

USB Drive 2ME WP

Customer:

Customer

Part Number:

Innodisk

Part Number:

Innodisk

Model Name:

Date:

Innodisk Approver	Customer Approver

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REVISION HISTORY

Revision	Description	Date
1.0	First Release	Sep, 2013
1.1	Remove the Flash endurance SPEC and modify PN rule	Jan, 2015
1.2	Add write protection (W/P) description Modify product picture and mechanical drawing for W/P feature Update specifications based on 15nm Nand Flash	Jun., 2016
1.3	Modify power requirement Update RoHS/REACH certification	Mar., 2017
1.4	Modify Product Photo and Update RoHS/REACH certification	July, 2019

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1. Product Overview

1.1 Introduction of USB Drive

The Innodisk USB Drive products provide high capacity USB flash memory storage that electrically complies with High-speed USB 2.0 interface & backward compatible with USB 1.1. The device features attractive small form factor and the connectivity over USB2.0 and the NAND flash architecture provide a faster data transmission.

1.2 Product View



Figure 1: USB Drive 2ME WP

1.3 Product Models

USB Drive 2ME WP is available in follow capacities.

- USB Drive 2ME WP 8GB
- USB Drive 2ME WP 16GB
- USB Drive 2ME WP 32GB
- USB Drive 2ME WP 64GB

1.4 Capacity

USB Drive 2ME WP provides unformatted from 8GB up to 64GB capacities within MLC Flash IC.

1.5 VID/PID

Customize VID/PID(specify 4bits for each ID, Hexadecimal(0~F)

For Option, Default is 196D/0201.

2. Theory of operation

2.1 Overview

Figure 2 shows the operation of USB Drive 2ME from the system level, including the major hardware blocks.

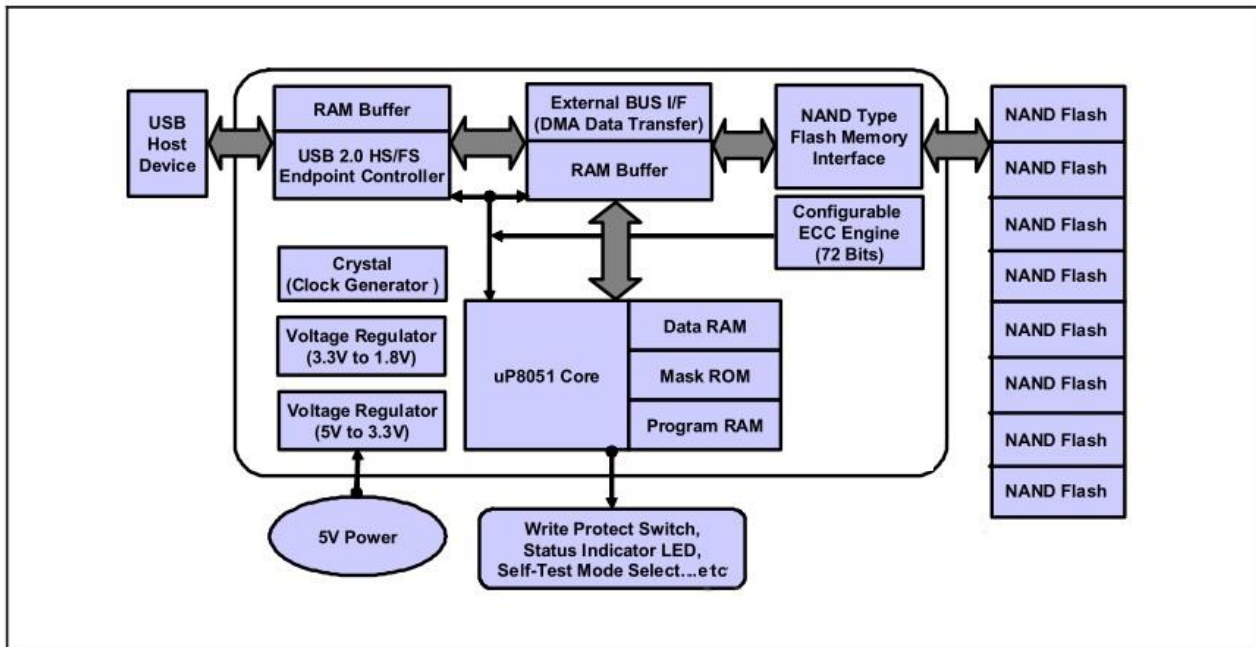


Figure 2: USB Drive 2ME Block Diagram

USB Drive 2ME integrates a USB2.0 controller and NAND flash memories. Communication with the host occurs through the host interface. Communication with the flash device(s) occurs through the flash interface.

