USB 3.1 Disk Module

Specification

(U7)

Version 0.2

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Revision History

Revision	History	Draft Date
0.1	First Release	2017.7.31
0.2	Update PN information	2019.1.16

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A. General Description

The SQF-UPD is a **removable flash disk drive** with USB connection and can support various storage capacities.

SQF-UPD supports USB 3.1 Gen 1 is also compatible with both USB 1.1 and USB 2.0 specification which is a plug and play device, simply plug it into any USB port and it will automatically get detected by the computer as a removable drive. A dedicated write protect function is also supported for making repair drive for system or for other security purpose.

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B. System Features

- **Compatible with USB specification revision 3.1, 2.0, and 1.1.**
- **Capacity available: 4GB ~ 64GB**
- **Support Windows 2000 SP4 and later 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 MAC OS 10.8 and later without device driver. (USB 3.0 speed)**
- **Support Linux Kernel ver 2.4.0 or above without device driver. (USB 1.1 speed)**
- **Support Linux Kernel ver 2.4.10 or above without device driver. (USB 2.0 speed)**
- **Hot Plug & Play.**
- **Software write protect function supported**
- **No external power is required - DC 4.5V ~ 5.5V from USB port.**
- **Transfer rate for USB interface :**
    - Super speed up to 5Gbit/sec for USB 3.1 GEN 1
    - High speed up to 480Mbits/sec for USB 2.0
    - Full speed up to 12Mbits/sec for USB 1.1
- **Low Power consumption.**
- **Acoustic noise：0 dB (at one meter)**
- **Vibration：15 G peak to peak max**
- **Operating temperature : 0℃ to 70℃**
- **Humidity : 10% to 90%**

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C. General Description

■ Bad Block Management

Bad blocks are blocks that contain one or more invalid bits of which the reliability is not guaranteed. Bad blocks may be representing when flash is shipped and may developed during life time of the device.

Advantech SQFlash UDM implement an efficient bad block management algorithm to detect the factory produced bad blocks and manages any bad blocks that may develop over the life time of the device. This process is completely transparent to the user, user will not aware of the existence of the bad blocks during operation.

■ Wear Leveling

NAND Type flash have individually erasable blocks, each of which can be put through a finite number of erase cycles before becoming unreliable. It means after certain cycles for any given block, errors can be occurred in a much higher rate compared with typical situation. Unfortunately, in the most of cases, the flash media will not been used evenly. For certain area, like file system, the data gets updated much frequently than other area. Flash media will rapidly wear out in place without any rotation.

Wear leveling attempts to work around these limitations by arranging data so that erasures and re-writes are distributed evenly across the full medium. In this way, no single sector prematurely fails due to a high concentration of program/erase cycles.

Advantech SQFlash UDM provides advanced wear leveling algorithm, which can efficiently spread out the flash usage through the whole flash media area. By implement both dynamic and static wear leveling algorithms, the life expectancy of the flash media can be improved significantly.

■ Error Detection / Correction

Advantech SQFlash UDM utilizes BCH ECC Algorithm which offers one of the most powerful ECC algorithms in the industry. Built-in EDC/ECC up to 12 random bits error per 512 bytes.

■ Sophisticate Product Management Systems

Since industrial application require much more reliable devices compare with consumer product, a more sophisticated product management system become necessary for industrial customer requirement. The key to providing reliable devices is product traceability and failure analysis system. By implement such systems end customer can expect much more reliable product.

