military grade computer which contains confidential data might require this feature.



Hardware PLP



Hardware PLP supports SSD to store all data from DRAM to flash when sudden power loss happen. Power Lost Protection also protect SSD from damage, and make sure SSD can wake up or work normally during the next boot up.



Customization

Support customization requirement, for example: extended temperature up to **45~+95C**, pre-set device model name, NSA-130 & conformal coating etc.

Flexxon Military Galaxy Series

MILITARY DESIGN



- Advance Heat Management
- Military Design on Firmware Configuration
- 100% tested with MIL requirement
- Compliant to NCAGE codes

HARDWARE DESIGN FOR UPS



Advance Hardware UPS Design which can ensure the whole drive is protected upon host power failure or unsafe shutdown

FULL DRIVE HARDWARE ENCRYPTION



Full Drive Hardware Encryption with AES 128/256 by using random key

POWER SURGE PROTECTION



Offers ESD, surge and short-circuit protection to hinder electrical damages to SSD itself and host devices

SELF-DESTRUCTION



- Physical Destruction Design
- High voltage is transmitted to SSD for burning each NAND flash IC after the pin is enabled
- During Self-Destruction, smoke could be seen on NAND flash and each NAND is destroyed within 2 seconds
- Data in NAND flash is permanently destroyed and uncoverable

SECURE ERASE



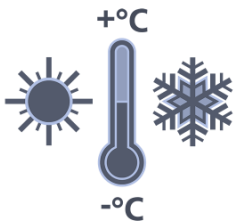
- Data destruction will launch once the Security Erase pin is triggered
- Both mapping table and storage blocks are deleted, and SSD will be written with meaningless pattern
- Secure Erase will not stop even if power outage occurs

MIL-STD-810G Compliance



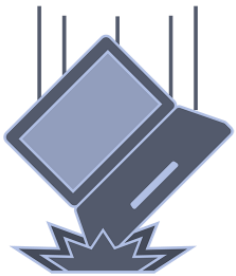
Rain

Protection from water, including spray, dripping water, and rain, and able to retain its performance during & after water exposure.



Temperature (incl. Low & High Temp)

Determines a device's ability to withstand sudden, drastic changes in temperature without deteriorating in performance or being physically damaged.



Shock (incl. Low & High Temp)

Withstand the shocks that come with handling, transport, and fieldwork and remain functioning and physically intact.



Sand & Dust

Ability to resist dust particulates under 150µm (micrometers) and operate amidst blowing sand particles of 150-850µm in size.



Vibro-Acoustic/Temperature

This test combines multiple factors, vibration, acoustic noise, and temperature to evaluate externally carried aircraft stores during flight.



Contamination by Fluids

Tested on temporary exposure to contaminating fluids occasionally, intermittently, or over extended periods.

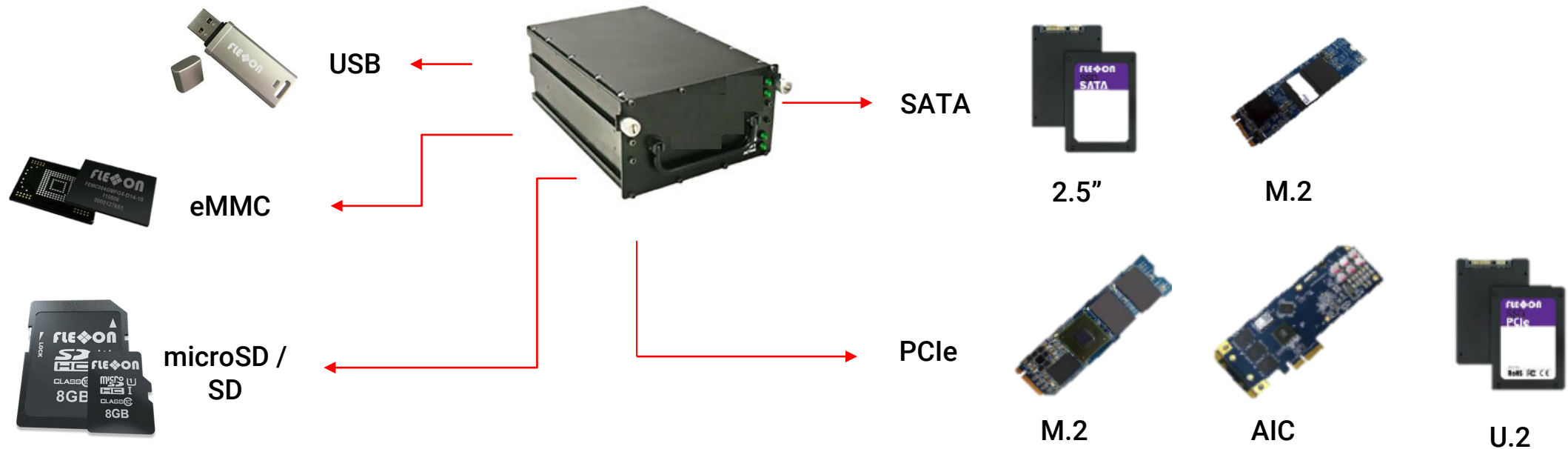
Many more...

