Industrial USB 2.0 Flash Module Specification

(FxAlp Series, SLC)

Version 1.5

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1. GENERAL DESCRIPTION

1.1. Introduction

FLEXXON's Industrial USB Flash Module (FxAlp series) is fully compatible with USB specification (USB1.1 / USB 2.0). It offers super performance & fast data transfer especially in 4K random write. Moreover, it also offers wide compatibility and high reliability, suitable for different type of applications and built-in systems in any rigorous environment.

FLE❖ON™

1.2. Product Overview

- ❖ **Flash**
  - ▪ SLC

- ❖ **Capacity**
  - ▪ 1GB up to 32GB

- ❖ **High IOPS**

- ❖ **AES 128 & 256 bits encryption engine.**

- ❖ **Conformal Coating (Anti-Dust & Anti-Moisture).**

- ❖ **Compatible with USB specification revision 1.1 and 2.0.**

- ❖ **Support Windows 2000 SP4 and Windows XP without device driver.**

- ❖ **Support Windows Vista and Windows 7 without device driver.**

- ❖ **Support MAC OS X and later without device driver (USB 1.1 speed).**

- ❖ **Support MAC OS 10.2.8 and later without device driver (USB 2.0 speed).**

- ❖ **Support Linux Kernel ver2.4.0 or above without device driver (USB 1.1 speed).**

- ❖ **Support Linux Kernel ver2.4.10 or above without device driver (USB 2.0 speed).**

- ❖ **ECC Scheme**
  - ▪ BCH ECC Engine correct up to 96 bits error in 1K Byte Data

- ❖ **No external power is required—DC 4.5V-5.5V from USB port.**

- ❖ **Transfer rate for USB interface:**
  - ▪ High speed up to 480Mbits/sec for USB 2.0
  - ▪ Full speed up to 12Mbits/sec for USB 1.1

- ❖ **Low Power Consumption**

- ❖ **Sudden Power Loss Management**

- ❖ **Dynamic, Static & Global Wear Leveling Algorithm**

- ❖ **Temperature Range**
  - ▪ Operation: -40°C ~ 85°C
  - ▪ Storage: -40°C ~ 85°C

- ❖ **RoHS Compliant**

2. PRODUCT SPECIFICATIONS

2.1. Performance

Table 2-1 Performance of FxAlp UFM

Sequential		Random	
Max. Read (MB/s)	**Max. Write (MB/s)**	**Max. Read (IOPS)**	**Max. Write (IOPS)**
31	23	2000	1000

NOTES:

1. The performance was measured using CrystalDiskMark.
2. Performance may differ according to flash configuration and platform.

2.2. Power

Table 2-2 Supply Voltage of FxAlp UFM

Parameter	Rating
Operating Voltage	5V +/-5%

Table 2-3 Power Consumption of FxAlp UFM

Capacity	Item	Power Consumption (mA)
1GB ~ 32GB	Active	<160
	Idle	<60

Unit: mA

NOTES:

1. Power Consumption may differ according to flash configuration and platform.

2.3. MTBF

MTBF, an acronym for Mean Time Between Failures, is a measure of a device's reliability. Its value represents the average time between a repair and the next failure. The predicted result of FLEXXON's FxAlp industrial UFM (USB Flash Module) is more than 2 million hours.

2.4. Data Retention

- 10 years if > 90% life remaining (@25C)
- 1 year if < 10% life remaining (@25C)

3. ENVIRONMENTAL SPECIFICATIONS

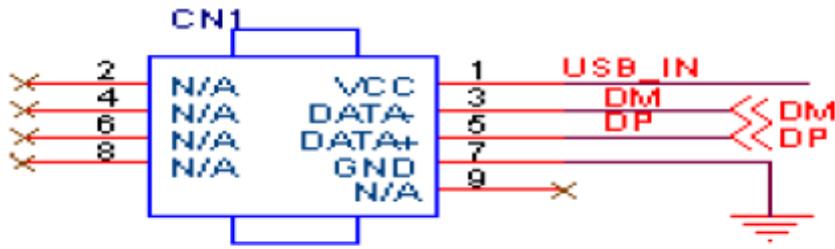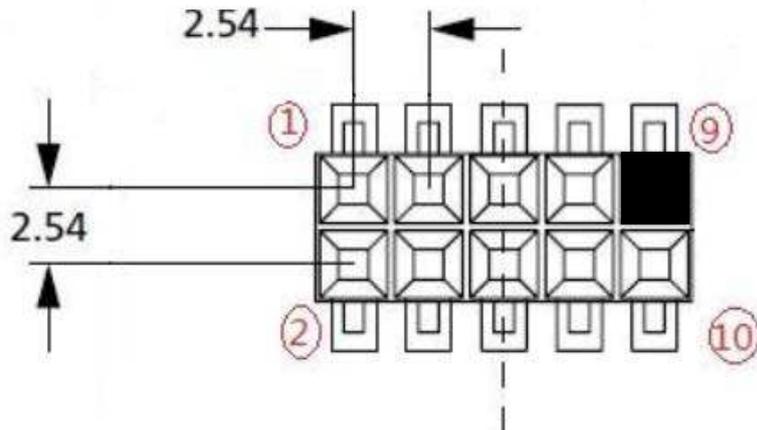| Test Items	Test Conditions
Storage Temperature	-40°C ~ 85°C
Operating Temperature	-40°C~ 85°C
Storage Humidity	55°C, 95% RH
Operating Humidity	55°C, 95% RH
Shock	1500G, Half Sin Pulse Duration 0.5ms
Vibration	80Hz ~ 2000Hz/20G, 20Hz ~ 80Hz/1.52mm, 3 axis/30min