2.2 Error Detection and Correction

Highly sophisticated Error Correction Code algorithms are implemented. The ECC unit consists of the Parity Unit (parity-byte generation) and the Syndrome Unit (syndrome-byte computation). This unit implements an algorithm that can correct 72 bits per 1024 bytes in an ECC block. Code-byte generation during write operations, as well as error detection during read operation, is implemented on the fly without any speed penalties.

2.3 Wear-Leveling

Flash memory can be erased within a limited number of times. This number is called the *erase cycle limit* or *write endurance limit* and is defined by the flash array vendor. The erase cycle limit applies to each individual erase block in the flash device.

USB Drive 2ME uses a static wear-leveling algorithm to ensure that consecutive writes of a specific sector are not written physically to the same page/block in the flash. This spreads flash media usage evenly across all pages, thereby extending flash lifetime.

2.4 Bad Blocks Management

Bad Blocks are blocks that contain one or more invalid bits whose reliability are not guaranteed. The Bad Blocks may be presented while the SSD is shipped, or may generate during the life time of the SSD. When the Bad Blocks is detected, it will be flagged, and not be used anymore. The SSD implement Bad Blocks management and replacement, Error Correct Code to avoid data error occurred. The functions will be enabled automatically to transfer data from Bad Blocks to spare blocks, and correct error bit. After the reserved block less than 40, the SSD will be locked, and cannot be written anymore.

3. Specifications

3.1 CE and FCC Compatibility

USB Drive 2ME conforms to CE and FCC requirements.

3.2 RoHS Compliance

USB Drive 2ME is fully compliant with RoHS directive.

3.3 Environmental Specifications

3.3.1 Temperature Ranges

Operating Temperature Range:

- Standard Grade: 0°C ~ +70°C
- Industrial Grade: -40°C ~ +85°C

Storage Temperature Range:

- Standard Grade: -55°C to +95°C

3.3.2 Humidity

Relative Humidity: 10-95%, non-condensing

3.3.3 Shock and Vibration

Reliability	Test Conditions	Reference Standards
Vibration	7 Hz to 2K Hz, 20G, 3 axes	IEC 68-2-6
Mechanical Shock	Duration: 0.5ms, 1500G, 3 axes	IEC 68-2-27

Table 1: Shock/Vibration Testing for USB Drive 2ME

3.3.4 Mean Time between Failures (MTBF)

Table 2 summarizes the MTBF prediction results for various USB Drive 2ME configurations. The analysis

was performed using a RAM Commander™ failure rate prediction.

- Failure Rate: The total number of failures within an item population, divided by the total number of life units expended by that population, during a particular measurement interval under stated condition.
- Mean Time between Failures (MTBF): A basic measure of reliability for repairable items: The mean number of life units during which all parts of the item perform within their specified limits, during a particular measurement interval under stated conditions.

Product	Condition	MTBF (Hours)
USB Drive 2ME	Telcordia SR-332 GB, 25°C	>3,000,000

Table 2: USB Drive 2ME MTBF

3.3.5 Terabyte Written (TBW)

Parameter	Value
TBW(Sequential Write)	
08GB	21.6
16GB	43.2
32GB	86.4
64GB	172.8

Table 3: USB Drive 2ME TBW

3.4 Golden finger

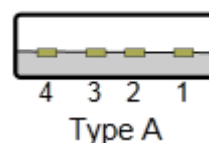
30μ"

3.5 Pin Assignment

USB Drive 2ME is designed within USB2.0 Interface. Particularly, its built-in power pin enables the device more compactable. Table 3 demonstrates USB Drive 2ME pin assignments.