Use Case Application – Military Aerospace

Avionics Digital Video & Data Recorder



Interface	Form Factor	Series	Flash	Capacity
SATA	2.5", M.2	XCEL	3D TLC	2TB/4TB/8TB
PCIe	M.2, AIC, U.2	HIX	3D TLC	2TB/4TB/8TB
USB 3.1	Pen Drive	FxAce	3D TLC	32GB~512GB
eMMC	eMMC	XTRA III	MLC	8GB~16GB
eMMC	eMMC	AXO	3D TLC	32GB~512GB
SD	SD/microSD	FxPrem	SLC/MLC	512MB~64GB



Use Case Application – Military Grade Computers

Military Grade Computer & Navigation Systems



Interface	Form Factor	Series	Flash	Capacity
SATA	2.5"	Galaxy	2D MLC	1TB
USB 3.1	Pen Drive	FxAce	3D TLC	32GB~512GB

Features:

- MIL-STD-810-F/G Compliant
- Secure Erase
- Physical Destruction
- Hardware PLP
- Security (AES-256 Encryption, TCG OPAL)
- Extended Customization (Temperature/Device Model)



Military Grade Computer



Military Navigation Systems



SATA
2.5"



USB

Galaxy Series Advantages:

2.5" (1TB)	Competitor	Flexxon
Sequential Read (MB/s)	570	520
Sequential Write (MB/s)	470	440
Endurance (TBW)	1180	3070
Physical Destruction	No	Yes
Secure Erase	No	Yes

Product Qualification Test

No.	Test Item	Test Reference
1	High Temperature Storage Test	IEC 60068-2-2
2	High Temperature Operation Test	IEC 60068-2-2
3	Low Temperature Storage Test	IEC 60068-2-1
4	Low Temperature Operation Test	IEC 60068-2-1
5	Temperature & Humidity Storage Test	IEC 60068-2-3
6	Temperature & Humidity Operation Test	IEC 60068-2-3
7	Temperature Cycling Operation Test	IEC 60068-2-14
8	Bending Test	FLEXXON Spec.
9	Torque Test	FLEXXON Spec.
10	Drop Test	FLEXXON Spec.
11	Vibration Test	IEC 60068-2-6
12	Mechanical Shock Test	IEC 60068-2-27
13	Durability Test	EIA 364-09/13

Flexxon PCIe SSD (HIX Series)



Industrial Diamond Grade

Support operating temperature (-40C-85C)



DRAM Solution

Stable and Consistence Performance regardless system workload



Sustained Performance

R: 2,900MB/s W: 970MB/s

Applications



Data Centre



Server



Military & Avionics system

CE & FCC Certified



- ❖ CE and FCC Test are primarily focused on electromagnetic compatibility (EMC) and **radiated emissions compliance**, which relate to how electronic devices emit electromagnetic interference (EMI) and respond to electromagnetic disturbances.

Flexxon SSD CE Certified



HIX Series

EN 55032 / CISPR 32

- ✓ Emission Test
- ✓ Measures radiated and conducted emissions

EN 55024 / CISPR 24

- ✓ Measures device's susceptibility to electromagnetic disturbances and interference from external sources.

AS/NZS CISPR 32 Class B

- ✓ Similar to the CISPR 32 test
- ✓ Specific to Australia and New Zealand markets

IMMUNITY EN 61000-3-2

- ✓ Immunity test against voltage fluctuations and flicker caused by external sources.

EN 61000-3-3

- ✓ Immunity test against voltage dips, short interruptions, and voltage variations.