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D. System Power Consumption

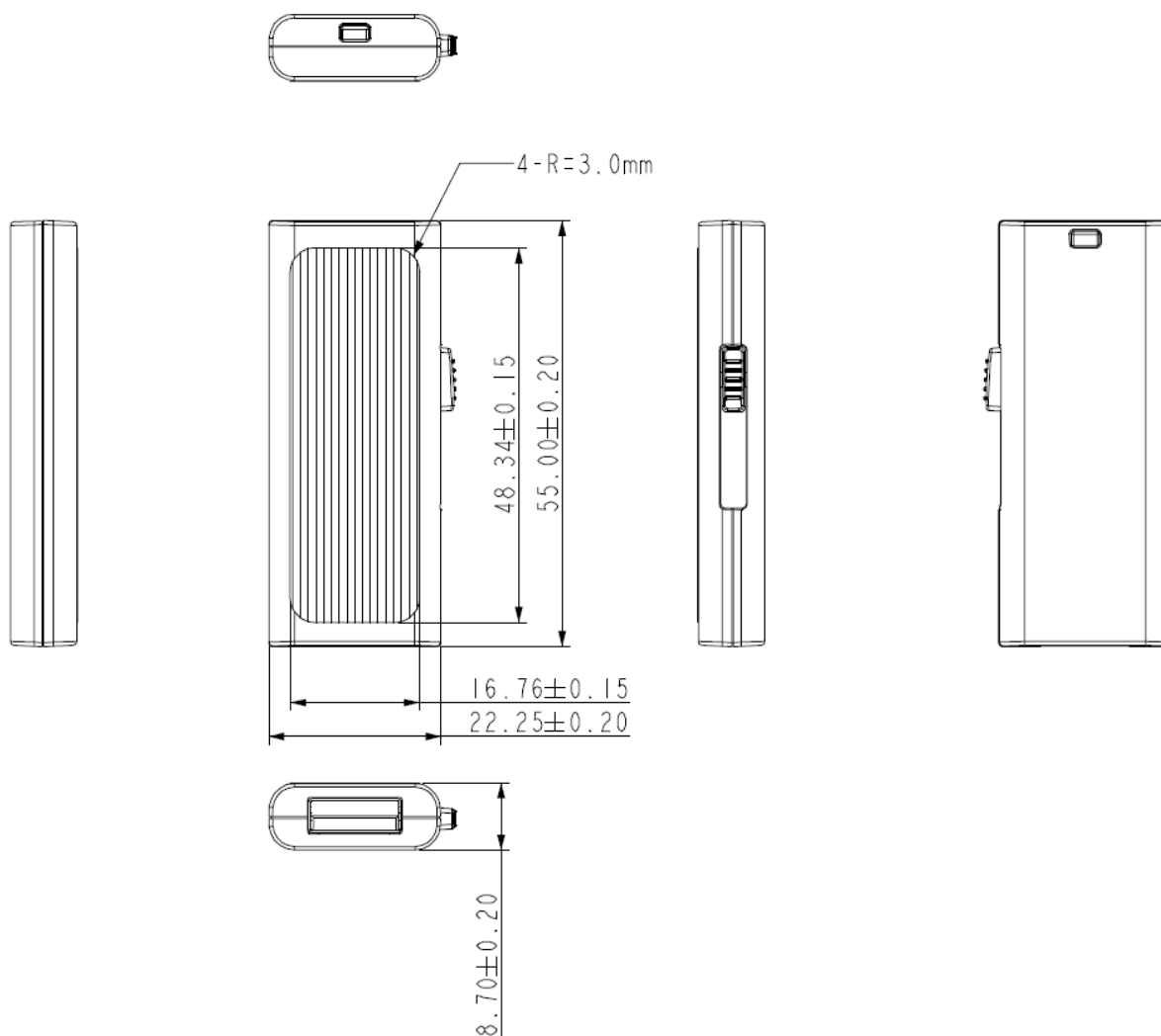| Item	Power Consumption (mA)
Normal	75
Suspend	2
Read	188
Write	190

The above values are for reference only; it may change according to the flash memory used.

E. Electrical Specifications

Absolute Maximum Rating

Parameter	Symbol	Min	Typ	MAX	Unit
Operating Temperature (Commercial)	T_a	0	+25	+70	℃
Storage Temperature (Commercial)	T_{st}	-25	+25	+85	℃
Operating Temperature (Industrial)	T_a	-40	+25	+85	℃
Storage Temperature (Industrial)	T_{st}	-50	+25	+125	℃
1.1V regulator power supply	V11 VCCK	1.04	1.12	1.20	V
1.8V regulator power supply	V18	1.74	1.86	1.98	V
3.3V Regulator Power Supply	V33 V33P	3.15	3.3	3.45	V
5.0V Regulator Power Supply	VCC5A	4.5	5.0	5.5	V

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F. Dimension (Unit: mm)

4-R=3.0mm

48.34±0.15
55.00±0.20

16.76±0.15
22.25±0.20

8.70±0.20

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Appendix A: Product Part Number Table

MLC

Product	Advantech PN
SQF USB 3.1 PEN DRIVE 4G MLC (0~70°C)	SQF-UPDM1-4G-U7C
SQF USB 3.1 PEN DRIVE 8G MLC (0~70°C)	SQF-UPDM1-8G-U7C
SQF USB 3.1 PEN DRIVE 16G MLC (0~70°C)	SQF-UPDM1-16G-U7C
SQF USB 3.1 PEN DRIVE 32G MLC (0~70°C)	SQF-UPDM2-32G-U7C
SQF USB 3.1 PEN DRIVE 64G MLC (0~70°C)	SQF-UPDM2-64G-U7C

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