Pin No.	Name	Description
1	VBUS	+5V
2	D-	Data -
3	D+	Data +
4	GND	Ground

Table 4: USB Drive 2ME Pin Assignment



3.6 Mechanical Dimensions

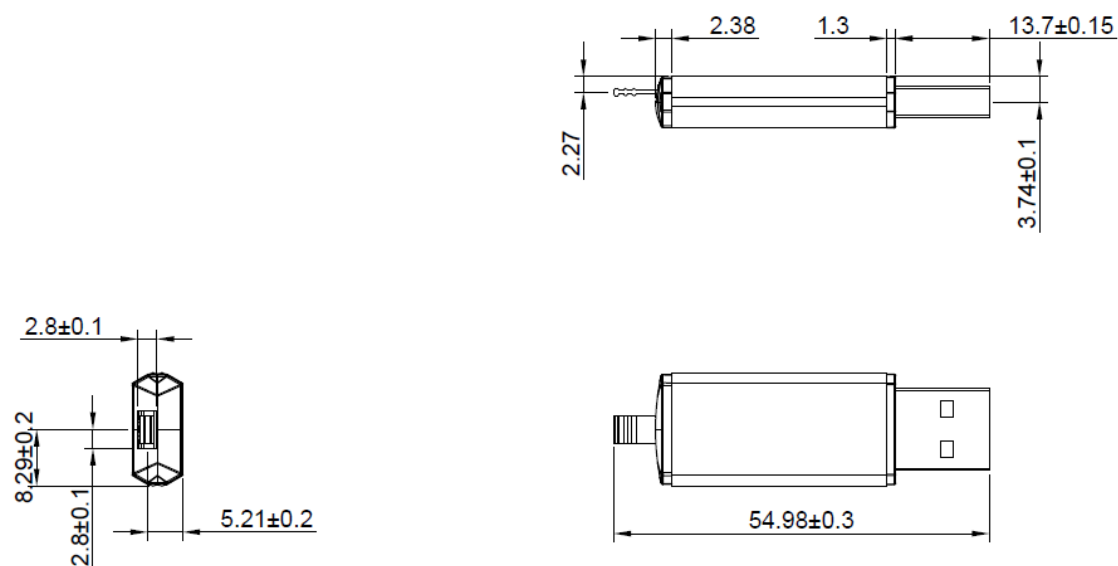


Figure 3: USB Drive 2ME WP mechanical dimensions

3.7 Weight

10g±2

3.8 Performance

Product name		8GB	16GB	32GB	64GB
USB Drive 2ME (Max.)	Sequential Read	25 MB/S	25 MB/S	25 MB/S	25 MB/s
	Sequential Write	17 MB/S	17 MB/S	17 MB/S	17 MB/s

3.9 Write Protection function

USB Drive 2ME WP provides hardware write-protection (W/P) function that could prevent the device from modification and deletion. Write-protection function is enabled through plugging out W/P Jumper, making write-protected data to be read only, that is, users could not write to it, edit it, append data to it, or delete it. On the contrary, user could insert W/P jumper to disabled write protection function to write, edit or delete data.

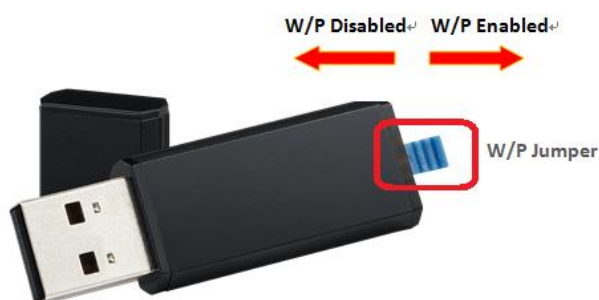


Figure 4: USB Drive 2ME WP mechanical dimensions

3.10 NAND Flash Memory

USB Drive 2ME uses Multi Level Cell (MLC) NAND flash memory, which is non-volatility, high reliability.