Flexxon SSD FCC Certified



HIX Series

FCC CFR Title 47 Part 15 Subpart B: Section 15.107 & 15.109

- ✓ Ensures that devices do not emit excessive electromagnetic radiation

ICES-003 Issue 6: 2016 Class B

- ✓ Canadian standard EMC tests

ANSI C63.4-2014

- ✓ Measures EMI (include radiated and conducted emissions)

NAND Storage Radiation Test for Space Application

To ensure the storage devices can withstand the radiation environment of space without experiencing critical failures, there are some key radiation specifications and metrics to consider

Total Ionizing Dose (TID)

- ✓ Measure the cumulative ionizing radiation dose absorbed by a device
- ✓ measure in Gy (Grays) or rads (radiation absorbed doses)
- ✓ ASTM E1249, ESA/SCC Basic Specification No. ESCC 22900

Single Event Effects (SEE)

- ✓ Effects of a single ionizing particle hitting a device and causing a transient or permanent change.
- ✓ MIL-STD-883 Method 1019.7, ESA/SCC Basic Specification No. ESCC 23600

Neutron Radiation

- ✓ Significant concern in space environments, especially in deep space mission.
- ✓ Can cause displacement damage.
- ✓ MIL-STD-883 Method 1017.2, ESA/SCC Basic Specification No. ESCC 25100

Total Non-Ionizing Dose (TNID)

- ✓ Refer to the cumulative of non-ionizing radiation dose.
- ✓ ESA/SCC Basic Specification No. ESCC 22910

Temperature and Vacuum

- ✓ MIL-STD-883 Method 1008
- ✓ ASTM E595

NAND Storage Post-Exposure Testing

Testing to measure the effects of radiation on NAND storage:

Performance Test

- ✓ Measure read and write speeds to check for any degradation

Data Integrity Testing

- ✓ Perform read and write operations and comparing the results to the original data.

Wear-Leveling

- ✓ Check if radiation exposure accelerates wear on certain memory blocks, leading to uneven wear distribution.

Endurance Testing

- ✓ Identify how radiation exposure affects the lifespan of the NAND storage.

Uncorrectable Bit Errors

- ✓ Count the number of uncorrectable bit errors that occur during read operations. Indicates data corruption under radiation.

Flexxon eMMC (XTRA VII Series)



Automotive Grade

Up to AEC Q100 Grade 2 (-40C-105C)



Certification

CE, FCC Certified



Radiation Test

Passed the 1 Gy X-ray test



Mainstream Capacity

3D TLC: 32GB~128GB

3D pSLC: 8GB~32GB

Applications



Drone



Networking system



Military & Avionics

Flexxon eMMC Radiation Test

2. Test item

2.1 X-Ray Test

X-Ray Equipment:

- ❖ Dage Quadra 7

Test Condition(s):

- ❖ Voltage: 80 KeV
- ❖ Power: 1.5W

Specification:


- ❖ 1Gy (Top-side 0.5Gy + Back-side 0.5Gy) of medium-energy radiation

Test Result:


Order	Single Exposure	Grand Total	Result
1st	1Gy (Top-side 0.5Gy + Back-side 0.5Gy)	1GY	PASS


Flexxon Memory Card (FxAdv II Series)



 **Industrial Diamond Grade**
Support operating temperature (-40C-85C)

 **Certification**
CE, FCC Certified

 **Radiation Test**
Passed the 1 Gy X-ray test

 **High Performance**
Up to C10, U3, V30, A2

Applications



Medical Imaging
Device



Networking
System



Military &
Avionics

Flexxon Memory Card Radiation Test

3.16. X-Ray Exposure Test

Purpose:

To verify quality of the microSD card.

Test Condition(s):

- ❖ Specification: 0.1 Gy of medium-energy radiation (70keV to 140 keV, cumulative dose per year) to both sides of the card.
- ❖ DUT State: Storage
- ❖ Quantity: 5 pcs
- ❖ Equipment: Dage XD7600NT
- ❖ Laboratory Ambience: $23 \pm 3^{\circ}\text{C}$, $50\% \pm 3\%$ (RH)

Pass/Fail Criteria:

1. To ensure that no abnormalities with physical appearance are found or any electrical function failures are detected.
2. Appearance: Refer to product appearance inspection specification.
3. Electrical Function: After testing, the product needs to be burn-in 5 cycles by AP at room temperature.

Test Result:

Sample No.	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
Appearance	Pass	Pass	Pass	Pass	Pass
Function	Pass	Pass	Pass	Pass	Pass

Why Flexxon?

Long Product
Life

Fixed BOM

Industrial Grade

Special Capacity
& Customize
Memory Solution

Strong Technical
Support

Support HMLV(High-
Mixed Low Volume)

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