USB Pin Header Size & Defines – 10 pins

2.54

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① ⑨

② ⑩

CN1

2	N/A	VCC	1	USB_IN
4	N/A	DATA-	3	DM
6	N/A	DATA+	5	DP
8	N/A	GND	7	
	N/A	N/A	9	

DM
DP

2X5 PEN HEAD CONNECTOR SMD

| 1 | 3 | 5 | 7 | 9 |
| 2 | 4 | 6 | 8 | 10 |
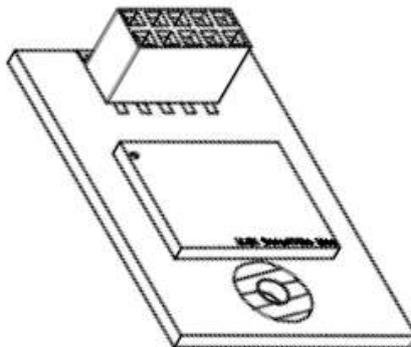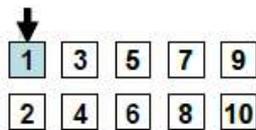
Table 4-1 FxAlp UFM Pin Header Description (Type D)

Pin	Pin Name	Pin Description
1	VCC	5.0V USB Bus Power Input
2	NC	Not Connection
3	DM	USB2.0 data in negative pin terminal
4	NC	Not Connection
5	DP	USB2.0 data in positive pin terminal
6	NC	Not Connection
7	GND	0V regulator ground reference input
8	NC	Not Connection
9	Key	Key
10	NC	Not Connection

5. PHYSICAL DIMENSION

Dimension: 36.9 (L) x 26.6 (W) x 9.6 (H) mm

6. ORDERING INFORMATION
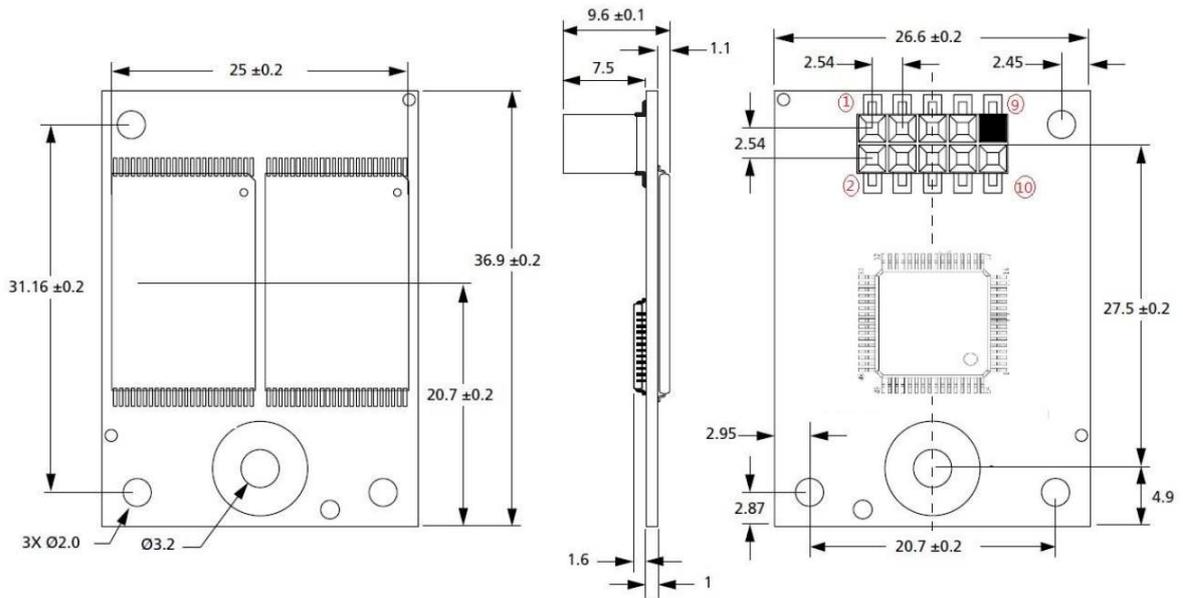
Capacity	MPN (Diamond Grade)
1GB	FUUD001GSE-H600
2GB	FUUD002GSE-H600
4GB	FUUD004GSE-H600
8GB	FUUD008GSE-H600
16GB	FUUD016GSE-H600
32GB	FUUD032GSE-H600

Revision History

Revision	Release Date	History
1.0	2019/07	First release
1.1	2019/08	Add AES & Conformal Coating. Add 1GB.
1.2	2019/09	Change Pin 9 from NC to Key
1.3	2020/04	Change Series Name from FxUH to FxAlp
1.4	2020/04	Update template
1.5	2020/05	Update spec