4. Electrical Specifications

4.1 Power Requirement

Item	Symbol	Rating	Unit
Input voltage	V _{IN}	+5 DC +- 5%	V

Table 5: USB Drive 2ME WP Power Requirement

4.2 Power Consumption

Mode	Power Consumption
Read	184 mA (max.)
Write	188 mA (max.)
Idle	91 mA (max.)
The power consumption is based on 64GB Model.	

Table 6: USB Drive 2ME WP Power Consumption

4.4 Device Parameters

USB Drive device parameters listed in Table 7.

Capacity	LBA	User capacity (MB)
8GB	15810560	7720
16GB	31653888	15456
32GB	63373312	30944
64GB	126812160	61920

Table 7: Device parameters

5. Part Number Rule

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	D	E	U	A	1	-	0	8	G	I	7	2	B	C	2	S	C			
Description	Disk	Form Factor				-	Capacity			Category			Flash mode	Operation Temp.	PCB Version	Channel	Flash		Customized Code	
Definition																				
Code 1 st (Disk)										Code 14 th (Operation Temperature)										
D: Disk										C: Standard Grade (0℃ ~ +70℃)										
Code 2 nd ~ 5 th (Form Factor)										W: Industrial Grade (-40℃ ~ +85℃)										
EUA1: USB Drive										Code 15 th (PCB Version)										
Code 7 th ~9 th (Capacity)										1: Standard Version										
08G: 8GB 16G: 16GB										2: with W/P switch design										
32G: 32GB 64G: 64GB										Code 16 th (Channel)										
Code 10 th ~12 th (Category)										S: Single										
I72: USB 2.0 Series										Code 17 th (Flash)										
Code 13 th (Flash mode)										C: Toshiba MLC										
B: Sync. Flash (15nm)																				

6. Appendix

RoHS

innodisk

宜鼎國際股份有限公司
Innodisk Corporation

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Tel:(02)7703-3000 Fax:(02) 7703-3555 Internet: <http://www.innodisk.com/>

RoHS 自我宣告書 (RoHS Declaration of Conformity)

Manufacturer Product: All Innodisk EP products

- 一、 宜鼎國際股份有限公司（以下稱本公司）特此保證售予貴公司之所有產品，皆符合歐盟 2011/65/EU 及 (EU) 2015/863 關於 RoHS 之規範要求。

Innodisk Corporation declares that all products sold to the company, are complied with European Union RoHS Directive (2011/65/EU) and (EU) 2015/863 requirement.

- 二、 本公司同意因本保證書或與本保證書相關事宜有所爭議時，雙方宜友好協商，達成協議。

Innodisk Corporation agrees that both parties shall settle any dispute arising from or in connection with this Declaration of Conformity by friendly negotiations.

Name of hazardous substance	Limited of RoHS ppm (mg/kg)
鉛 (Pb)	< 1000 ppm
汞 (Hg)	< 1000 ppm
鎘 (Cd)	< 100 ppm
六價鉻 (Cr 6+)	< 1000 ppm
多溴聯苯 (PBBs)	< 1000 ppm
多溴二苯醚 (PBDEs)	< 1000 ppm
鄰苯二甲酸二(2-乙基己基)酯 (DEHP)	< 1000 ppm
鄰苯二甲酸丁酯苯甲酯 (BBP)	< 1000 ppm
鄰苯二甲酸二丁酯 (DBP)	< 1000 ppm
鄰苯二甲酸二異丁酯 (DIBP)	< 1000 ppm

立 保 證 書 人 (Guarantor)

Company name 公司名稱： Innodisk Corporation 宜鼎國際股份有限公司

Company Representative 公司代表人： Randy Chien 賴川騰

Company Representative Title 公司代表人職稱： Chairman 董事長

Date 日期： 2018 / 07 / 01



REACH



宜鼎國際股份有限公司 Innodisk Corporation REACH Declaration

Tel:(02)7703-3000 Fax:(02) 7703-3555 Internet: <http://www.innodisk.com/>

We hereby confirm that the product(s) delivered to

Innodisk P/N	Description
All Innodisk EM FLASH Products	

- ☐ contain(s) no hazardous substances or constituents exceeding the defined threshold 0.1 % by weight in homogenous material if not otherwise specified, as described in the candidate list table currently including 201 substances and shown on the ECHA website (<http://echa.europa.eu/de/candidate-list-table>).
- ☒ contain(s) one or more hazardous substances or constituents exceeding 0.1 % by weight in homogenous material if not otherwise specified in candidate list table. Where the threshold value is exceeded, the substances in question are to be declared in accompanying Appendix A.
- ☒ Comply with REACH Annex XVII.

Guarantor

Company name 公司名稱: Innodisk Corporation 宜鼎國際股份有限公司

Company Representative 公司代表人: Randy Chien 簡川勝

Company Representative Title 公司代表人職稱: Chairman 董事長

Date 日期: 2019 / 07 / 24

Verification of Compliance

Product Name : USB Drive 2ME/2SE
Model Number : DEUA1-XXXI72 # % ※ & *
XXX : 512MB~16GB
: Flash Mode
% : Temperature (C : Commercial Temp W : Industrial Temp,
E : Extended Temp)
※ : PCB Version (A, B, C, ... or 1, 2, 3, ...)
& : Channel (S : Single, D : Dual)
* : Flash Vendor (T : Micron SLC, S : Samsung SLC, N : Micron MLC,
B : Toshiba SLC, C : Toshiba MLC)
Applicant : InnoDisk Corporation
Address : 9F, No.100, Sec. 1, Xintai 5th Rd., Xizhi Dist., New Taipei City 221,
Taiwan
Report Number : O22-U070-1302-270
Issue Date : April 16, 2013
Applicable Standards : EN 55022:2010 Class B ITE
AS/NZS CISPR22:2009 Class B ITE
EN 55024:2010
EN 61000-4-2:2009
EN 61000-4-3:2006+A1:2008+A2:2010
EN 61000-4-4:2004+A1:2010

Based on the EMC Directive 2004/108/EC and the specifications of the customer, one sample of the designated product has been tested in our laboratory and found to be in compliance with the EMC standards cited above.



TAF 0905
FCC CAB Code TW1153
NVLAP Lab Code 100575-0
IC Code 4699A
VCCI Accept. No. B-1327, C-1609, T-1441, G-18,
C-4400, T-1334, G-614



Central Research Technology Co.
EMC Test Laboratory
11, Lane 41, Fushuen St., Jungshan Chiu,
Taipei, Taiwan, 104, R.O.C.
Tel : 886-2-25984568
Fax : 886-2-25984546

(Tsun-Yu Shih/ General Manager)

Date: April 16, 2013

Verification of Compliance

Product Name : USB Drive 2ME/2SE
Model Number : DEUA1-XXXI72 # % ※ & *
XXX : 512MB~16GB
: Flash Mode
% : Temperature (C : Commercial Temp W : Industrial Temp,
E : Extended Temp)
※ : PCB Version (A, B, C, ... or 1, 2, 3, ...)
& : Channel (S : Single, D : Dual)
* : Flash Vendor (T : Micron SLC, S : Samsung SLC, N : Micron MLC,
B : Toshiba SLC, C : Toshiba MLC)
Applicant : InnoDisk Corporation
Address : 9F, No.100, Sec. 1, Xintai 5th Rd., Xizhi Dist., New Taipei City 221,
Taiwan
Report Number : F-U070-1302-270
Issue Date : April 16, 2013
Applicable Standards : FCC Part 15, Subpart B Class B ITE
ANSI C63.4:2009
Industry Canada ICES-003 Issue 5
CSA-IEC CISPR22-10 Class B ITE

One sample of the designated product has been tested in our laboratory and found to be in compliance with the FCC rules cited above.



NVLAP LAB CODE 200575-0

TAF 0905

FCC CAB Code TW1053

IC Code 4699A

VCCI Accp. No. R-1527, C-1609, T-1441, G-110,
C-4480, T-1334, G-614



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Tel : 886-2-25084568
Fax: 886-2-25084546

(Tsun-Yu Shih General Manager)

Date: April 16, 2013